Industrial Water Efficiency

Solutions that benefit businesses, communities and our future workforce

June 29, 2020

Minnesota Technical Assistance Program
University of Minnesota

Metropolitan Council

Clean Water Land & Legacy Amendment

Minnesota Technical Assistance Program

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

MnTAP

UNIVERSITY OF MINNESOTA

MnTAP

- Established in 1984
- University of Minnesota, SPH
  - Outreach and assistance unit
  - Grant and partner funded
- Confidential, No Cost Engineering Assistance for Minnesota Businesses
- Site Assessments, Interns, Teams
- http://www.mntap.umn.edu

Industrial Water Efficiency Project Partnership

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Minnesota Technical Assistance Program
University of Minnesota

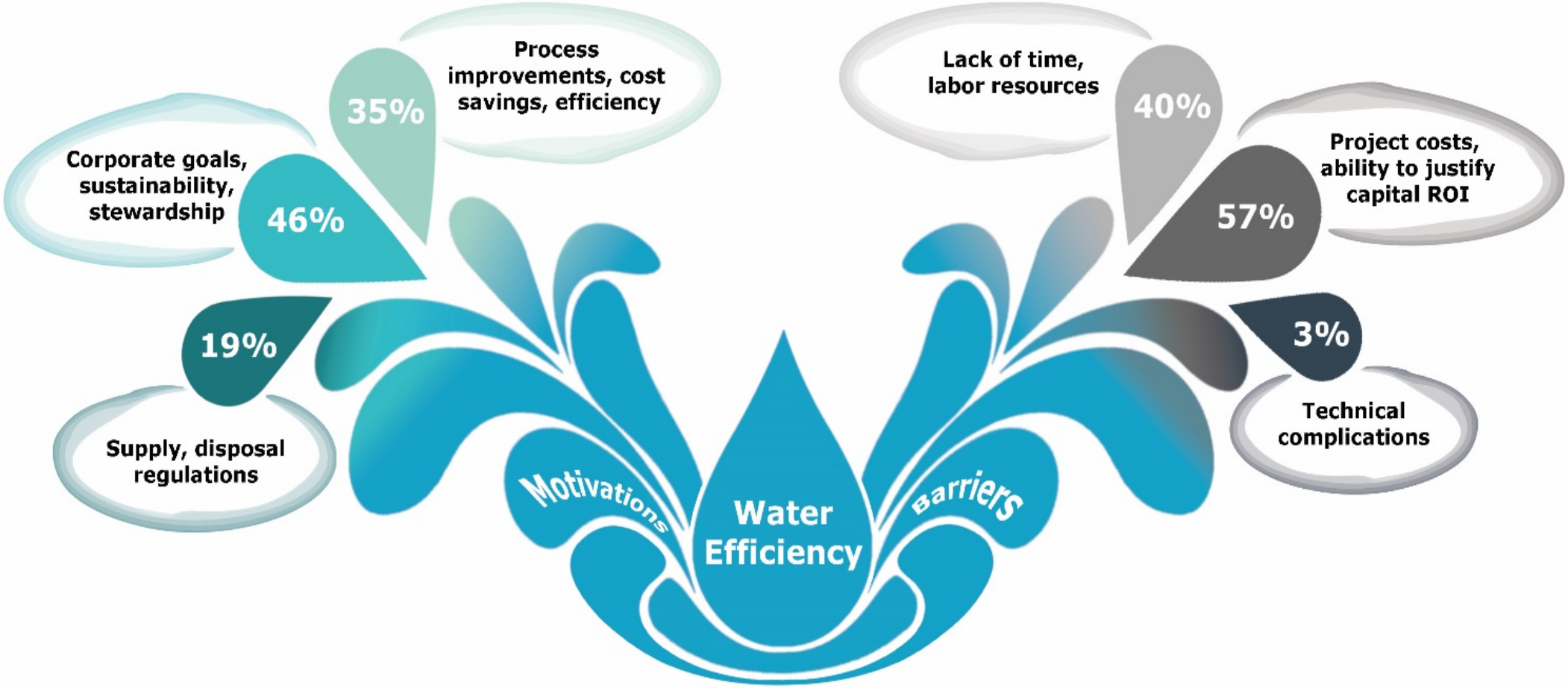
- Groundwater availability and community water efficiency research
- Financial support
- Goal of preserving our water resources, promoting conservation and sustainable consumption

- Technical staff and intern resources
- 35+ years of experience
- Mission to help industries in MN find cost-effective solutions for water and energy conservation

Overview

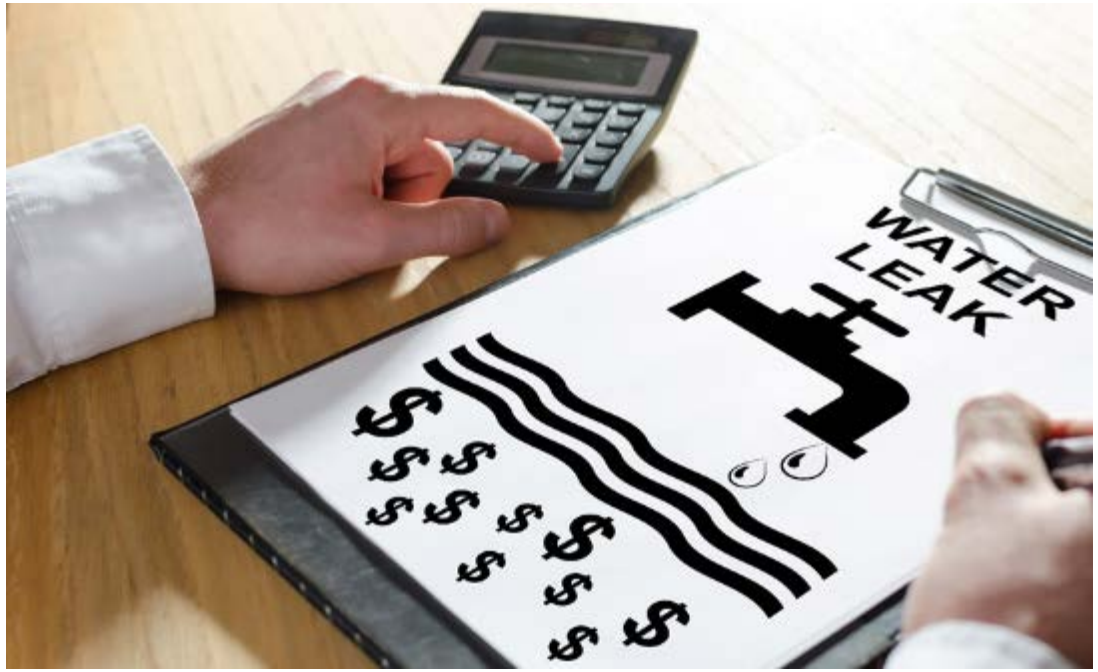
- **Understanding *Motivations* and *barriers* to industrial water efficiency**
  - What have we learned?
  - How can we use that knowledge to provide better assistance?
- **Finding water efficiency opportunities**
  - Where do we look?
  - Using a 4-part approach to technical assistance
- **Inspiring future workers, businesses and communities**
  - Set interns up for success
  - Give businesses a game-plan to implement and sustain efficiency
  - Share findings with communities for replication

Understand motivations and barriers



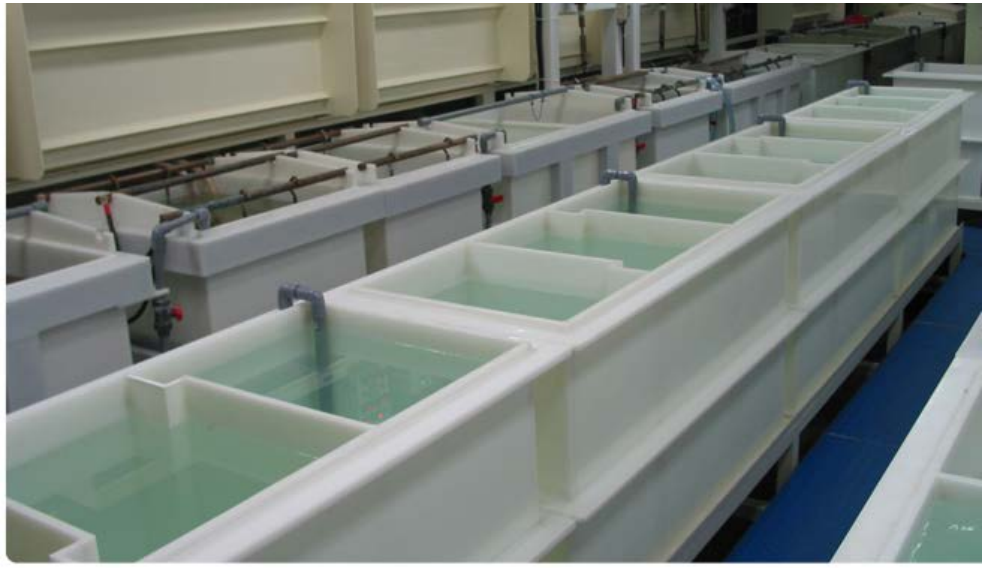
Water: a limited resource with real costs

- Water costs industry ***THREE*** times
- Incoming supply cost
- Processing cost
  - Purification
  - Heating/Cooling
  - Pumping
  - Treatment
- Discharge



Water use in the workplace

Washing and rinsing



Water use in the work place - 1

Product transport
Product processing
Product ingredient
Process sanitation

Water use in the work place - 2

Evaporative cooling

Heating

Water use in the work place - 3

Water treatment and purification

Water use in the work place - 4

Landscape irrigation, as well as other domestic uses

Photo credit: Alliance for Water Efficiency *www.allianceforwaterefficiency.org/*

MnTAP's 4-part strategy

Process for Technical Assistance

Map

- Measure
- Value
- Plan

Maintain

- Inspect
- Repair
- Prevent
- Repeat

Manage

- HP-LF
- High Eff.
- Automate

Modify

- Reduce
- Reuse
- Recycle

Identify and validate opportunities

Determine major components of the water balance- measure what's happening

- Water data from site contacts
- Meter readings
- Physical measurements to fill in the gaps

Maintenance

Leak identification and repair

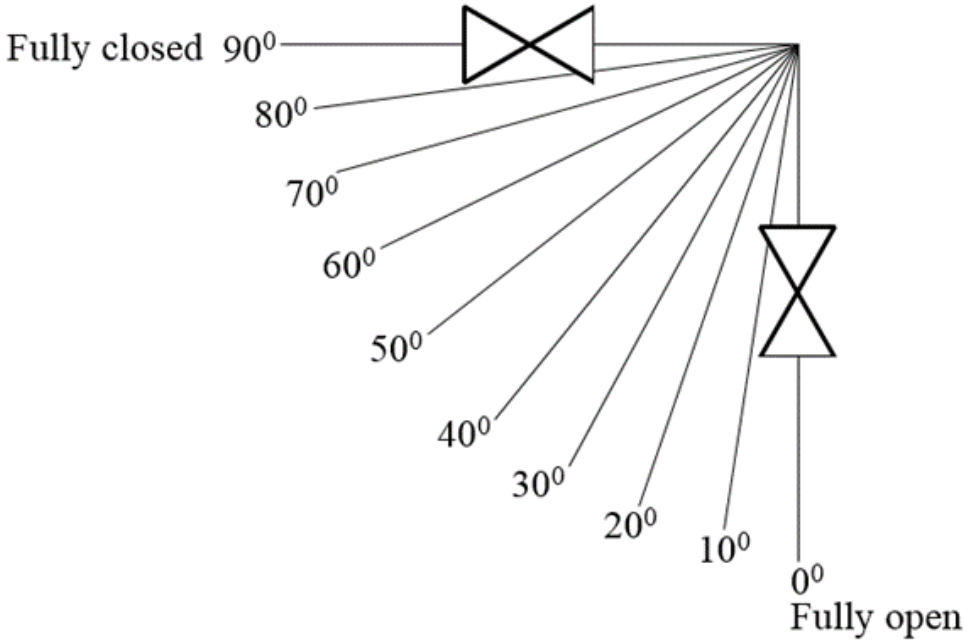
Management

No water cleanup

Management of Water Use

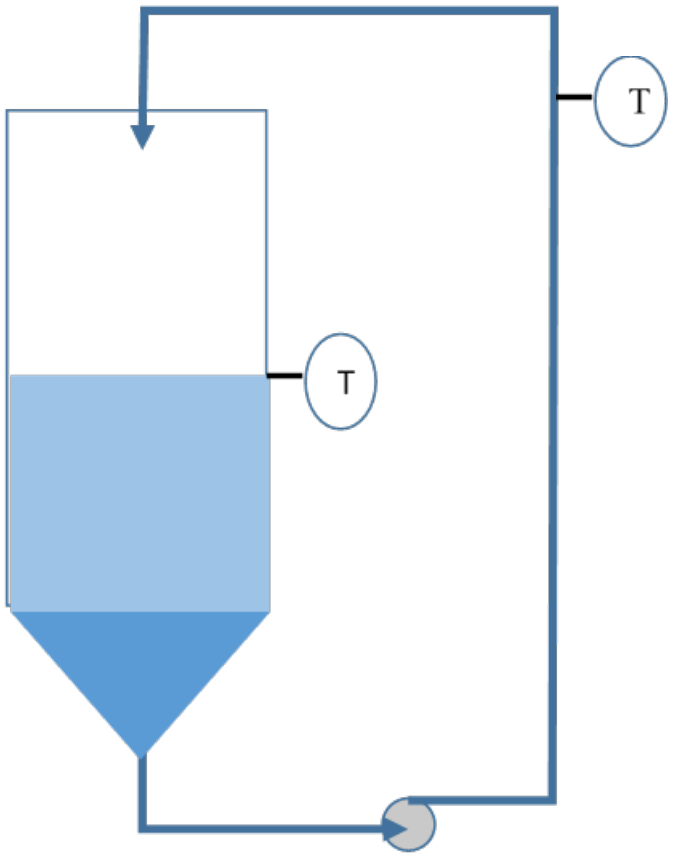
Pressure (heat), not volume

Management example: Tuning flow rates



Do valves *need* to be fully open?

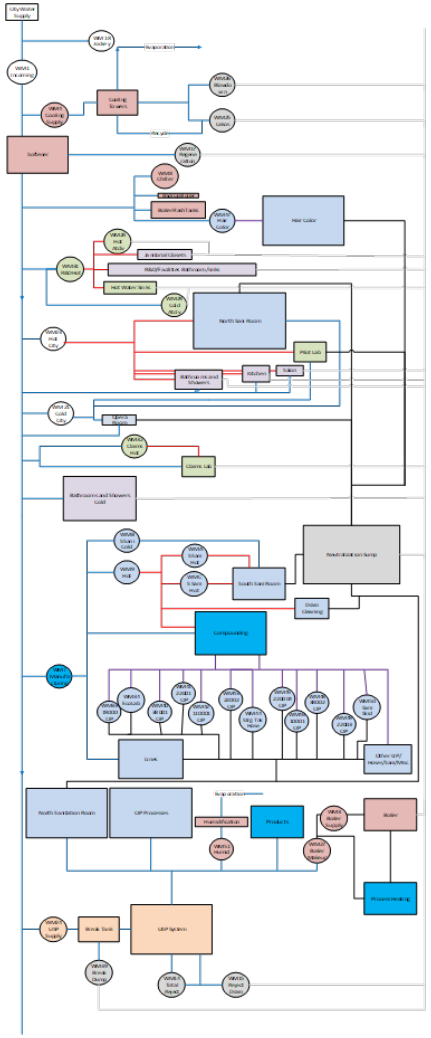
Manage/Modify
Closed-loop tank cleaning opportunity



- **Challenges**
  - Hot water cleaning needed for sanitation
  - Need to monitor temperature for compliance
  - Need to fill tank to probe level (T)
- **Improvements**
  - *Modify* temperature probe location
  - Recirculation loop reads temperature
  - Minimize fill volume needed
  - Automate process to not overfill

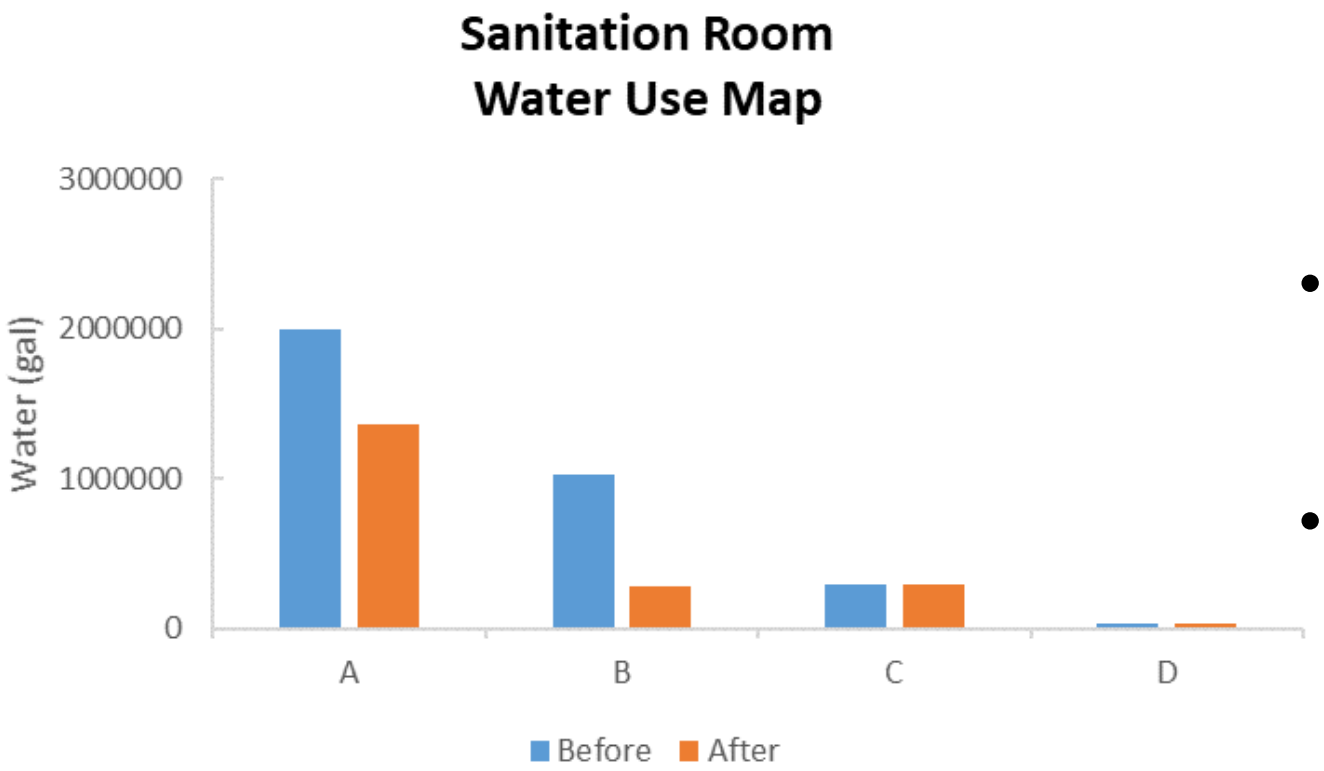
Map Water Use – Aveda in Blaine, MN

- **Motivation**
  - 22 million gpy water use
  - 25% used in cleaning
  - Reduce water use and costs
- **Approach**
  - Analyzing water meters
  - Observe CIPs and manual sanitization
  - Flow rate measurements
  - Talking with workers
  - SAP reports



http://www.mntap.umn.edu/download/270/meghan-pieper/15179/meghan-pieper-aveda-corporation-summary-2018.pdf

Manage/Modify - increase water efficiency



- **From water map, 15% usage in Sanitation room**
  - 4 operations
  - Manual and automated
- **Changes in two operations**
  - High efficiency spray nozzle
  - High efficiency spray ball
- **Savings**
  - 1.4 million gpy (40% of area use)
  - 7,300 therms
  - 56,000 kWh
  - $20,000/yr (<1yr ROI)

Strategies for Water Efficiency

Process for Technical Assistance

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Providing technical assistance

MnTAP staff

site assessments

MnTAP

Intern Projects

Half-day to a full-day

(can do multiple visits)

3 month project

Full-time, 40 hrs/week

Technical assistance - *simple process summary*

- **Map and diagram water use as best as possible**
- **Collaborate with the facility team to prioritize opportunities**
- **Identify solutions that fit multiple categories (the 4 Ms)**
  - This is key for businesses that may lack commitment!
- **Give them a game-plan**
  - Estimate cost/resource savings
  - Note where more process analysis is needed
  - Outline plans for implementation

The results: Cost-effective solutions that benefit all

Businesses

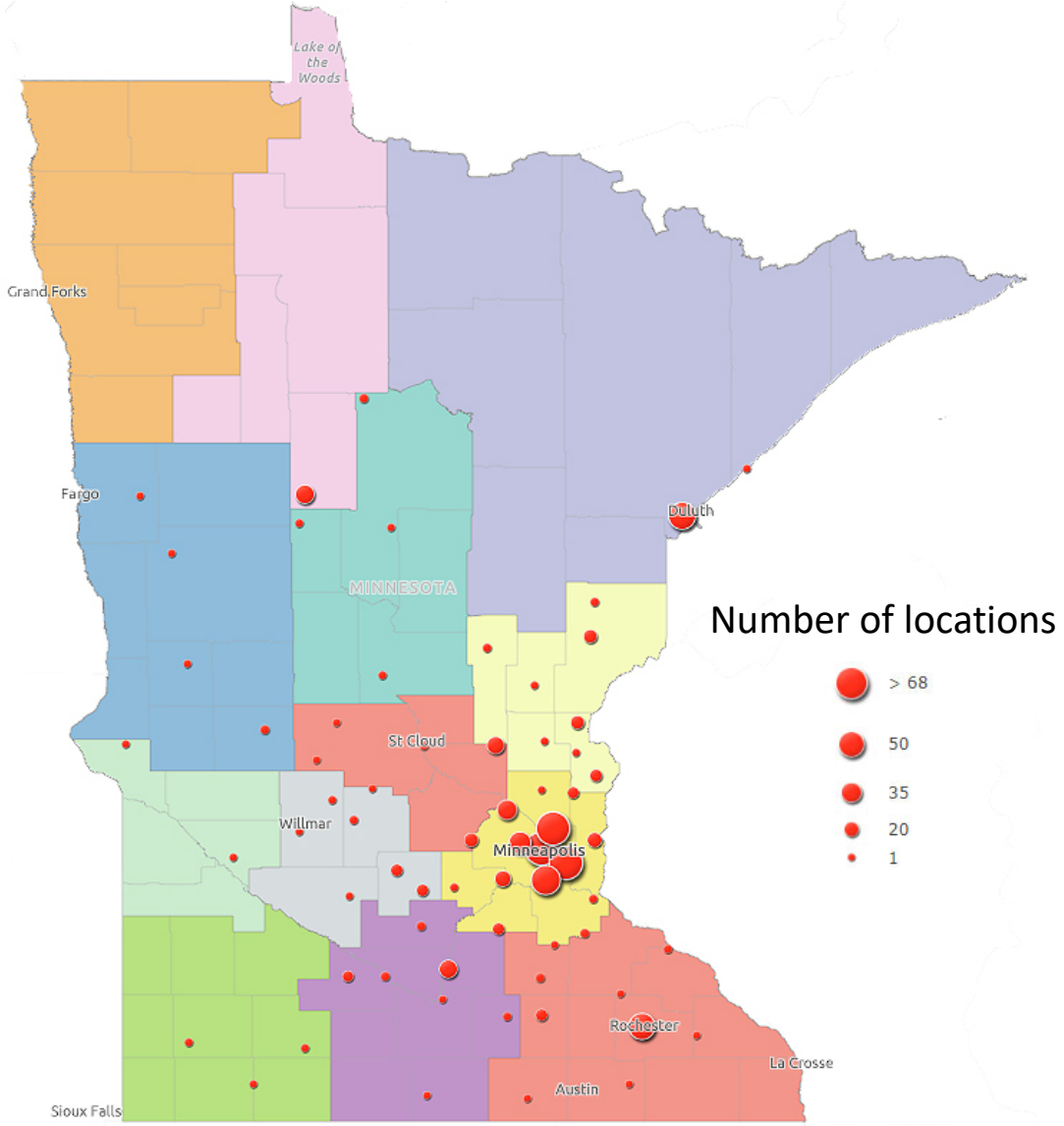
- Increase operational efficiency
- Minimize water usage (among other resources)
- Build confidence in continuous improvement and environmental solutions

Communities

- Reduce demand on water resources
- Increased economic value for local businesses
- Opportunity to make progress on community-wide water conservation goals

Student interns

- Real-world experience managing their own projects
- Opportunity to provide legitimate recommendations that yield measurable results
- Enter the workforce with a problem-solving, can-do mindset, that they can bring to whatever career they choose!



MnTAP Impacts 2015-2019		
Number of Companies Assisted		1,488
Water Reduction (gal)	*Recommended*	*641,000,000*
	Implemented	**183,700,000**
Electric Energy Reduction (kWH)	*Recommended*	*37,400,000*
	Implemented	**18,300,000**
Waste Reduction(lbs)	*Recommended*	*15,300,000*
	Implemented	**3,600,000**
Gas Energy Reduction (therms)	*Recommended*	*1,600,000*
	Implemented	**620,000**
Cost Savings	*Recommended*	*11,500,000*
	Implemented	**5,600,000**

2020 MnTAP Intern Virtual Symposium

Wednesday, August 19th, 2020

Register at: https://form.jotform.com/71426420284956

Featured projects:

Abbott – Little Canada

Albert Lea Wastewater Treatment Plant

August Schell Brewing – New Ulm

Bosch Automotive – New Ulm

LCCMR wastewater nutrient projects 1 and 2

LifeCore Biomedical – Chaska

MN Dept. of Admin Facilities – St. Paul

MN Specialty Yeast – Hutchinson

MnTAP/MCES water data – Minneapolis

Old Dutch Foods – Roseville

Otsego Wastewater Treatment Plant

Pearson's Candy Co. - St. Paul

Post Consumer Brands – Northfield

Ruse-Oleum – Brooklyn Park

Sappi Paper Mill – Cloquet

St. Croix Forge – Forest Lake

University of Minnesota Physicians

Thank you!

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METROPOLITAN COUNCIL

MnTAP

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Water Efficiency Resources

- **MnTAP Water Resources**
  - http://www.mntap.umn.edu/greenbusiness/water.html
- **Reports and Publications**
  - http://www.mntap.umn.edu/greenbusiness/water/119-WaterConservation.htm
  - https://metrocouncil.org/Wastewater-Water/Publications-And-Resources/WATER-SUPPLY-PLANNING/Water-Conservation-by-Private-Well-Industries.aspx
  - https://metrocouncil.org/Wastewater-Water/Publications-And-Resources/WATER-SUPPLY-PLANNING/Industrial-Water-Conservation-North-East-Metro-G.aspx
- **Industrial water use tips newsletters**
  - http://www.mntap.umn.edu/greenbusiness/water/water_projects.html
- **MnTAP Intern Current Projects and Past Summaries**
  - http://www.mntap.umn.edu/interns/currentprojects/
  - http://www.mntap.umn.edu/intern/pastproj.htm
  - http://www.mntap.umn.edu/resources/solutions.html