

Minnesota Department of Administration Energy and Water Conservation

Yaakov Knobloch

MnTAP Advisors: Jon Vanyo

Company Supervisor: A.J. Van den Berghe



UNIVERSITY OF MINNESOTA

Driven to DiscoverSM



UNIVERSITY OF MINNESOTA

- The state would like to become more sustainable and have six sustainability goals outlined in Executive Order 19-27.
- This project focuses on 2 of the goals.
 - 30% energy reduction per square foot by 2027 relative to 2017.
 - 15% water reduction by 2025 relative to 2017.



Project Overview

- Investigate energy and water conservation opportunities throughout the complex.
- Four subprojects:
 - Bathroom Fixtures Water Usage
 - Irrigation Analysis
 - Lighting Analysis
 - Air Compressor Analysis

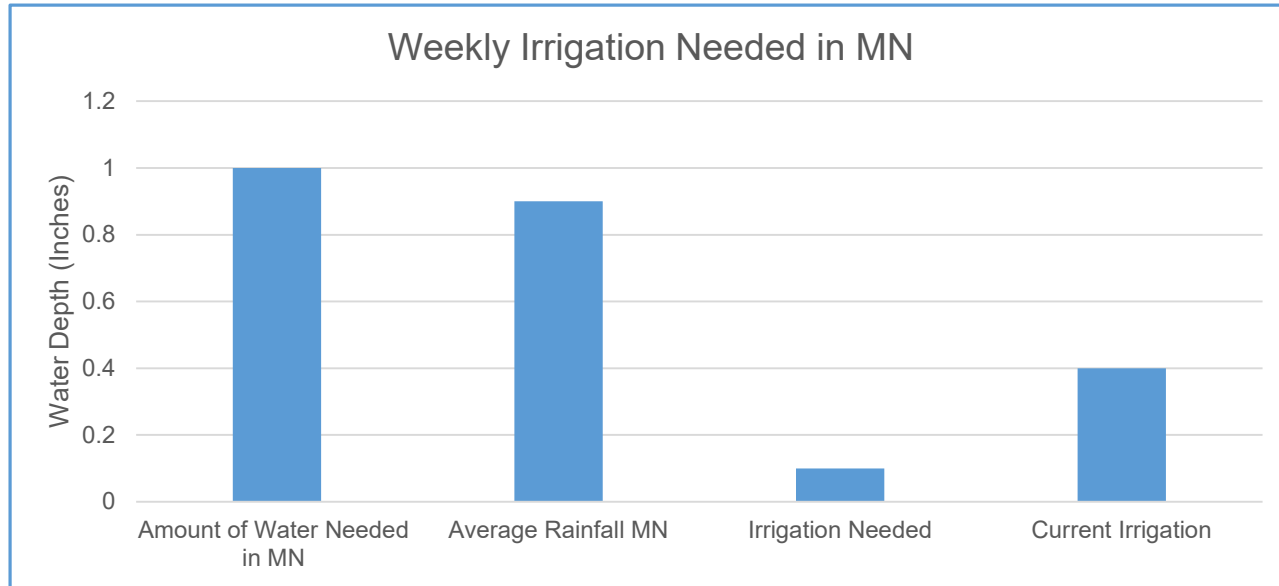


Approach

- Investigate and analyze current energy and water usage.
- Research products and processes that are more efficient.
- Cost and savings analysis for recommendation.



Irrigation and Bathroom Fixtures Water Conservation



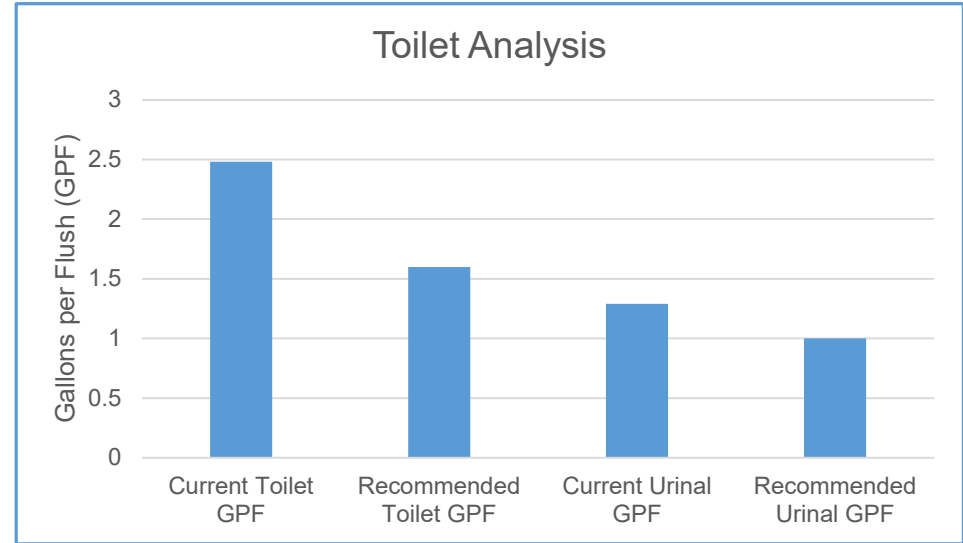
Irrigation Solutions

- Each irrigation clock has a seasonal adjust dial.
- If the dial is set to 50% it will run for half the time, using half the water.

Recommendation	Water Savings (Annually)	Implementation Cost	Cost Savings (Annually)	Payback Period	Status
Change the Seasonal Adjust Dial	6,900,000 Gallons of Water	\$1,000	\$30,000	.4 Months	Recommended

Toilet and Urinal Retrofits

- Previous report done on bathroom fixtures.
- Used the report for current flush rates.



Toilet and Urinal Retrofit Solutions

- Complex wide replacement of the current diaphragms in the toilet and urinals to 1.6 and 1 GPF respectively.



Recommendation	Water Savings (Annually)	Cost of Replacement	Cost Savings (Annually)	Payback Period	Status
Replace Flush Valves on Toilets and Urinals	2,500,000 Gallons of Water	\$35,000	\$30,000	1.19 Years	Recommended

Solutions

Recommendation	Annual reduction	Total cost	Annual savings	Payback period	Status
Irrigation Savings	6,900,000 Gallons of Water	\$1,000	\$30,000	.4 months	Recommended
Retrofit W.C Flush Valves	2,500,000 Gallons of Water	\$35,000	\$30,000	1.19 Years	Recommended
Retrofit Lighting Fixtures	896,000 KWh	\$109,000	\$80,000	1.35 Years	Implementing
Compressor Savings	527 KWh	\$900	\$500	1.81 Years	Recommended

Anecdote

- I did most of the work this summer exclusively online and at home.
- While I was giving a presentation to the administrators of Minnesota Department of Administration, my 5-year old cousin came running down stairs yelling hello and wanted to join. He disturbed us for a second but was really cute and everyone chuckled.