

Municipal Energy Challenges and Opportunities



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Mayors Innovation Project
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By: Mike Wiza

Municipal Energy - Facts

- The municipal operations are usually one of the largest consumers of energy.
- Cities are expected to provide essential services.
- Costs are increasing and budgets are not.
- Many opportunities exist to develop sustainable operations and we must seek them out.



Municipal Initiatives

- Eco-Municipality Task Force/Green Tier program

LED Street Lighting – DPW (American Recovery & Reinvestment Act '09)

Hybrid Busses – City Transit Department

Ice Arena/ Restrooms – Parks Department

Building Efficiency Projects – All City Depts.

Green Hinges, motion lighting, LED, GPS on vehicles, GIS overlays



Wastewater Utility

- The Wastewater Utility is responsible for:
 - Treatment of wastewater
 - Customers Served: 27,000 (daytime around 40,000)
 - Type of treatment: Activated Sludge
 - Treatment capacity: 4.6MGD
 - Average flow: 3.0 MGD



How do you get here?

Annual Net Electricity Consumed (kW)



- 23.5% decrease in annual net electricity consumed 2002 – 2011
- 98% decrease in annual net electricity consumed 2012-2014



Efforts toward Energy Independence

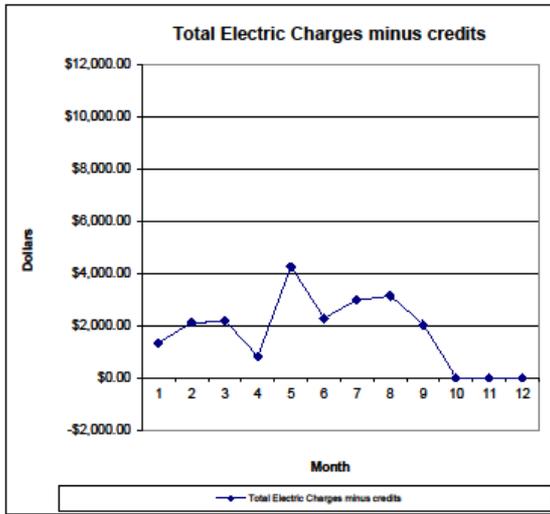
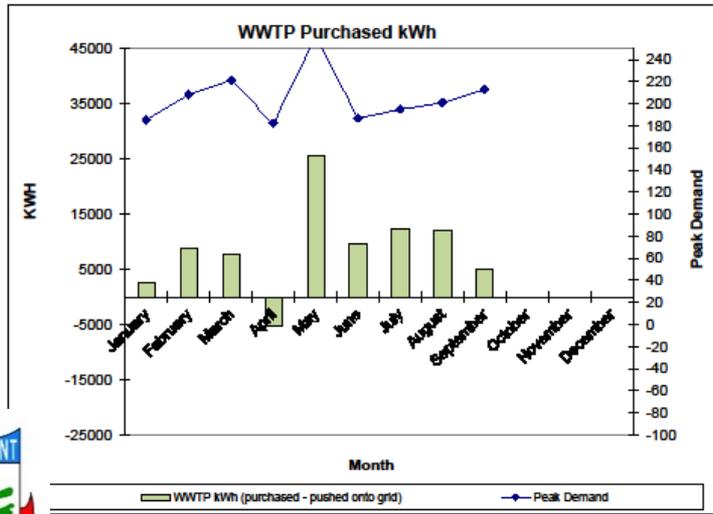
- Energy Audit by Focus on Energy 2003
- Started Tracking and Understanding Energy consumption
- Set realistic goals for lowering energy consumption
- Operational changes to conserve energy
- Plant equipment upgrades for energy conservation



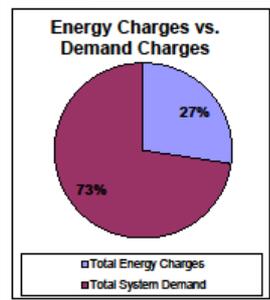
Energy Monitoring

Stevens Point Wastewater Treatment Plant
Energy Usage Summary 2015

Date Ending	Billing Day of Month	kWh Purchased	Biogas Gen kWh produced	Total Power Consumed (Est)	kWh pushed on to grid	WWTP kWh (purchased - pushed onto grid)	On Peak KWH	Off Peak KWH	On Peak \$	Off Peak \$	Total Energy Charges	Total Monthly Charges	Total System Demand	Peak Demand	Demand Cost per kW	12-Month Max Demand kW	Total Customer Demand Change	credit for pushing onto grid	Unit Charge Credit	Total Electric Charges minus credits	Daily Ave. Energy Purchased kWh/day	Daily Ave. Energy Used kWh/day	Ave Total Cost, \$/kWh	Waste water Flow MGD	Lbs BOD Removed per day	Cost/lb BOD Removed
January	29	9300	133967	136667	8600	2700	3508	5792	\$231.28	\$230.39	\$461.65	\$124.46	\$1,612.52	185	\$8.83	282	\$476.30	\$404.82	\$939.02	\$1,330.19	93	4713	\$ 0.143	2.581	8135	\$ 0.006
February	29	12600	121103	129803	3900	8700	4708	7892	\$310.30	\$314.97	\$625.27	\$126.67	\$1,827.81	208	\$8.83	282	\$476.30	\$218.39	\$737.74	\$2,099.92	300	4478	\$ 0.167	2.567	9535	\$ 0.008
March	29	13800	132806	140606	8000	7800	5833	7987	\$384.45	\$317.98	\$702.41	\$126.67	\$1,951.43	221	\$8.83	282	\$476.30	\$355.38	\$729.77	\$2,171.66	269	4848	\$ 0.157	2.647	8892	\$ 0.008
April	30	9000	131215	125815	14400	-5400	3128	5874	\$208.03	\$234.43	\$440.46	\$135.84	\$1,607.06	182	\$8.83	343	\$579.33	\$903.99	\$1,061.39	\$707.31	-169	3932	\$ 0.089	2.823	9124	\$ 0.003
May	30	29700	89936	115436	4200	25500	11015	18885	\$728.00	\$745.72	\$1,471.72	\$129.73	\$2,295.80	260	\$8.83	343	\$579.33	\$239.15	\$4,237.43	\$4,237.43	850	3948	\$ 0.143	2.728	8546	\$ 0.017
June	29	16200	109239	118839	8600	9600	7901	8298	\$520.75	\$331.22	\$851.97	\$126.67	\$2,335.84	187	\$8.83	343	\$579.33	\$409.34	\$1,218.17	\$2,266.30	331	4098	\$ 0.140	2.933	8708	\$ 0.009
July	31	18300	114283	126583	8000	12300	10019	8281	\$660.35	\$330.49	\$990.84	\$136.80	\$2,582.39	195	\$13.24	343	\$579.33	\$342.96	\$969.46	\$2,976.94	384	3956	\$ 0.163	2.805	8494	\$ 0.011
August	30	22800	110304	122304	10800	12000	8466	14334	\$567.99	\$572.07	\$1,130.06	\$130.87	\$2,661.84	201	\$13.24	343	\$579.33	\$969.82	\$405.40	\$3,126.88	400	4077	\$ 0.137	2.754	8073	\$ 0.013
September	30	14100	119371	124471	9000	5100	7883	6437	\$505.07	\$256.90	\$761.97	\$130.87	\$2,820.76	213	\$13.24	434	\$579.33	\$548.32	\$1,709.51	\$2,035.10	170	4149	\$ 0.144			#DIV/0!
October				0		0														\$0.00	#DIV/0!	#DIV/0!	#DIV/0!			#DIV/0!
November				0		0														\$0.00	#DIV/0!	#DIV/0!	#DIV/0!			#DIV/0!
December				0		0														\$0.00	#DIV/0!	#DIV/0!	#DIV/0!			#DIV/0!
Sum/MN	270	145800	1062224	1140524	67500	78300	62239	83561	\$ 4,102.20	\$ 3,334.15	\$ 7,436.35	\$124.46	\$ 19,695.45	182	\$2.7	282	\$476.30	\$4,392.17	\$7,771.36	\$ 21,041.73	#DIV/0!	#DIV/0!	#DIV/0!	21.838	69507	#DIV/0!
Ave	30	16200	118025	95044	7500	6525	6915	9285	\$ 455.80	\$ 370.46	\$ 826.26	\$ 129.84	\$ 2,188.38	206	###	333	\$ 544.99	\$ 488.02	\$ 971.42	\$ 1,753.48	#DIV/0!	#DIV/0!	#DIV/0!	2.730	8688	#DIV/0!
Max	32	29700	133967	140606	14400	25500	11015	18885	\$ 726.00	\$ 745.72	\$ 1,471.72	\$ 136.80	\$ 2,820.76	260	\$ 13.24	434	\$ 579.33	\$ 969.82	\$ 1,709.51	\$ 4,237.43	#DIV/0!	#DIV/0!	#DIV/0!	2.933	9535	#DIV/0!



Cost per lb BOD removed	#DIV/0!
Average kWh per day	540
Total charges per kWh	\$0.144
kWh per 1000 PE	5673
MWh/MG	0.20
kWh/1000lb of BOD/yr	62
MG/Year	737
kWh/MG/Year	198
\$/MG/Year	\$28.55
kWh/person/year	5.67



goal

<-5600

<-900

<-1600

Biogas Utilization 2012-2014

- Biogas Conditioning
 - Hydrogen Sulfide Removal
 - Siloxane Removal
 - Moisture Removal
- Biogas Generator
 - 180 KW (4320 KWh/day)
 - Heat recovery for digester heating and building heating



High Strength Waste Program

- Currently bring in over 2,000,000 gallons of HSW Annually
 - Dairy waste
 - F.O.G
 - Food Waste
 - Beer Waste
- Newly Constructed 40,000 gallon HSW tank (Brewery Project)
- Utilize two 6,000 gallon retrofitted tanks as HSW receiving tanks
- Currently generates over \$30,000 annually in tipping fees



Resource Recovery

- The Wastewater Treatment Plant recovers:
 - Clean water
 - 98% of the energy needed to run the plan
 - Nutrients that are applied to crops
 - Heat that gets used in the treatment process



Planning for Sustainability

- Energy Audit (Focus on Energy & others)
- Capital Improvement Plans (CIP)
- Follow-through
 - Staff and other champions are the only answer
- In all improvements, upgrades and planning - consider energy and sustainability



Thank You!



Mayor Mike Wiza
mwiza@stevenspoint.com
Stevenspoint.com
715-346-1570