IMPACT

Minnesota Technical Assistance Program

2017 Annual Report

Strengthening Minnesota businesses by improving efficiency while saving money through energy, water, and waste reduction

MnTAP

University of Minnesota
Driven to Discover℠

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, School of Public Health, Division of Environmental Health Sciences. 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.

Pollution prevention technical assistance is tailored to individual businesses through a number of services, including site visits, student internship, the Minnesota Materials Exchange, facilitated teams, workshops and industry specific website resources. Since MnTAP's inception in 1984, staff members have conducted over 3,900 site visits in all parts of the state and have developed creative solutions to help Minnesota businesses save $48 million in first-year savings through conservation and avoided regulatory costs. MnTAP services help businesses avoid regulatory burdens, reduce their impact on the environment, be better neighbors, and reinvest savings in improvements, expansions and new jobs. MnTAP strengthens businesses, supports local economies, preserves Minnesota's natural environment and promotes regional public health.

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, which totaled 31 percent of the FY2017 budget.

MnTAP Staff Members

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2017 MnTAP Staff

Back row, left to right: Mick Jost, Matt Domski, Jon Vanyo, Paul Pagel, Frank Strakan, Nathan Landwher, Karl DeWahl

Front row, left to right: Carol Wiebe, AJ Van den Berghe, Peggy Bradley, Jane Paulson, Michelle Gage, Laura Babcock, Alaina Ryberg

SCHOOL OF PUBLIC HEALTH
UNIVERSITY OF MINNESOTA

Technical Assistance Delivered Across Minnesota

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Director's Note

Over the course of 2017, MnTAP continued to deliver high quality technical assistance to industrial facilities across Minnesota. In 2017, **226 businesses** across the state received assistance from MnTAP engineers and scientists; **71 facilities have implemented 116 MnTAP recommended process changes** and realized reductions totaling nearly **60 million gallons of water, 754,000 pounds of waste, 3.0 million kWh and 192,000 therms of energy.** Combined, these reductions are saving companies **$1.13 million annually.**

Highlights of MnTAP's efforts in 2017 include:

- Provided assistance to 14 auto repair shops in the Phillips Communities of Minneapolis to eliminate release of nearly 850 lbs of volatile organic compounds (VOCs)
- Completed 11 wastewater treatment energy audits and identified 5.5 million kWh of energy efficiency opportunity with 79% implemented or planned at the end of the three year grant
- Launched a weekly newsletter highlighting items available on the Minnesota Materials Exchange resulting in 77 successful exchanges for a total of 50,000 pounds saved from landfill

MnTAP continues to contribute to Minnesota's economic well-being by reducing waste at the source and training the next generation of engineers through the MnTAP Intern Program, with the fundamental goal of improving public health and the environment. Throughout this report are stories celebrating 2017 successes from businesses and organizations that call Minnesota home. The companies implementing these changes are positively impacting their environmental footprint and their profitability. This is good business for Minnesota.

We thank our clients, partner organizations and sponsors for the opportunity to work with them in 2017, and we look forward to serving YOUR business in 2018.

Laura Babcock
Director, Minnesota Technical Assistance Program

Links to MPCA's Strategic Plan

Water

- Reduce chloride (salt) entering surface waters and groundwater
- Accelerate prioritized and targeted reductions in nutrient pollution by integrating strategies with local watersheds
- Achieve wastewater pollutant reduction goals and maximize cost effectiveness of public infrastructure investment

Land

- Reduce food waste from households and businesses by generating less and rescuing and recycling more
- Identify and address emerging risks by completing assessment of backlogged contaminated sites
- Prevent and reduce risks to groundwater from unlined construction and demolition landfills

Air

- Improve air quality in population centers
- Offset excessive emissions and advance diesel reductions via the Volkswagen settlement
- Reduce air permitting backlog
- Reduce Minnesota's greenhouse gas emissions from transportation

Cross Agency

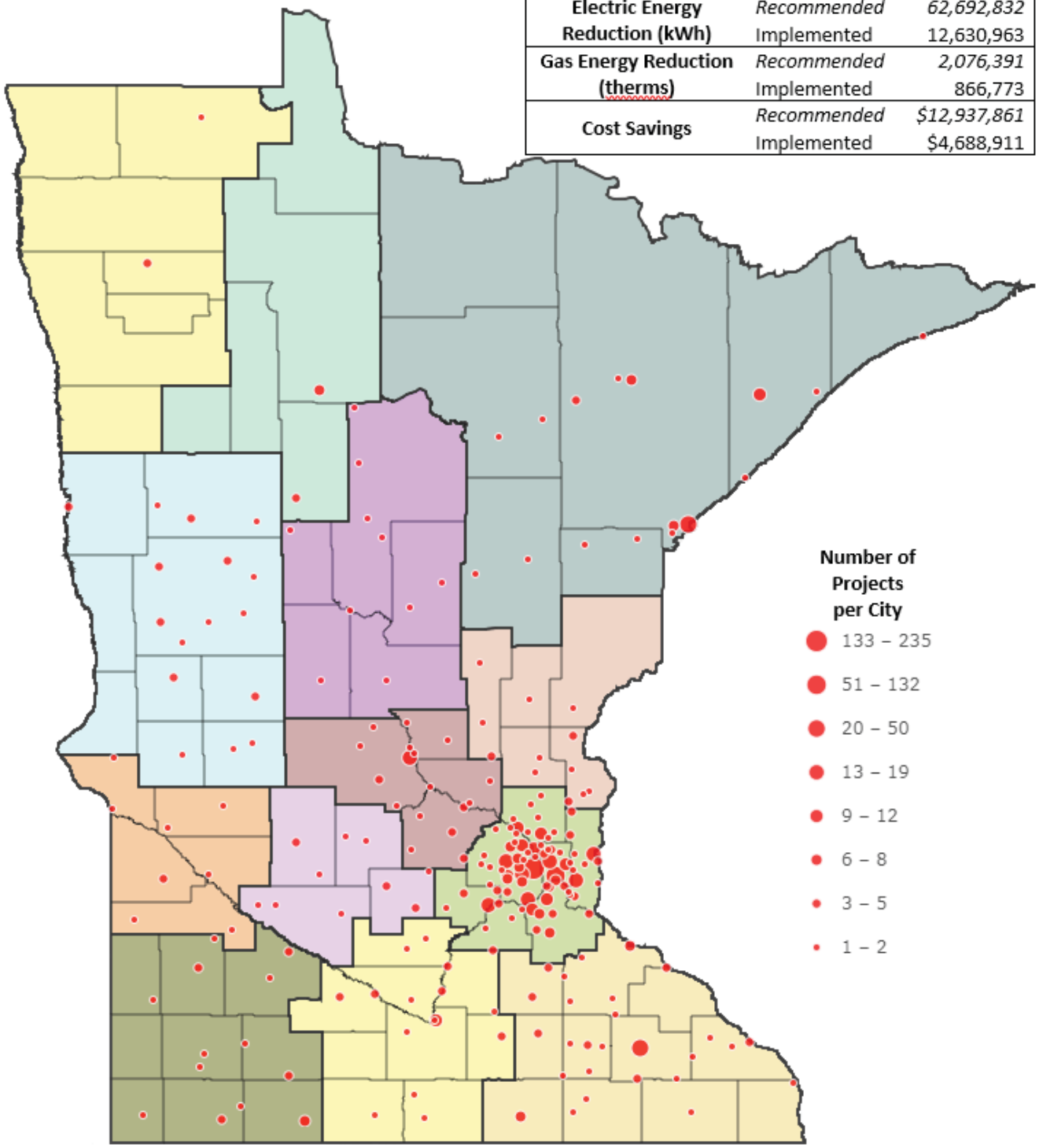
- Incorporate strategies to address environmental justice concerns in all programs
- Increase involvement of communities in decisions and actions that affect them
- Act on opportunities to increase resilience of communities and the environment to climate change impacts

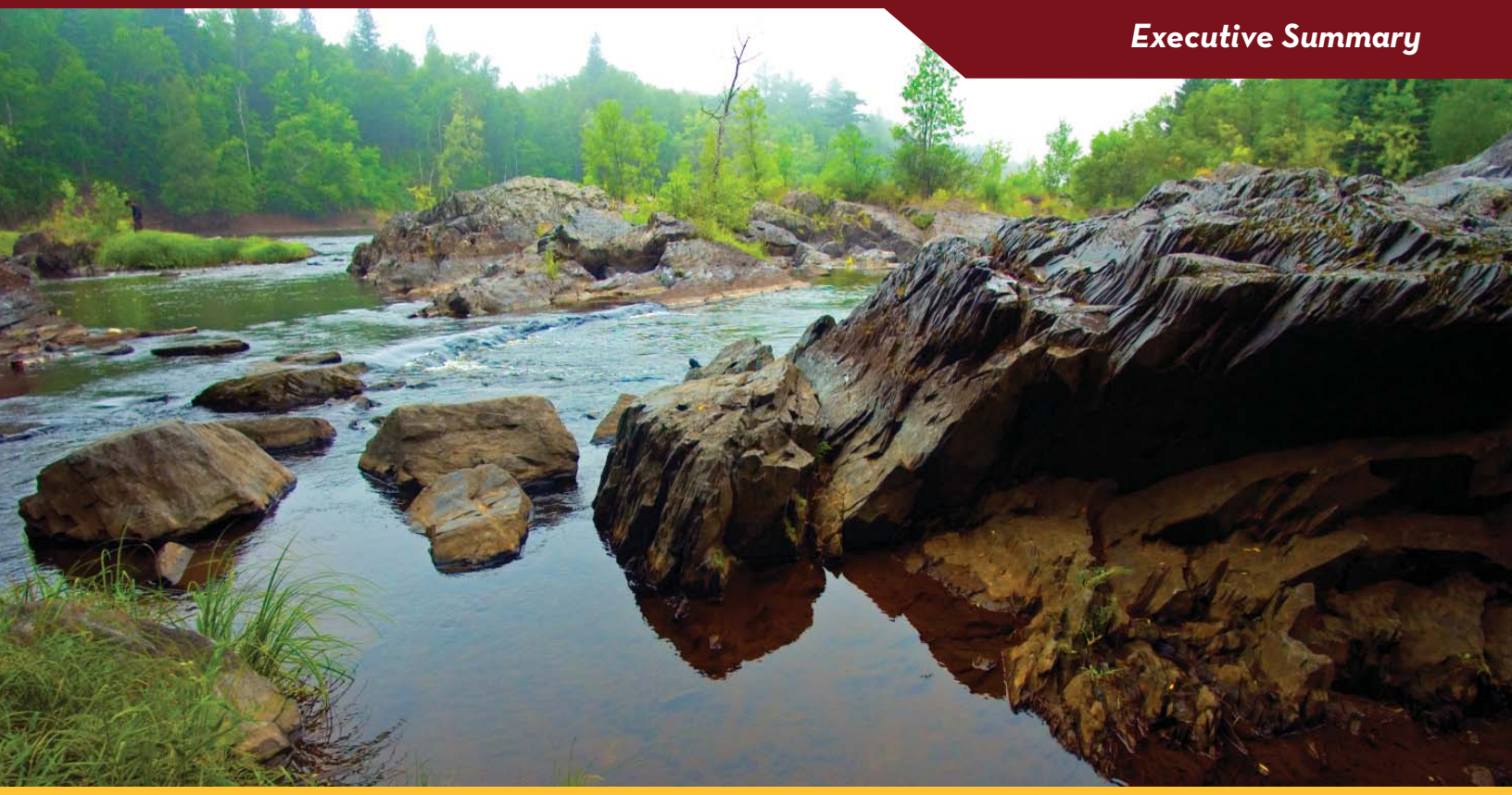
MnTAP Contributes to Minnesota's Economic Well-Being

MnTAP Impacts for Minnesota

2013-2017

MnTAP Impacts		
Number of Companies		896
Number of Projects		1,270
Waste Reduction (lbs)	*Recommended*	*15,259,658*
	Implemented	2,470,825
Water Reduction (gal)	*Recommended*	*638,035,091*
	Implemented	190,663,885
Electric Energy Reduction (kWh)	*Recommended*	*62,692,832*
	Implemented	12,630,963
Gas Energy Reduction (therms)	*Recommended*	*2,076,391*
	Implemented	866,773
Cost Savings	*Recommended*	*$12,937,861*
	Implemented	$4,688,911





2017 Outcomes

Activity	Waste			Energy		Water	Savings
	Air Emissions (lbs)	Hazardous Waste (lbs)	Non-Hazardous/ Solid Waste (lbs)	Electric (kWh)	Gas (therms)	(Gallons)	
Site Visits	15,300	300,000	1,200	1.5 million	---	31.8 million	$290,000
Interns	4,400	39,300	343,800	1.5 million	192,000	28.1 million	$807,000
Materials Exchange	---	---	50,000	---	---	---	$35,000
TOTALS	**754,000**			**3 million**	**192,000**	**59.9 million**	**$1,132,000**

2017 Outputs

Technical Assistance Activity	2015 Results	2016 Results	2017 Results
Contacts (calls/emails/meetings)	830	611	599
Requests for Assistance	96	109	41
Total Staff Site Visits (unique facilities)	144 (90)	158 (97)	113 (69)
Student Interns	13	14	17
Materials Exchanges	27	27	77
Events and Presentations	70	45	56
Publications	--	14	45
MnTAP Website Unique Visitors	37,009	39,302	65,400

On-Site Assistance

2017 Outputs

113 site visits

69 unique facilities

41 requests for assistance

2017 Outcomes

754,000 lbs waste

60 million gal water

3.0 million kWh

192,000 therms

$1,132,000 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, *Pollution Prevention Coordinator, MPCA*

2017 Goals

Conduct 5,000 site visit hours at 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.

2017 Accomplishments

During site visits, MnTAP staff members analyze the current production situation, research possible alternatives for hazardous material reduction, and complete a report with specific recommendations to the organization for material, water and/or energy utilization improvement.

MnTAP staff made **223 recommendations** with a value of **$2.1 million** for resource conservation at Minnesota businesses in 2017 from all onsite services. Of the recommendations made during 2017 engagements, 59 have been implemented in the same year.

2017 Environmental Recommendations

Recommendation Area	Proposed Reduction	Actual Reduction	First Year Implementation
Water Use gal/yr	323,400,000	38,100,000	12%
Energy kWh/yr	2,000,000	1,300,000	65%
Energy therms/yr	160,000	68,000	42%
Air Emissions lbs/yr	4,600	1,400	30%
Hazardous Material/Waste lbs/yr	187,000	30,500	16%
Non-Hazardous Material/Solid Waste lbs/yr	4,700,000	146,000	3%
Savings $/yr	**$2,100,000**	**$419,000**	**20%**

Triple Region Pollution Prevention Roundtable

The 2017 Triple Region Roundtable for EPA Region 5, 7, 8 was held in Minneapolis from May 2-4, 2017. MnTAP assisted in planning the meeting, supporting local logistics, promoting the event to the Minnesota community and providing meeting content. Fifty-five pollution prevention specialists from 11 states and the District of Columbia were present to share program ideas/results, learn about new P2 tools and explore options and opportunities for future activities and collaborations. MnTAP staff conducted training on P2 techniques and presented results from our projects identifying safer degreasing alternatives.

A summary of the meeting presentations is posted - http://www.glrppr.org/meetings/Minneapolis2017/index.cfm

On-Site Assistance: Intern Program

2017 Outputs

17 intern projects serving 31 companies

27 company applications

157 student applications

What they said...

"MnTAP allowed us to work on a project that we did not have the resources to focus on. Our intern arrived at comprehensive, cost effective solutions. I would recommend MnTAP to anyone looking for support with environmental initiatives...there are many opportunities to benefit not only the environment, but also the business."

~ Nick Bergman, Electric Machinery Company

Funding Partners

Minnesota Pollution Control Agency

Center for Energy and Environment

Metropolitan Council Environmental Services

Southern Minnesota Municipal Power Agency

U. S. Environmental Protection Agency

MN Department of Commerce, Division of Energy Resources

Xcel Energy

Connexus Energy

Washington County

East Central Energy

Minnesota Energy Resources

Franklin Energy

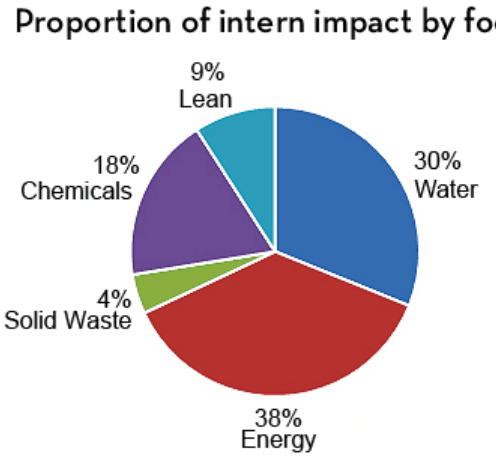
2017 Accomplishments

MnTAP guided 17 intern projects in 2017 - the most ever in a single season of the program.

MnTAP interns come from a variety of disciplines. In 2017, chemical, aerospace, electrical, environmental and geological engineering, as well as environmental science and policy management were represented. While most interns came from the University of Minnesota – Twin Cities, three came from the Duluth campus, two from the University of Wisconsin – Madison, and two were from St. Louis (Washington University and University of St. Louis).

This summer's projects focused on water conservation, energy efficiency, as well as solid and chemical waste reduction and lean manufacturing as shown in the chart at right.

Read more about MnTAP's intern projects in our annual program summary, *Solutions*: http://z.umn.edu/Solutions-2017



Focus-Specific savings from recommendations of 2017 interns.

2017 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)		
2013	--	--	775,000	1.4 million	182,000	24.8 million	$512,000
2014	--	53,170	50,100	3.2 million	440,000	1.39 million	$648,000
2015	--	98,500	156,100	2.0 million	238,000	15 million	$673,000
2016	--	6,000	548,000	898,000	28,700	44.2 million	$478,000
2017	**4,400**	**39,300**	**344,000**	**1.5 million**	**192,000**	**28.1 million**	**$807,000**

*Implementation reported in listed year for intern projects from all prior years

Partner Highlight: Center for Energy and Environment

MnTAP has partnered with the Center for Energy and Environment (CEE) for two years to help small businesses save energy. Through CEE's Energy Intelligence (EI) Program MnTAP interns have assessed eight small businesses around the Twin Cities metro. Participating businesses varied; from a bakery, to an epoxy manufacturer, to a small brewing operation, and more. **Recommendations for all eight businesses amount to nearly 2.2 million kWh and almost $300,000 in savings**. MnTAP looks forward to continuing this partnership with CEE in 2018.

Minnesota Materials Exchange

2017 Outputs

115 New organizations/ companies

260 Listings

77 Successful exchanges

473 New users

41,200 Unique visitors

19 MME newsletters

8 Publication/promotions

3 Promotional events

2017 Outcomes

50,000 lbs waste diverted

What they said...

"MME has been incredibly helpful sourcing new uses for Science Museum exhibit components. With the exchanges help we were able to find new homes for some awesome stuff without it costing me or my crew any time or logistical support."

-- Ethan Lebovics, Science Museum of Minnesota

2017 Overview

The Minnesota Materials Exchange (MME) is a website that links organizations that have reusable goods they no longer need to others who can use them. This no cost reuse network helps prevent usable materials from becoming waste and saves users money.

In June of 2017, MnTAP began sending weekly Materials Exchange Newsletters to MME users. The purpose was to increase awareness of the service, increase usage and website traffic. Each newsletter featured new listings, practical advice on improving reuse practices, and other reuse related content. Since the first newsletter was sent, average monthly usage and growth has increased:

- 40% more new users
- 170% more new organizations
- 230% more website traffic (unique visitors)
- 20% more listings
- 220% increase in monthly exchanges
- 60% more waste diversion

2017 Exchanges

Almost 50,000 lbs of waste was diverted from landfills via exchanges, with the most weight in furniture, followed by miscellaneous raw materials and goods. The amount diverted from each of the top 5 exchange categories is shown below:

1. Furniture - 31,000 lbs
2. Misc. Raw Materials - 1,200 lbs
3. Misc. Goods - 2,800 lbs
4. Computers & Office Equipment - 2,600 lbs
5. Office Supplies - 1,300 lbs

To view or list items for exchange at: http://www.mnexchange.org

Science Museum of Minnesota

Minnesota Materials Exchange Successes

During 2017, the Science Museum of Minnesota decided to clear out some of their left-over inventory from various decommissioned exhibits. Over time these various items had lost their apparent value but were still usable and in good shape. They didn't want to throw them in a dumpster and previous efforts to donate them were too time consuming. Enter the Minnesota Materials Exchange!

Through the web site and direct sourcing, the exchange was able to find new homes for nine glass display cases (total weight 1,350 lbs) and snap-together Mila wall sections (combined 2,400 lbs) without costing SMM any time, money, or logistical support.

General Outreach & Communications

2017 Outputs

11 MnTAP e-newsletters

8,000 online subscribers

2 printed *Source* publications

400 tweets

1 *Solutions* intern program magazine

1 *Solutions* water issue

8 events co-hosted by MnTAP

38 presentations

3 training events

4 booth events

3 webinars

2017 Outcomes

20% open rate of email news

360 unique visits to Twitter account

46 external publication highlights

30 externally placed articles

3 awards received

2017 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.

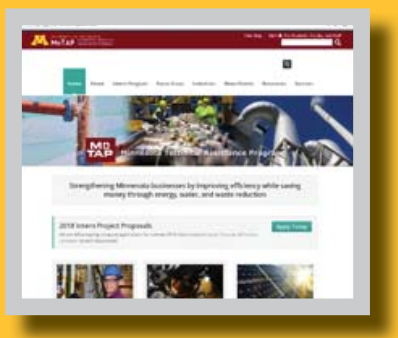
2017 Accomplishments

Communication methods included electronic newsletters, targeted email campaigns, project-specific printed materials and webinars. Highlights include:

- MnTAP launched a new website at the end of September.
- Two Source newsletters were sent to 4,000 people
  - Increasing productivity and reducing pollution through the "Lean" principle
  - Energy efficiency at wastewater treatment plants around the state
- The MnTAP Intern Program was highlighted in the U of MN Alumni "Legacy" magazine, reaching over 477,000 alumni
  - "*Fresh Perspectives*" article: http://legacy.umn.edu/stories/fresh-perspectives
  - Published on College of Food, Agriculture and Natural Resource's website: https://www.cfans.umn.edu/alumni-friends/ways-to-connect/cfans-connections/june-2017/mntaplandwehr-june17
- MnTAP was one of Finance & Commerce Progress Minnesota 2017 honorees
  - https://finance-commerce.com/2017/04/progress-mn-minnesota-technical-assistance-program/
- Director Laura Babcock was honored as one of 2017's Minnesota Women in Energy.
  - https://www.cleanenergyresourceteams.org/blog-series/women-in-energy
- MnTAP staff presented at 38 events ranging from the MWOA 41st Annual Conference to the Sustainable Manufacturing Principles & Practices class at the University of Minnesota

2017 Online Audience

- The MnTAP website had 32,585 new users, most arriving via an organic search for "technical assistance." In total, our web site was had over 65,400 unique page views This is up from 39,302 in 2016.
- Users are spending more time on the site, often up to 4:00 minutes (this is considered a high rate of time), and viewing at least 2 pages per visit (this is considered an average amount).
- Over 40,000 users came to the web site through social media such as Twitter and LinkedIn.



Upgrades to MnTAP website: easier to find information and publications

Part of recent upgrades to MnTAP's website was to provide visitors an easy way to access information and to establish the site as a resource or those looking to learn more about pollution prevention, energy and water efficiency, and saving money by working more efficiently.

The new database provides for a more dynamic experience for the user, allowing an easier way to access the more than 1,000 publications MnTAP has created over 32 years. Users also have a quick way to find back issues of our *Source* newsletter, the Solutions magazine, the IMPACT/Environmental Benefits Reports, and the many reports written to share information learned through grant and other special projects.

MnTAP's 2017 Special Projects

Project & Funding Source	Highlighted Activities	Page
Compressed Air Tool Study *Minnesota Department of Commerce, Division of Energy Resources*	Determine the statewide energy savings opportunity, cost and greenhouse gas impacts of replacing compressed air-driven power tools with electric or battery-driven alternatives in industrial settings.	11
Energy Reduction in Wastewater Treatment Plants *Minnesota Department of Commerce, Division of Energy Resources; U.S. Department of Energy*	Provide energy benchmarking and assessments at wastewater treatment plants throughout Minnesota and identify sites where combined heat and power could be an option for energy generation.	12
HAP and VOC Air Emission Reduction in Minneapolis Communities *U.S. Environmental Protection Agency Region 5*	Support site assessments and intern projects at businesses to reduce hazardous air emissions in the Phillips communities of Minneapolis.	13
Industrial Water Conservation *Metropolitan Council with funding from the Clean Water, Land, and Legacy Amendment and others*	Support for 10 intern projects focused on industrial water efficiencies.	14
Non-Residential Water Efficiency *Washington County Public Health and Environment*	Conduct three site assessments and one intern project to identify water efficiency opportunities at Washington County businesses.	15
Reducing Waste in Food Processing *MN Pollution Control Agency* *U.S. Environmental Protection Agency Region 5*	Provide no-cost waste reduction assessments for Minnesota food processors focused on hazardous material reduction, as well as support intern projects focused on in-depth waste reduction strategies.	16
Sustainable Spirits *Minnesota Pollution Control Agency Environmental Assistance*	Reducing environmental impacts of micro-distilleries and microbreweries in Minnesota through 10 site assessments and supported efficiency measures.	17

Compressed Air Tools: Energy Efficiency Study

2017 Outputs

64 manufacturers interviewed

11 compressed air and tool experts interviewed

43 industries identified for savings potential

Total Project Outcomes

Switching Guide for Facilities

Switching Energy and Cost Savings Calculator

Sponsor

Conservation Applied Research and Development Grant

MN Department of Commerce, Division of Energy Resources

Project Overview

2017 was the second year of a two-year study to determine the statewide energy savings and greenhouse gas reduction potential of replacing compressed air-driven power tools with electric or battery-driven alternatives in industrial settings. In 2017, MnTAP focused efforts on extrapolating feedback from informational interviews to draw conclusions on the statewide potential for energy savings achievable through tool switching.

2017 Results

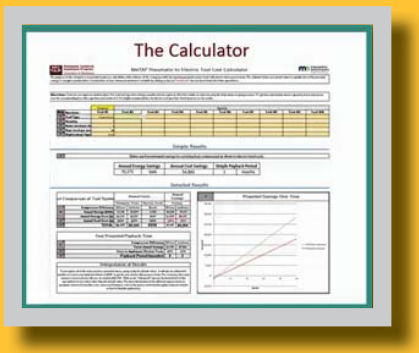
- Usage and savings potential for industries with significant power tool use was estimated
- Seven key industrial subsectors in the state use 149 million kWh of energy for tool use annually
- Switching to comparable electric and battery-powered tools would use 92% less electric energy or 11 million kWh annually
- Opportunity to save approximately $9.7 million per year
- Energy efficiencies potential of 138 million kWh annually.

MnTAP generated a guide for facilities to use when considering a transition from compressed air to electric tools, and a cost and energy savings calculator to provide facilities with estimates for their unique energy-saving opportunity. The calculator is under review by the state's energy office.

Our **Facilities' Guide** is a white paper that summarizes key differences between the tool types and provides additional background information and references that can help inform decision-makers. This guide is at: http://z.umn.edu/ToolGuide

Our **Energy and Cost Savings Calculator** is a spreadsheet-based calculator that allows decision-makers to provide information on their specific number and uses of tools. The calculator provides outputs showing the financial upside unique to each facility. This calculator is at: http://z.umn.edu/ToolCalc

Learn more about energy efficiency tools at: http://www.mntap.umn.edu/focusareas/energy/compair



Pneumatic to Electric Tool Example

The goal of the tool is to help people and businesses easily calculate the energy savings, cost savings, and simple payback period of switching from pneumatic to electric hand power tools.

Take a look at the inputs and results from the following example, then try the calculator for yourself at: http://z.umn.edu/ToolCalc

Input	Results
Tool Type: **5" Sander/Grinder**	Annual Energy Savings: **42,164 kWh**
Quantity: **3**	Annual Cost Savings: **$2,930**
Hours used per day: **4**	Simple Payback Period: **3 Months**
Days used per year: **250**	
Replacement Type: **Corded Electric**	

For an in-depth explanation of the tool, a recording of a 2/22/18 webinar is located at: http://www.mntap.umn.edu/resources/webinars/#calculatorwebinar

Energy Reduction in Wastewater Treatment Plants

2017 Outputs

10 presentations

5 case studies

5 process efficiency site visits (11 total)

4 CHP assessments

1 Intern project

2 combined heat and power screening assessments

18 energy conservation recommendations (54 total)

2017 Outcomes [Energy Assessments]

1,700,000 kWh per year implemented

1,600,000 kWh per year additional potential savings identified

$130,000 per year savings implemented

2017 Outcomes [CHP Screening Assessments]

6,650,000 kWh per year identified

$188,000 per year identified

Sponsors

MN Department of Commerce, Division of Energy Resources

U.S. Department of Energy

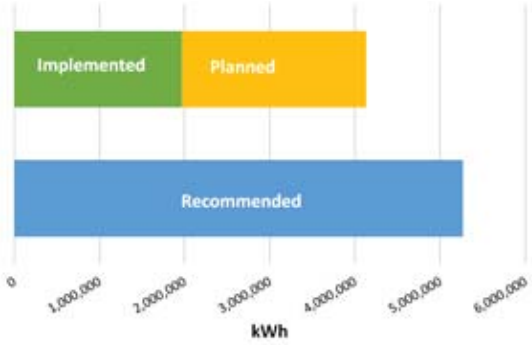
Project Overview

The goal of this project was to identify energy efficiency opportunities for wastewater treatment plants and empower operations staff to take action on energy projects to capture energy and money. Energy benchmarks are used to identify plants with energy efficiency opportunities, while onsite assessments allow MnTAP staff and site operators to identify opportunities to save energy.

2017 Project Activities

- Completed assessments at 8 plants - 5 launched in 2017, 3 earlier
- Guided one intern project in the city of New Prague
- Provided expert energy efficiency guidance through 10 presentations
- Worked with MPCA, MN Dept. of Commerce, and the Weidt Group to develop a benchmarking module for the state's B3 building benchmark tool for wastewater treatment
- Conducted benchmarking at 10 plants served by Minnesota Power and 10 plants served by Otter Tail Power
- Developed a project implementation plan to share with others

2017 Project Results



2018 Activities

- March 7, 2018 presentation at the MRWA Water and Wastewater Conference in St. Cloud with staff from three wastewater plants who will share their successful projects.
- March 22, 2018 presentation at the MPCA Annual Wastewater Operations Conference to share three keys to energy efficiency at wastewater treatment plants.
- MnTAP will continue to support wastewater testing and energy efficiency in 2018 though development of energy training modules as part of a CARD grant supported by MN Department of Commerce, Division of Energy Resources.

Learn more about MnTAP's WWTP benchmarking assistance at: http://www.mntap.umn.edu/industries/facility/potw/wwtp/

Project Success: Wastewater Treatment Efficiency in Northfield, MN

Operators at the Northfield Wastewater Treatment plant understood that they were spending a lot of money on energy – roughly $310,000 per year. The team at Northfield is passionate about sustainability, and in 2017 they chose to address their energy challenge head-on. Northfield contacted MnTAP about an energy assessment for some help in finding energy savings opportunities.

The primary clarifiers at the plant were not properly removing TSS, and by making some operational and chemical changes, the plant was able to improve clarifier performance, allowing the plant to take some aeration cells offline. Implemented savings for this process are **422,000 kWh per year, with another 422,000 kWh of savings still being pursued.** An additional estimate of 250,000 kWh in savings associated with VFDs for blowers is planned.

HAP and VOC Air Emission Reduction in Minneapolis Communities

2017 Outputs

4 assessments at large facilities

14 assessments at small facilities

17 safer product substitutions

2 intern projects

4 automotive product suppliers engaged

2 local newspaper articles

2017 Outcomes

838 lb. VOC (433 HAP) reduced

Sponsors

U. S. Environmental Protection Agency Region 5

Project Partners

Hope Community

Lake Street Council

Franklin Area Business Association

Project Overview

This project seeks to reduce emission of hazardous air pollutants (HAPs) and volatile organic compounds (VOCs) in the Phillips communities of Minneapolis. The work has been carried out in collaboration with two trusted community partner organizations, Hope Community and Lake Street Council who have been instrumental in providing promotion and support for project activities. The project has two business targets: non-point (area) sources of air emissions, or smaller emitters, and point (permitted) sources of air emissions, or larger emitters. The primary objective of this work is to encourage source reduction of air emission sources from both small and large businesses in the Phillips communities through site-based technical assistance in the form of staff assessments and MnTAP intern projects.

2017 Activities

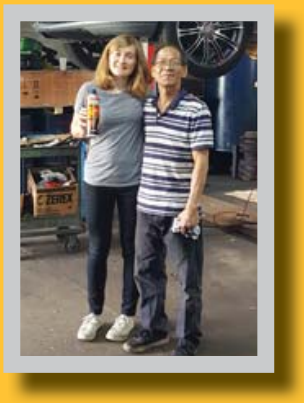
- Performed site assessments at large emitting facilities providing information on areas for potential improvements, including vehicle wash systems, solid waste, chemicals, water use, road salt use, tool inventory, and paint booths
- Analyzed ingredients for 25 chemical products identifying HAPs, MN Chemicals of Concern, and DfE ratings and recommended replacements for products with high hazard content
- Conducted a MnTAP Intern project at Smith Foundry
- Engaged suppliers to the automotive repair sector in the Phillips communities to share information and identify less hazardous product options available
- Conducted a MnTAP Intern project at auto repair businesses in the Phillips communities focused on reducing HAP and VOC content of degreasing products
- Published information on the automotive repair degreasing projects through two local newspaper articles in *The Alley,* July and September, 2017

2018 Activities

- In 2018, MnTAP will be reaching out to small and large businesses in North Minneapolis continuing the project of seeking to reduce emission of HAPs and VOCs in the area. MnTAP is expanding the safer degreasers effort with project partners, West Broadway Business Coalition and the University's Urban Research and Outreach-Engagement Center.
- In Phillips communities MnTAP will conduct site assessments and advise interns to identify solutions for janitorial services.

This project is funded through an Environmental Assistance grant from MPCA.

Learn more about MnTAP intern solutions to reduce emissions of hazardous air pollutants at: http://z.umn.edu/Solutions-2017



Project Success: Small Businesses Act to Improve Local Air Quality

The Phillips community is made up of four unique neighborhoods located in South Minneapolis. Phillips is home to 20,000 residents from all over the world with an impressive variety of economic activity due to the prosperity of small businesses. Despite decades of revitalization efforts, the Phillips community remains one of the most environmentally overburdened and economically vulnerable areas of Minneapolis.

Many cleaning and degreasing products used in the automotive repair industry emit harmful amounts of HAPs and VOCs which contribute to poor air quality and may trigger negative local health outcomes. Through evaluation of current products as well as selection and testing of less hazardous products, a MnTAP intern working in the Phillips community was able to help small businesses replace 17 products with less hazardous alternatives. This work has helped **reduce over 800 lbs of VOCs/HAPs from the neighborhood air annually.**

A summary of the project is published at: https://z.umn.edu/2017-CEE-pdf

Industrial Water Conservation Initiatives

2017 Outputs

5 metro-area intern projects

24 water efficiency recommendations

20 client interviews on water efficiency

2017 Outcomes

128,000,000 gallons water efficiency recommendations over 11 projects

34,100,000 implemented from all projects during 2017

Water efficiency motivations report

Sponsors

Metropolitan Council Environmental Services Water Supply Planning Unit

Project Overview

MnTAP's strategic emphasis on water conservation and efficiency assistance continued in 2017 with support and direction from the Metropolitan Council Environmental Services (MCES) Water Supply Planning Unit.

This phase of a long standing partnership includes a comprehensive report from all the previous MCES-sponsored water conservation interactions in the metro on what motivates or prevents industrial facilities to take action on water efficiency opportunities. The report will be completed in early 2018.

2017 Project Activities

- A total of eleven intern projects across Twin Cities metro region in 2016/2017 with a water efficiency emphasis
- Water conservation recommendation potential for the eleven interns totaled over 128,000,000 gallons of water
- Implementation for the eight projects has resulted in saving over 34,100,000 gallons
- MnTAP website water pages were all updated in 2017

Learn more about MnTAP's water conservation intern solutions at: http://z.umn.edu/Solutions-2017

Partnerships

Several other water efficiency engagements were launched or continued in 2017. They included:

- Contributing to an interagency effort to address statewide water reuse potential
- Contributing to the Department of Natural Resources development of a water conservation data tracking system
- Participating with Metro Conservation Districts on large campus water conservation program development

The MCES Water Supply Planning Unit was presented the Community Partner Agency award by the School of Public Health. The Unit was recognized for it's partnership with MnTAP providing industry focused research as well as delivering site assessments and intern projects at more than 40 metro businesses between 2012 and 2017.

Project Success: WEG Electric Machinery, Inc.

At the start of the project, WEG Electric Machinery was using roughly 1.8 million gallons of water per year to keep motors cool during testing and to cool welders. The business recognized that single pass cooling water was inefficient, and they sought a cost-effective, sustainable solution. A MnTAP intern spent the summer investigating options to save this water and the costs associated with permitting it. The intern identified air-cooled heat exchangers as an alternative for the existing water cooled heat exchangers for motor testing, and found water recirculation loops to be an effective solution for spot welder and machine enclosure cooling. The company is in the process of implementing these changes which will **eliminate nearly all process water use on site.**

A summary of the project is published at: http://z.umn.edu/2017-Electric-pdf

Non-Residential Water Efficiency

2017 Outputs

6 visits to high water use target facilities

3 technical site assessments

1 successful 2017 intern project

2017 Outcomes

3.7 million gallons of water saved

28,000 kWh energy savings

$27,500 saved

Sponsors

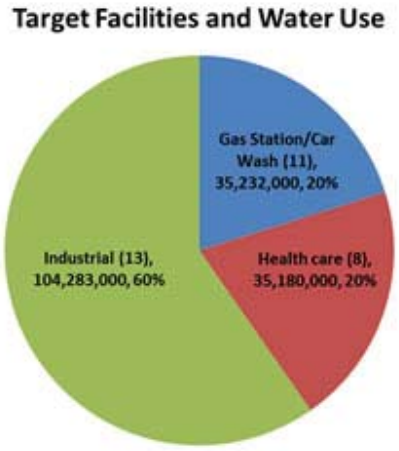
Washington County Public Health and Environment

Project Overview

MnTAP partnered with Washington County Public Health and Environment in late 2016 to focus on industrial water conservation opportunities. In collaboration with county staff, MnTAP received lists of the top 10 water users from 11 cities in the county. Outreach was conducted to 32 of these facilities with a total of nearly 85 million gal of water use annually.

2017 Activities

Six top water users were contacted to determine interest in water use assessments or an intern project. Three technical assistance site assessments were conducted at Lakeview Hospital, Minnesota Corrections Facility – Oak Park Heights and Minnesota Corrections Facility – Stillwater. Combined, 14.3 million gallons of water efficiency was identified at these facilities. Water efficiency opportunities were identified in irrigation systems, domestic water use and high efficiency fixtures. MnTAP continues to follow up with these sites.



A summer intern project was held at DiaSorin, a biomedical company that produces diagnostic tests. The intern project successfully implemented 3.7 million gallons of water efficiency with a cost savings of $27,000.

This project will continue into 2018 with additional water focused projects.

Learn more about MnTAP's water conservation solutions at: http://z.umn.edu/Solutions-2017

Project Success: DiaSorin, Inc.

Washington County Public Health and Environment sponsored a 2017 MnTAP intern at DiaSorin Inc, a biomedical company developing , producing, and commercializing diagnostic tests for a wide range of clinical areas. Incentives for DiaSorin to focus on water efficiency included avoiding additional water supply cost potential from Sewer Availability Charges (SAC).

Over the course of the project, it was discovered that the liquid ring vacuum pump that operated 24/7 was in need of repair and optimizing. Installing a new flow meter and solenoid valve along with pump repair will **save over 3 million gallons of water annually**. Making adjustments to the pump runtime will **save an additional 522,000 gallons by not running it when not needed.**

Other recommendations include domestic restroom fixtures, reuse of reverse osmosis concentrate water, optimizing the DiaSorin landscape irrigation system, and implementing a hard water monitoring plan to avoid line purging.

> "This is the first time that DiaSorin teamed up with MnTAP to sponsor an intern, and it was a huge success! The intern was professional, well prepared and organized. He stayed focused on mapping resource usage, collecting and analyzing data, and identifying ways to reduce resource consumption. MnTAP's internship program is a great benefit for interns and Minnesota businesses alike." ~ Kelly Gilliland, EHS Manager, DiaSorin

A summary of the project is published at: http://z.umn.edu/DiaSorin-2017-pdf.

Food Processing: Pollution Prevention Assistance

2017 Outputs

2 intern projects

3 facility assessments

2017 Outcomes

Implemented savings:

36,000 lbs of product waste prevented

26,000 lbs of chemical waste reduced

68,000 therms of natural gas

29,600,000 gallons of water reduced

$174,000 combined cost savings

Sponsors

Minnesota Pollution Control Agency

U. S. Environmental Protection Agency Region 5

Project Overview

Food processing is a vital part of the Minnesota economy, providing jobs to 46,000 people throughout the state. Excellent food products are supplied by the industry, but processing these products comes with challenges; the industry emits over 4.5 million pounds of TRI chemicals each year. Facilities also deal with large energy and water demands and must work to reduce process waste and manage wastewater effluent. Through this project, MnTAP is assisting food processors by conducting staff site assessments and summer intern projects. The primary goals of assistance include:

- Review cleaning procedures and reduce hazardous chemical use.
- Identify opportunities to conserve water.
- Reduce process related food waste and related wastewater strength charges.
- Find ways to save energy.

2017 Project Activities

Two summer intern projects completed: Seneca Foods and Kerry Ingredients and Flavors:

- Projects completed with final recommendations and presentations
  - A summary of the Seneca project is published at: http://z.umn.edu/2017-Seneca-pdf
  - A summary of the Kerry project is published at: http://z.umn.edu/2017-Kerry-pdf
- Learn more about MnTAP's solutions at: http://z.umn.edu/Solutions-2017

Three facility assessments:

- Site assessments completed by MnTAP staff
- Recommendation summaries provided for the facilities including economic analysis
- Follow-up conducted by MnTAP staff to review implementation potential and next steps
- One refrigeration system assessment application submitted to Xcel Energy
- Six additional facilities evaluated for assessments

Learn more about pollution prevention assistance in food processing at: http://www.mntap.umn.edu/industries/facility/food/

Project Success: Kerry Ingredients & Flavours

A MnTAP intern at Kerry Ingredients & Flavours spent the summer assisting Kerry staff with measures to improve water, chemical and energy usage at the Rochester facility. The intern worked with plant engineers and contractors to identify opportunities in the following areas:

- Assess closed-loop cooling process vs. single-pass cooling
- Optimize reverse osmosis unit for the boiler system
- Reduce water, gas and boiler chemical consumption
- Improve condensate recovery through more pumps and upgraded steam traps
- Improve wastewater equalization system – a new tank with agitation capability and better control

The combined recommendations from the Kerry Ingredients intern project resulted in **reduction estimates of 200 million gallons of water, almost 70,000 therms of energy, 26,000 lbs. of chemical and almost $40,000 in annual savings.**

Sustainable Spirits *(Reducing the Impact of Breweries and Distilleries in Minnesota)*

2017 Outputs

1 presentation

1 assessment at a local craft brewery

2017 Outcomes

11 facilities applied: (9 breweries 5 microdistilleries)

Project Partners

Ecolibrium 3

Iowa Waste Reduction Center

Sponsor

Minnesota Pollution Control Agency

Project Overview

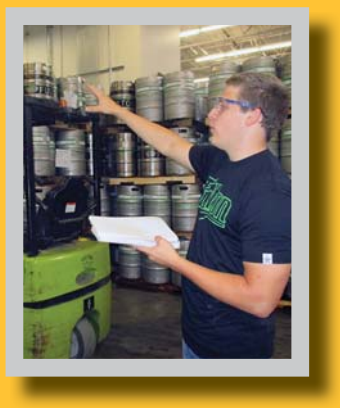
Continuing to build on past work MnTAP has done with small craft breweries, the "Sustainable Spirits" project started in 2017 to develop an outreach and technical assistance model to engage craft breweries and distilleries to reduce environmental impacts and production costs.

- Benchmarking activities identify opportunity areas at each facility.
- Technical assistance uncovers opportunities for reducing waste generated, optimizing water use and wastewater effluent compliance and improving energy efficiency.
- Implementation support brings needed resources to facilitate implementation of process improvements.
- Information from this project will be shared broadly through the industry.

Project Activities

- Created a new MnTAP web page to share resources and highlight project success.
- Promoted project and results of summer intern project at "Hopportunity Knocks" a joint event between the Minnesota State Bar Association, Environment, Natural Resource & Energy Law Section, and Minnesota Brownfields.
- Collaborated with Iowa Waste Reduction Center Green Brewery Certification Program for lessons learned and materials that could be shared with Minnesota Brewers and distillers. The Brewers Association Sustainability Manuals were examined for best practices.
- Sent project announcement to 350 emails which was opened by 130 unique facilities.
- Identified 14 facilities that either applied or were recommended by industry contacts.
- Completed first site assessment in December 2017. Site assessment protocol was developed and reviewed based on summer 2017 intern experience.

Learn more about reducing waste and wastewater at craft breweries, at: http://www.mntap.umn.edu/industries/facility/brewstill



Sustainable Spirits and Fulton Brewing

MnTAP kicked off the Sustainable Spirits grant based on information learned from an intern at Fulton Brewing. Fulton was interested in investigating ways to reduce water use and effluent strength to lower the costs of wastewater discharge. This investigation found that the dead yeast and hops that collect at the bottom of the fermentation vessel and hot trub from the brewhouse account for 2/3 of the total TSS and COD in the effluent. Finding a way to collect and dewater this stream would **capture 115,000 lbs of solids that could be added to spent grain animal feed and save $9,200 per year.** The intern also found ways to **save 410,000 gallons of water per year** by installing flatjet nozzles in the kettle, recycling rinse water on the canning line and recirculating water from the vacuum pump on the bottling line.

> "The intern identified areas of improvement on water consumption, waste water surcharge reduction, and boiler efficiency. He explored many engineering solutions for each problem and we are confident he found the most economical and diligent process for us. We are grateful for his effort and will use his knowledge towards operating as efficiently as we can."
> ~ Paul McDonald, Plant Manager, Fulton Brewing

A summary of the Seneca project is published at: http://z.umn.edu/2017-Fulton-pdf

MnTAP 2017 Engagement Summary (Interns, Team Meetings, and Site Visits)