



Pumping Strategies for Energy Optimization

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Overview



In 2017...

- MWU spent **\$2.16 Million** on **20.3 GWh** of electrical energy to pump **9.42 billion** gallons of water (PSC, 2017)
- Over 85% of total electricity consumption attributed to pumping (Hamilton, 2009)

What can we do?

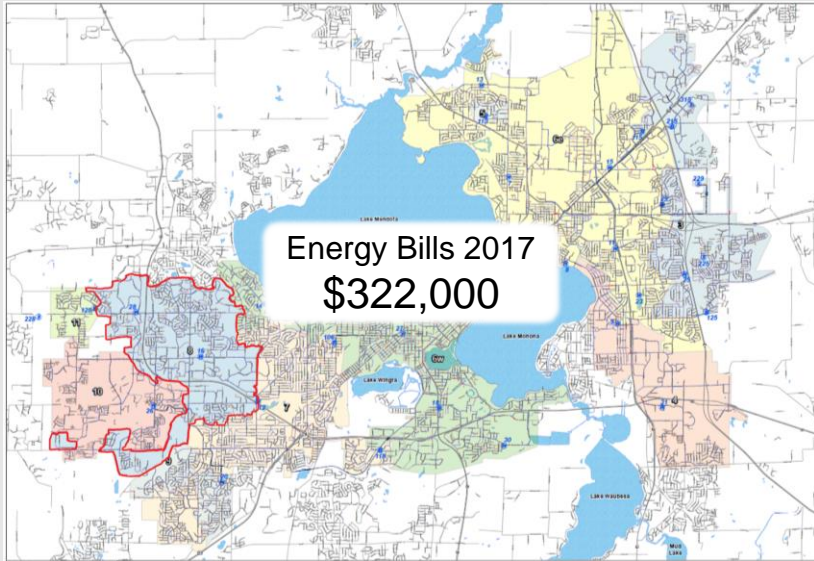
Seek the **Triple Bottom Line!**

- **Environment:** Decrease energy use
- **Economic:** Reduce energy costs
- **Social:** Maintain level of service

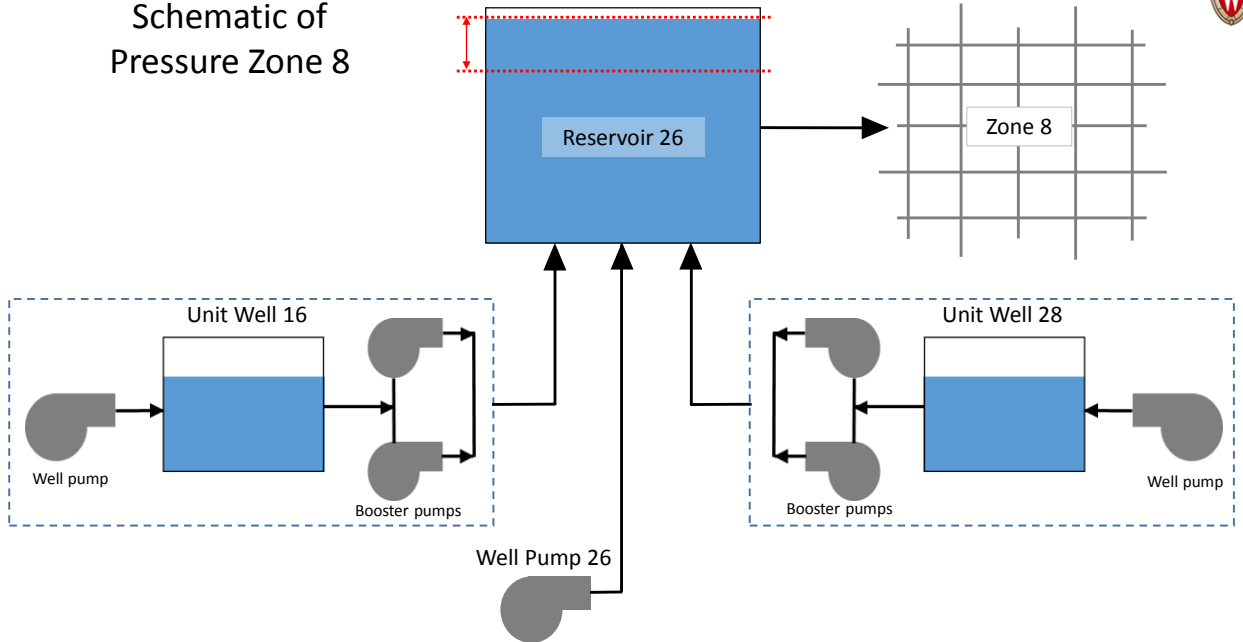
References:

PSC. (2017). *Water Utility Annual Report*. Wisconsin Public Services Commission.
Hamilton, G. (2009). "Driving Energy Efficiency in the U.S. Water & Wastewater Industry by Focusing on Operating and Maintenance Cost Reductions". ACEEE, 6-30 – 6-42.

System Map – Zone 8

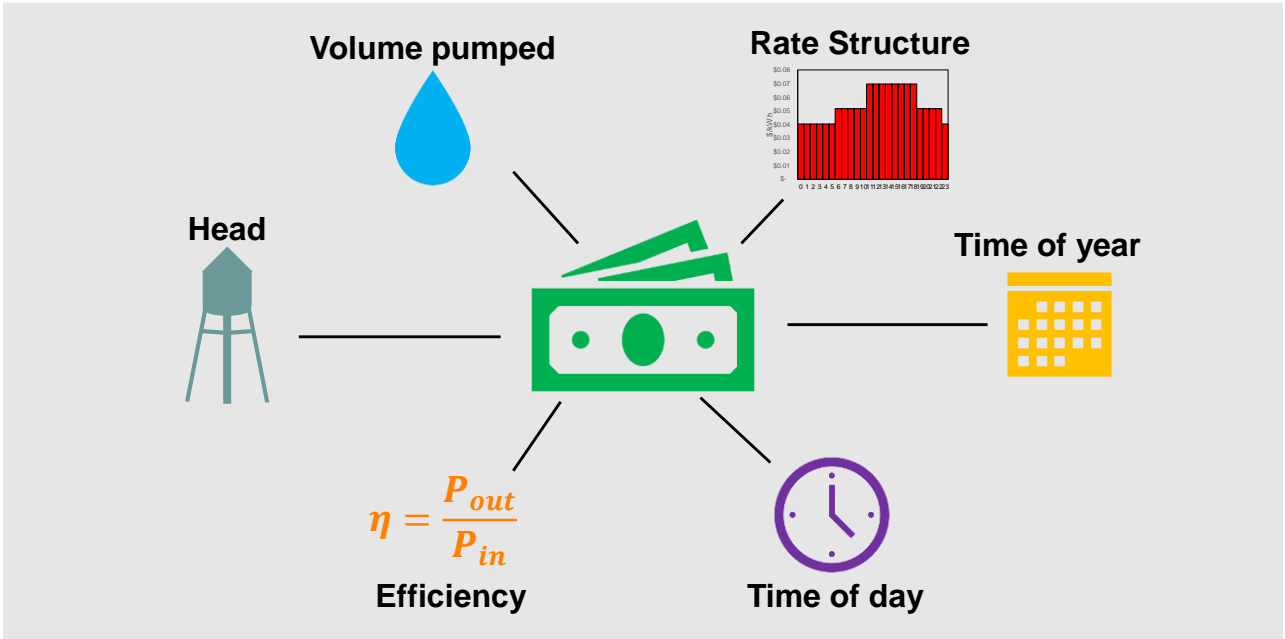


Schematic of Pressure Zone 8

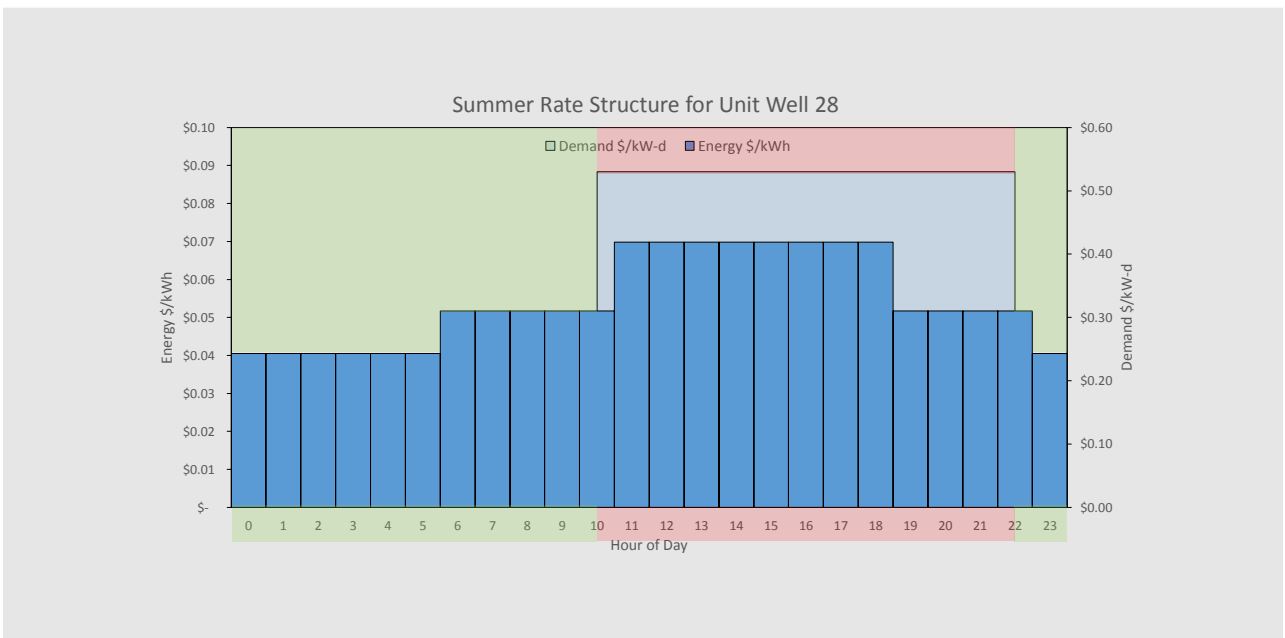




Energy Costs: A breakdown

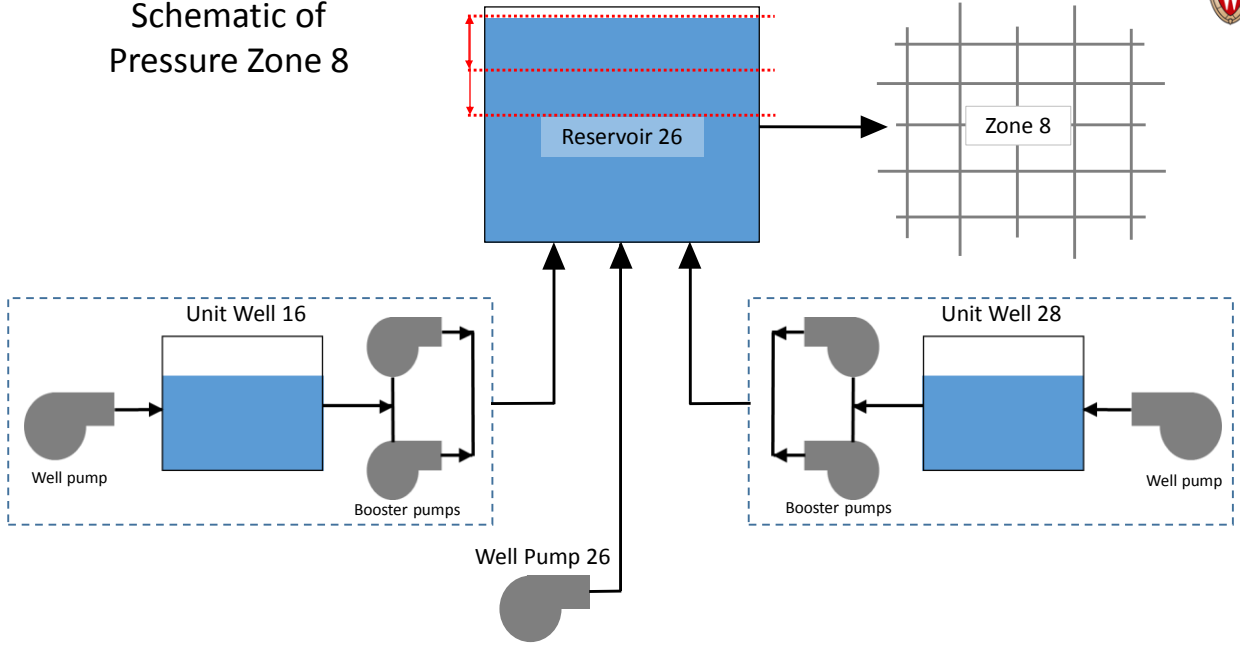


Basics of Rate Structure





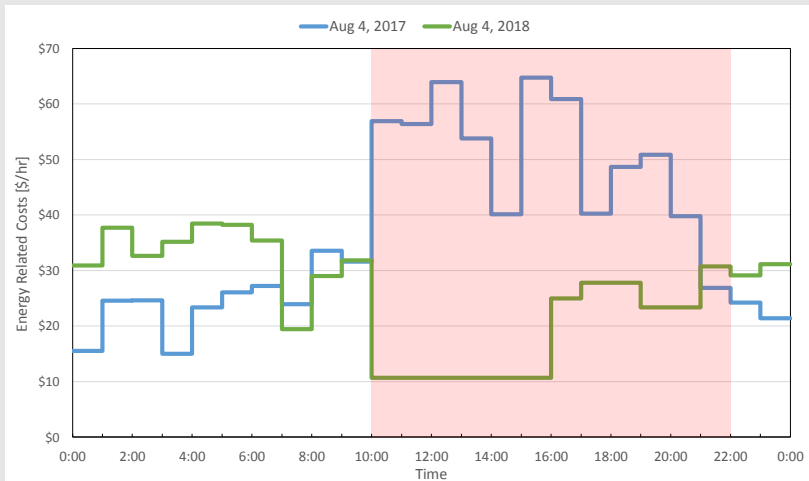
Schematic of Pressure Zone 8



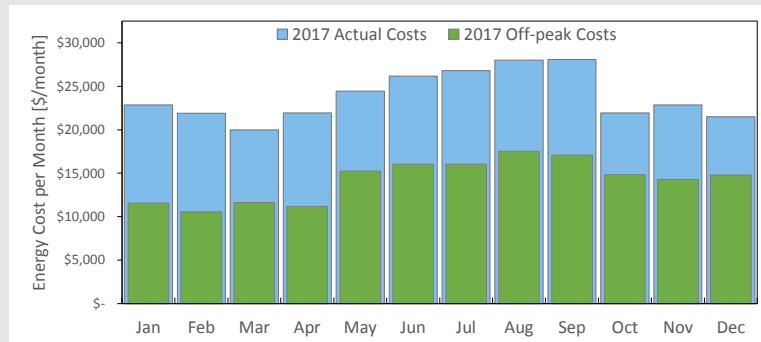
Zone 8 Energy Related Costs



August 2017
\$28,000/month
August 2018
\$18,500/month
August Savings
\$9,500



Zone 8 Energy Related Costs



2017 Actual Costs

\$287,000

2017 Optimized Costs

\$171,000

Savings

\$116,000 OR 40%

Difficulties of off-peak pumping



- Pumps **cannot** turn on during on-peak hours
 - All parties need to be made aware
 - Flushing and planned maintenance needs to be scheduled accordingly
 - Unplanned maintenance and fire flow could disrupt this requirement
- Unpredictable water demand can limit savings
- Learning curve expected

Summary



Triple Bottom Line

- **Environment:** Upcoming work will address the reduction of energy consumption
- **Social:** Pilot study revealed level of service was maintained
- **Economic:** Modeling and pilot study suggests energy related savings of up to **\$116,000 / year** or **40%** in Zone 8

Future work

- Energy saving initiatives
- Investigate possibility of spreading learnings to other zones

