District Energy St. Paul Operating Engineers Seminar November 14, 2018



New Custom Reports Overview



Chilled Water Billing Cost and Usage



Hot Water Billing Cost and Usage



Usage - Cost





Fiscal	Year	to	Date	Compar	rison
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	Cost	Usage (MWh)
Actual:	\$12,465	216
Budget:	\$12,283	197
Difference:	\$182	19





Chilled Water Hourly Demand Data 6/1/2018 - 9/30/2018



Hot Water Hourly Demand Data 11/1/2017 - 3/31/2018



Chilled Water Daily Max Demand History



- Daily Max Demand

Hot Water Daily Max Demand History



---- Rolling Hourly Max Demand ----- Instantaneous Max Demand





Chilled Water Delta T History



Hot Water Return Temp History



Chilled Water Delta T History



- Daily Average Delta T - Connection Standard Requirement

Hot Water Return Temp History



- Daily Average Return Temp - Connection Standard Requirement



60



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2014	42	31	22	10	1	2	2	2	0	0	19	34
2015	38	28	20	13	3	2	2	1	0	0	3	31
2016	46	29	25	13	5	2	2	2	4	8	21	39
2017	42	30	24	10	5	2	1	2	2	9	24	44
2018	51	34	21	12	7	2	2	2	3	10		



Common Issues & Effective Solutions



Manual Valve Position

- Bypass circuits open accidentally
- Gauge manifolds open on both sides
 - Issue magnified for >1/2" pipe





Control Valves



- Correct size
 - Does the valve have 'authority' over the flow?

N = Δ Pvalve / Δ Ptotal(including the valve)

- N < 0.25 = unstable control
- 0.25 < N < 0.5 reasonable control
- 0.5 < N < 1 excellent control
- N > 1 = wasted energy and possibly flow limited at the valve



Control Valves



- Positioner speed
 - Too slow = overheat/cool
 - Too fast = hammer and wear
 - More equipment cycling
 - Instability in the comfort space
- Modulating positioner
 - Is the signal binary (i.e. on/off) or variable?



Circulation/Re-Circulation Pumps

- Are pumps imbalanced and/or operating when they shouldn't be?
 - What is the purpose of the pump?
 - How is this pump controlled (dP, temperature, manual, etc.)?
 - Can I find this pump on the building's piping schematic/P&ID and mechanical schedule and make sense of it there?







Variable Frequency Drives (VFDs)

- Is there a "V" in your VFD?
 - Controlled via your building management system (BMS), energy management system (EMS) or building automation system (BAS)?
 - Are they running in manual mode?
 - Locked in a set speed?
 - DP sensors working?





Maintenance

- Replace faulty thermometers and pressure gauges
- Review District Energy's suggested maintenance checklist
- Always follow manufacturer suggested maintenance recommendations





Piping Schematic/P&ID and Mechanical Equipment Schedule

- Documentation is vital to troubleshooting and diagnostics.
- Have a current version readily available.
- Contact the design engineer if you don't have it.
- As-builts with changes during construction should be provided by the contractor.
- A contractor should not make any changes to your system without furnishing as-builts at the end of that job for the work they executed.
- If your contractor cannot (or will not) provide as-builts, make them yourself.





Resources at DistrictEnergy.com

- Ask the Engineer
- Past operating engineers presentations
- Maintenance checklist
- Request service or submit a question





Four Ways to Save

- 1. Improve your cooling Delta T or hot water return temperature
- 2. Building Walk-Throughs Invite the District Energy team to evaluate your building for opportunities
- 3. Add our experts to your projects
- 4. There are financing programs available for energy efficiency projects, including District Energy programs

Energize St. Paul

- 2018 Race to Reduce cooling challenge
- Second challenge program in 2019
- District Energy resources





District Energy St. Paul System Updates

- New customer meters providing real-time data
- Last year on coal, two years ahead of schedule
- Implementation of renewable fuel oil in Duluth system
- Installation of new chiller this winter

- Thank you for your work to manage peaks and dial in your flow efficiency
- Summer savings resulted in a customer rebate

