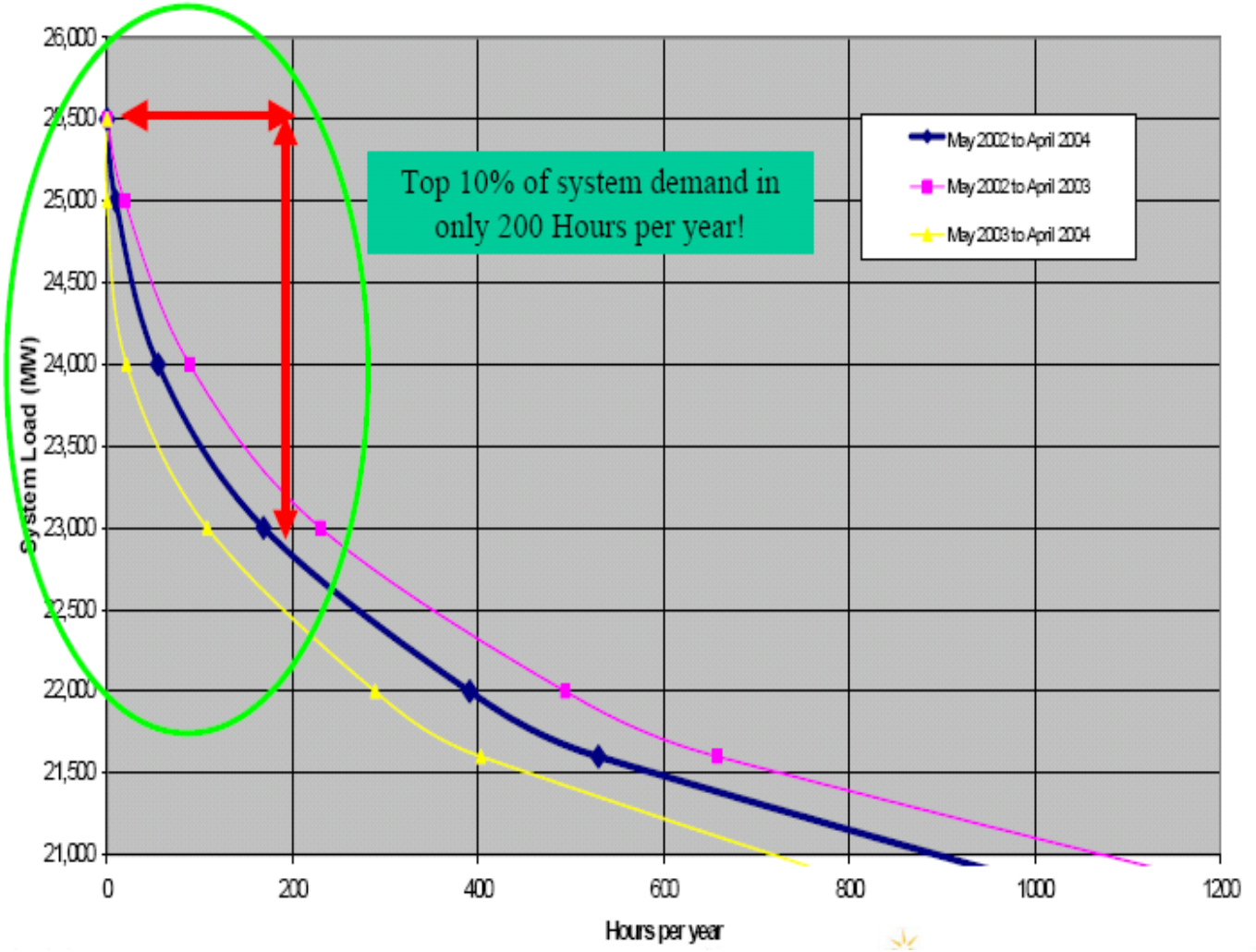
Wahoo Load Control Program

Cost Saving Switch(CSS) save You $$

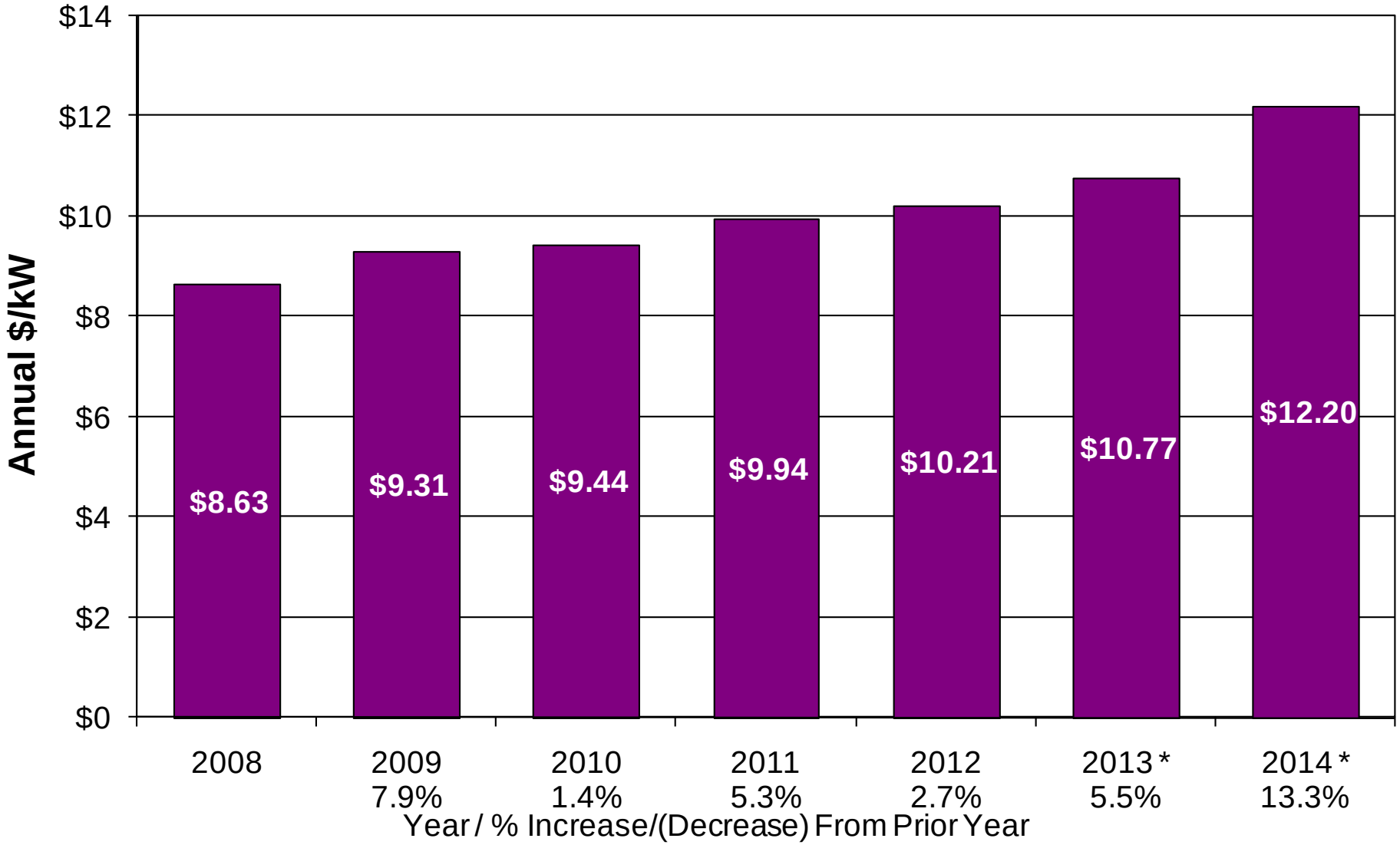
- Wahoo Utilities currently has some of the lowest electric rates in the state/nation. One of the ways of controlling costs is by the implementation of our load control program. By reducing our peak demand, with air conditioner and irrigation control, Wahoo Utilities customers help keep our rates low!

Demand Response: State of the Business

- Existing utility infrastructure strained by worsening load factor(Demand vrs Consumption)
- Peak demand continues to grow faster than supply
  - Total nationwide energy 1.4%/Yr
  - System peak nationwide growing at 2%/Yr
  - Total supply nationwide dropped 0.1% in 2006
- Demand control is the lowest total cost solution
  - $250-350/KW base generation vs. $700-850/KW for peak generation
  - Improved system reliability (reserve margin)
  - Reduced marginal supply costs


Top 10% of system demand in only 200 Hours per year!
May 2002 to April 2004
May 2002 to April 2003
May 2003 to April 2004
System Load (MW)
26,000
25,500
25,000
24,500
24,000
23,500
23,000
22,500
22,000
21,500
21,000
0
200
400
600
800
1000
1200
Hours per year

Forecasted Average Annual GFPS Demand $/kW

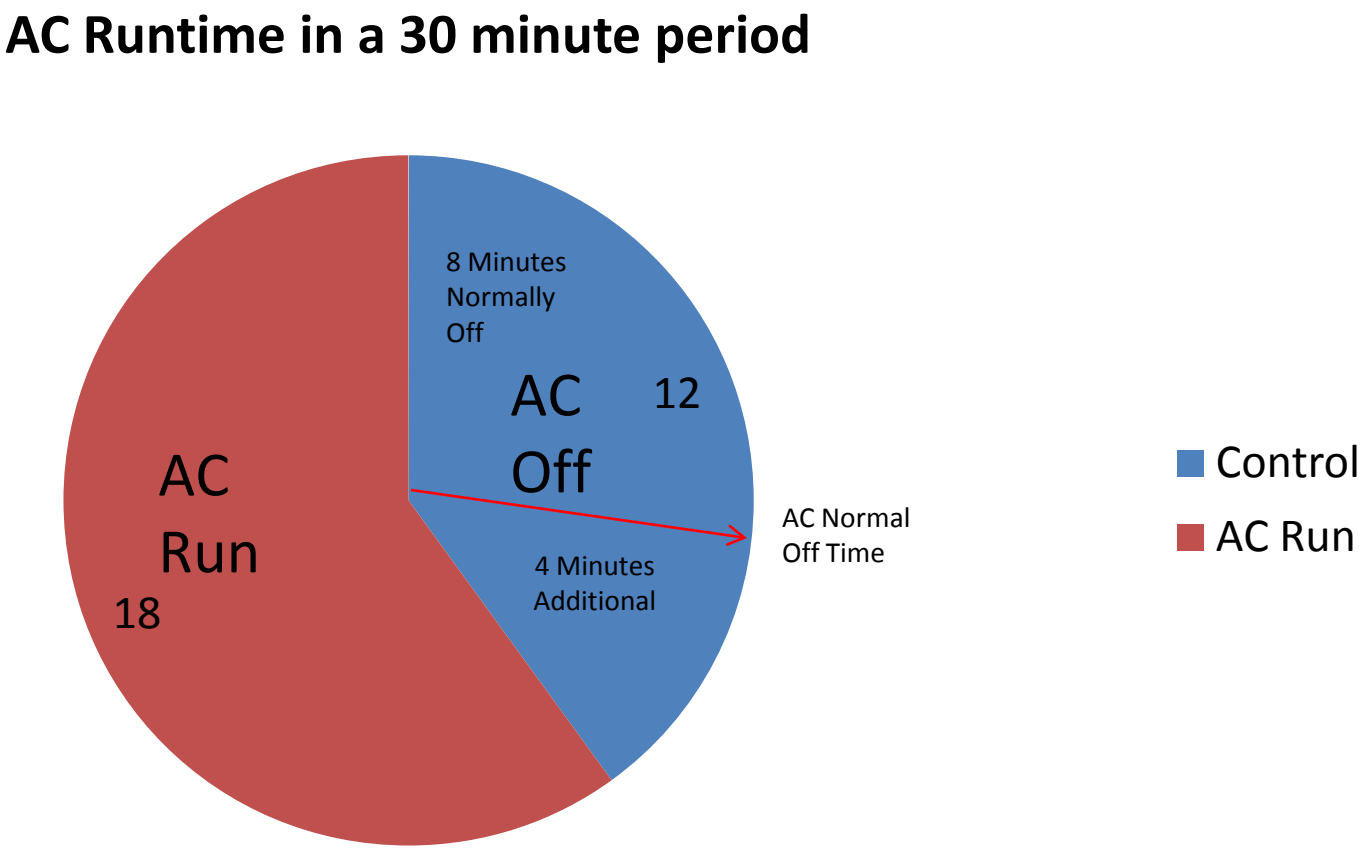


*Includes cost associated with the installation and operation of wet scrubbers on both Gentlemen Units

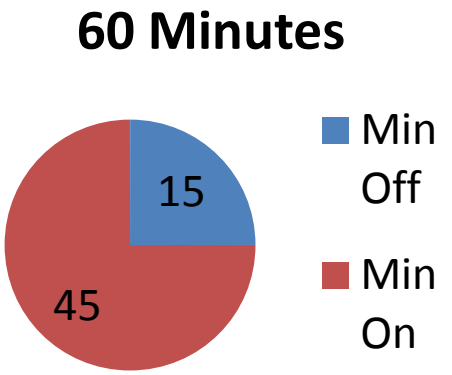
Air Conditioner and Irrigation load control

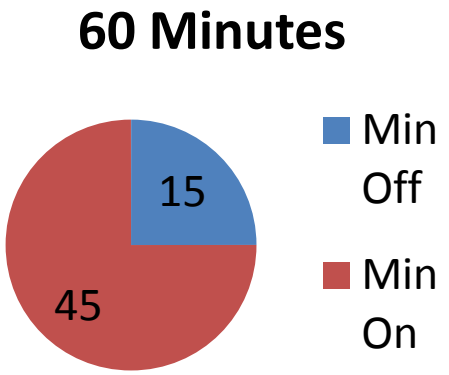
- NPPD sends out billable demand message for their anticipated peak days.
- At a locally determined threshold, Wahoo implements 5 groups of AC control and 1 group of irrigation.
- 10 different days of control in 2011
- Typical hours are from 3:00 P.M-6:00 P.M. Monday-Friday.
- 12 minutes control-18 minutes non-control for every 30 minutes.
- 14 hours/840 minutes for 2011.
- $700,000 savings in 10 years for every 1000 kW of demand reduction.

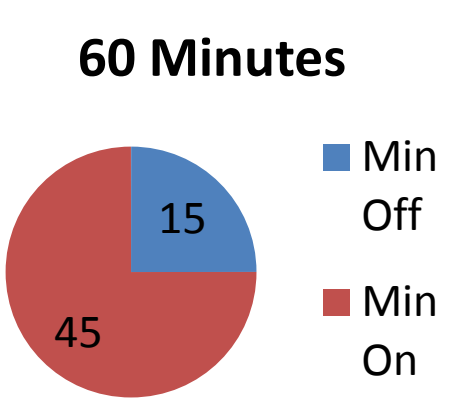
AC Run/AC Control minutes

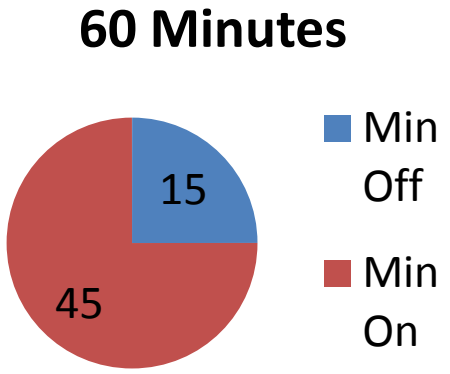


Uncontrolled with Normal Off Periods
4 kW Demand

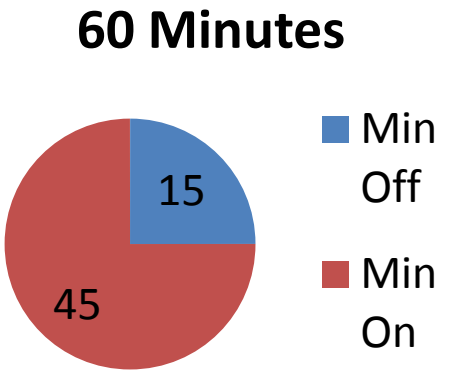


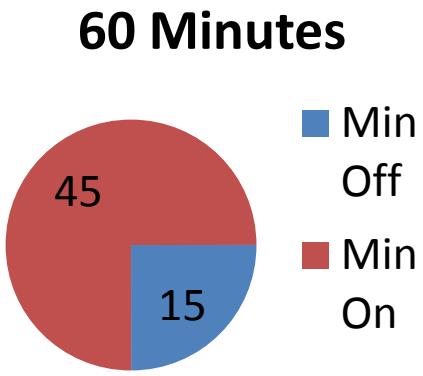


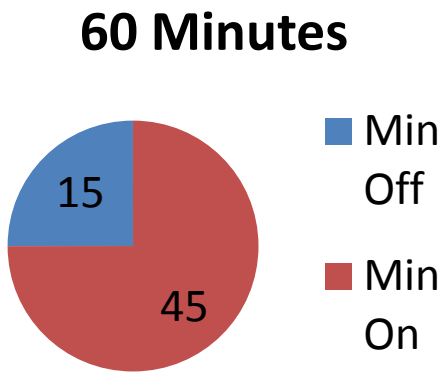


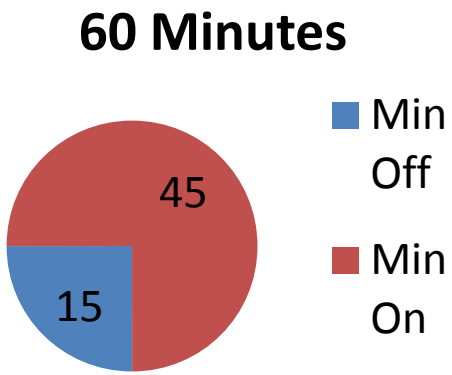


Controlled with Normal Off Period
3 kW Demand









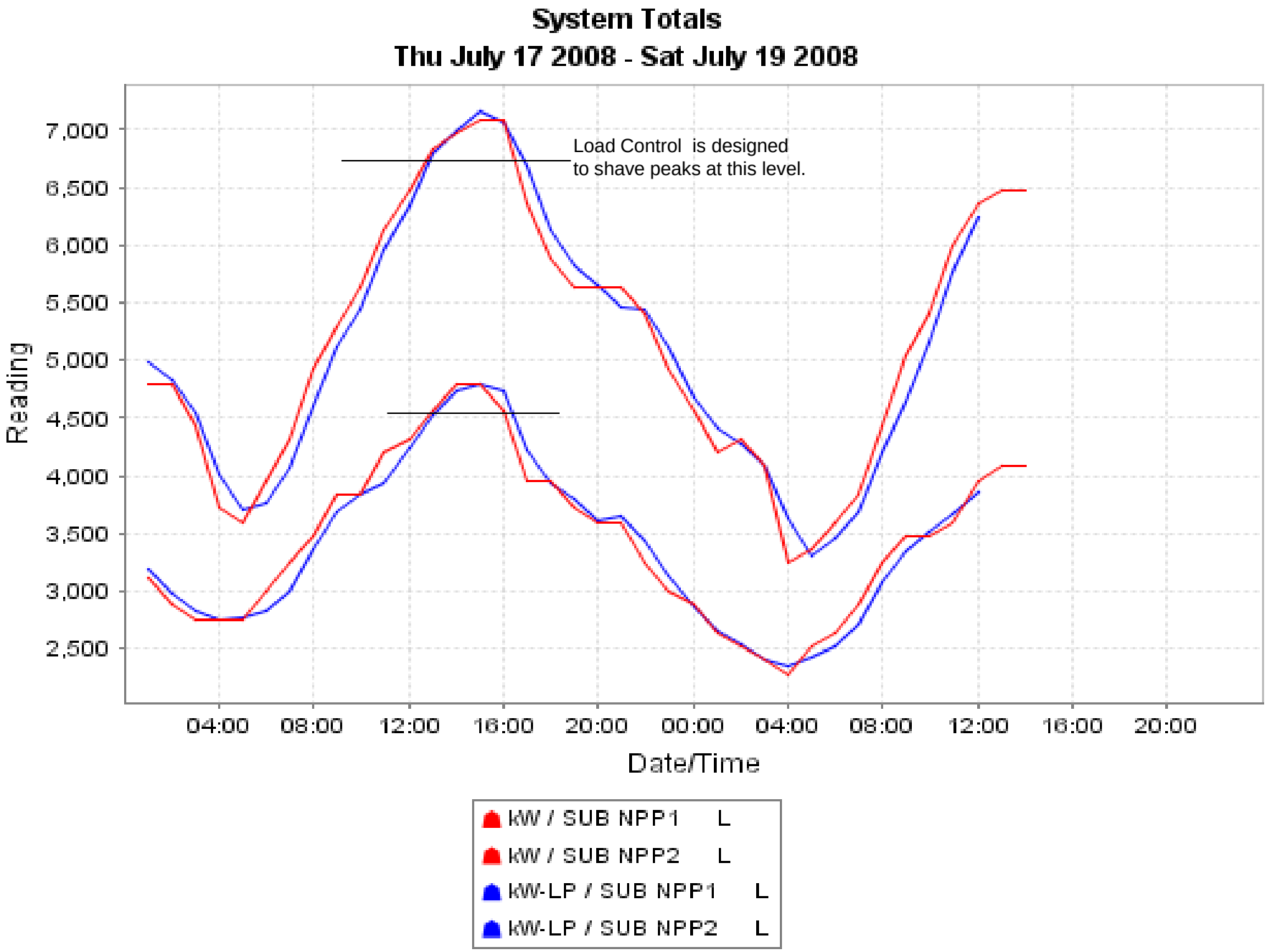
25% Reduction of demand & all A/C's run normal amount of time but at different times.

2011 Power Cost from NPPD

Gen Station Production Services		$ 113,016.32	$ 113,571.76	$ 83,819.04	$ 64,106.16	$ 102,494.40	$ 147,978.54	$ 151,638.14	$ 152,709.88	$ 152,709.88	$ 68,968.88	$ 75,508.40	$ 98,344.32		
Gen Station Reg & Frequency		$ 3,612.87	$ 3,612.87	$ 3,612.87	$ 3,612.87	$ 3,612.87	$ 3,612.87	$ 3,730.05	$ 3,730.05	$ 3,730.05	$ 3,730.05	$ 3,730.05	$ 3,730.05		
Gen Station Spinning Reserve		$ 1,600.76	$ 1,600.76	$ 1,600.76	$ 1,600.76	$ 1,600.76	$ 1,600.76	$ 1,653.26	$ 1,653.26	$ 1,653.26	$ 1,653.26	$ 1,653.26	$ 1,653.26		
Gen Station Supplemental Reserve		$ 228.68	$ 228.68	$ 228.68	$ 228.68	$ 228.68	$ 228.68	$ 236.18	$ 236.18	$ 236.18	$ 236.18	$ 236.18	$ 236.18		
Gen Station Reactive Supply		$ 1,070.48	$ 1,070.48	$ 1,070.48	$ 1,070.48	$ 1,070.48	$ 1,070.48	$ 1,105.20	$ 1,105.20	$ 1,105.20	$ 1,105.20	$ 1,105.20	$ 1,105.20		
Transmission Line		$ 29,438.20	$ 29,438.20	$ 29,438.20	$ 29,438.20	$ 29,438.20	$ 29,438.20	$ 30,393.00	$ 30,393.00	$ 30,393.00	$ 30,393.00	$ 30,393.00	$ 30,393.00		
Transmission Substation		$ 5,401.89	$ 5,401.89	$ 5,401.89	$ 5,401.89	$ 5,401.89	$ 5,401.89	$ 5,387.85	$ 5,387.85	$ 5,387.85	$ 5,387.85	$ 5,387.85	$ 5,387.85		
Total Demand Charges		$ 154,369.20	$ 154,924.64	$ 125,171.92	$ 105,459.04	$ 143,847.28	$ 189,331.42	$ 194,143.68	$ 195,215.42	$ 195,215.42	$ 111,474.42	$ 118,013.94	$ 140,849.86	$ 1,828,016	**Demand**
Gen Station On-Peak kWh		2,995,991	2,642,559	2,516,833	2,092,899	2,180,106	2,341,139	2,857,238	2,855,212	1,949,617	2,238,617	2,345,664	2,898,083		
Gen Station Off-Peak kWh		2,979,158	2,289,089	2,047,950	1,609,719	1,766,002	2,118,754	3,019,059	2,510,508	1,969,072	1,760,588	2,065,063	2,393,018		
Total kWh		5,975,149	4,931,648	4,564,783	3,702,618	3,946,108	4,459,893	5,876,297	5,365,720	3,918,689	3,999,205	4,410,727	5,291,101		
Gen Station On-Peak		$ 0.028000	$ 0.028000	$ 0.028000	$ 0.028000	$ 0.028000	$ 0.032710	$ 0.032710	$ 0.032710	$ 0.032710	$ 0.028000	$ 0.028000	$ 0.028000		
Gen Station Off-Peak		$ 0.018260	$ 0.018260	$ 0.018260	$ 0.018260	$ 0.018260	$ 0.023170	$ 0.023170	$ 0.023170	$ 0.023170	$ 0.018260	$ 0.018260	$ 0.018260		
Gen Station On-Peak		$ 83,887.75	$ 73,991.65	$ 70,471.32	$ 58,601.17	$ 61,042.97	$ 76,578.66	$ 93,460.25	$ 93,393.98	$ 63,771.97	$ 62,681.28	$ 65,678.59	$ 81,146.32		
Gen Station Off-Peak		$ 54,399.43	$ 41,798.77	$ 37,395.57	$ 29,393.47	$ 32,247.20	$ 49,091.53	$ 69,951.60	$ 58,168.47	$ 45,623.40	$ 32,148.34	$ 37,708.05	$ 43,696.51	$ 1,416,328	**Energy**
		$ 138,287.17	$ 115,790.42	$ 107,866.89	$ 87,994.64	$ 93,290.16	$ 125,670.19	$ 163,411.85	$ 151,562.45	$ 109,395.37	$ 94,829.61	$ 103,386.64	$ 124,842.83		
Energy		$ 0.023144	$ 0.023479	$ 0.023630	$ 0.023766	$ 0.023641	$ 0.028178	$ 0.027809	$ 0.028246	$ 0.027916	$ 0.023712	$ 0.023440	$ 0.023595		
		$ 292,656.37	$ 270,715.06	$ 233,038.81	$ 193,453.68	$ 237,137.44	$ 315,001.61	$ 357,555.53	$ 346,777.87	$ 304,610.79	$ 206,304.03	$ 221,400.58	$ 265,692.69		
												2011 Payment to NPPD		$ 3,244,344	

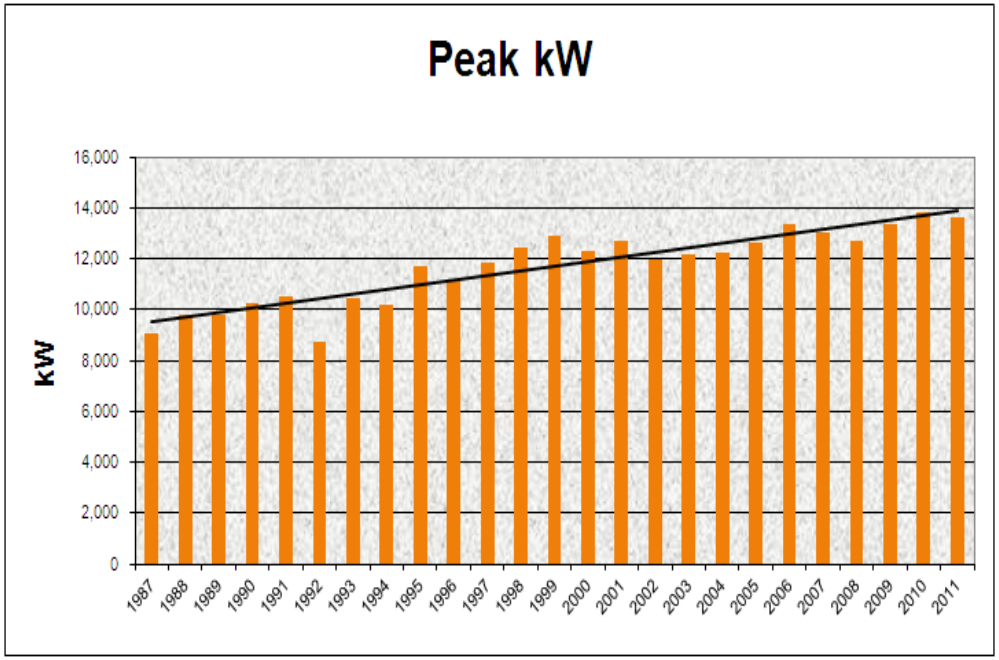
Wahoo Load Control

	Load Control	Approximate kW	Approximate Yearly Savings
2007	196 AC Load Control + 13 Irrigation(800kW)	996	$ 70,000.00
2008	236 AC Load Control + 13 Irrigation(800kW)	1036	$ 75,000.00
2009	543 Load Control + 13 Irrigation(800kW)	1343	$ 102,000.00
2010	970 AC Load Control + 13 Irrigation(800kW)	1770	$ 136,000.00
2011	1341 AC Load Control + 13 Irrigation(800kW)	2141	$ 164,000.00


System Totals
Thu July 17 2008 - Sat July 19 2008
Load Control is designed
to shave peaks at this level.
Reading
7,000
6,500
6,000
5,500
5,000
4,500
4,000
3,500
3,000
2,500
04:00
08:00
12:00
16:00
20:00
00:00
04:00
08:00
12:00
16:00
20:00
Date/Time
kW / SUB NPP1 L
kW / SUB NPP2 L
kW-LP / SUB NPP1 L
kW-LP / SUB NPP2 L

Peak kW

- Wahoo's load control program is designed to help keep customers electric utility costs down.
- Wahoo's electric peak demand(kW) continues to rise.



Vendor Background

- Wahoo's load control vendor serves nearly 400 electric utilities across North America. It's systems are used by many of the country's largest utilities to manage peak load, improve system power factor and improve substation reliability. They have systems at utilities of all sizes and have a staff of seasoned professionals who are expert in the field of power systems, metering and energy management.

Sample Cannon Customers

- Pacific Gas & Electric (CA)
- Alabama Power (AL)
- Dakota Electric (MN)
- WE Energies (WI)
- Indianapolis P&L (IN)
- Xcel Energy (MN, CO, TX)
- Progress Energy (NC)
- Idaho Power (ID)
- HECO (HI)
- City of Shakopee (MN)
- Alliant Energy (IA, WI)
- Toronto Hydro (Ont)
- Norris PPD (NE)
- 13 PPDs in Nebraska
- BG&E (MD)
- HydroOne (Ont)
- Nevada Power (NV)
- Consumers Energy (MI)
- Wabash Valley Power (IN)
- Com Ed (IL)
- LG&E (KY)
- San Antonio CPS (TX)
- Duke (NC, OH, IN & KY)
- Alabama Power (AL)
- Enersource (Ont)
- MidAmerican Energy (IA)
- Butler County PPD (NE)

Wahoo City Ordinance

- ***AIR CONDITIONERS***
- **§ 52.60 PERMIT REQUIRED.**
- (A) No person shall install an air conditioner within the city or its environs where supplied with electric current from the city electric system without first having procured a permit therefore from the Building Inspector, or to use such air conditioner during the period that a permit may be revoked.

- (B) The person making an application for and procuring a permit shall thereby consent that the Board of Public Works or its designated agent may check and inspect any air conditioner and its electric connections installed under such permit at any reasonable time without request of the permit holder or previous notice to such permit holder.

- ('72 Code, § 3-9 17) (Am. Ord. 1340, passed 4-19-90; Am. Ord. 1493, passed 4-13-95;
- Am. Ord. 1815, passed 10-24-02) Penalty, see § 10.99

Wahoo City Ordinance

- **§ 52.62 INSTALLATION REQUIREMENTS.**
- No unit of three-fourths horsepower or larger may be installed on less than 240 volts service.
- No air conditioner with a motor exceeding three horsepower actual rating shall be connected to a single phase service unless a special permit is granted by Utility Board or its Agent.
- Any user requiring three phase power for an air conditioner shall be subject
- at all times to any and all regulations of the city applicable to other three phase electric power users.
- All central air conditioners installed after April 15, 1990 must have a load
- control device approved by the Utility connected and operating. The load control device must not be disconnected there from without prior permission of the Utility.

- ('72 Code, § 3-919) (Am. Ord. 1340, passed 4-19-90) Penalty, see § 10.99