



Memo

To: Haines Borough Energy & Sustainability Commissioners
 Tom Bolen, Borough Manager
 Michael Byer, Superintendent of Schools
From: Stephanie Scott, Energy & Sustainability Coordinator
Date: February 13, 2009
Re: January 2009 KWH Reduction Targets

Response to Kilowatt-Hour (KWH) Consumption Benchmarks and Consumption Reduction Targets: January 2009

Each facility, save the Public Works Shops, has a benchmark that is the basis for calculation of the KWH consumption. Most benchmarks are the average of the KWH used over the same period for three consecutive years (2006,2007,2008). The exceptions are the ice house, the K-12 school, the new public works shop. The KWH use for 2008 is the benchmark for the K-12 school. A benchmark for the Public Works shop has not been finalized. Here is a chart of the status of KWH reduction efforts as of the January billing cycle (late December to mid January).

Facility	KWH December 2008	Benchmark (3-year average for January)	KWH January 2009	% Change January 2009 from Benchmark
Admin Building	2749	2878	2726	-5.3%
Public Safety Bldg.	5902	7442	6047	-18.7%
PW Shop: Old	2721	3337	2850	-14.6%
PW Shop: New	813	661**	1351	98.9%
Radio Tower	705	888	947	6.7%
Ports & Harbors	7513	10189	8929	-12.4%
Ice House	4240	3600*	3600	0%
Streetlights	30462	33328	32652	-2%
Chilkat Center	3520	3413	3760	10.2%
Library	7080	7453	9711	30.3%
Museum	2807	3321	4321	29.8%
Visitor Center	759	713	761	6.7%

Facility	KWH December 2008	Benchmark (3-year average for January)	KWH January 2009	% Change January 2009 from Benchmark
Water	7416	7885	8608	9.2%
Sewer	19108	21763	16486	-24.2%
K-12 School, Pool, Voc. Ed	94720	81045***	86720	7%
Mosquito Lake	3440	2853	6840	139.7%

* Ice House came on line May 2007. 2008 KWH is used as benchmark.

** Public Works moved into the new shop 12/18/08. The 2008 KWH consumption was used to benchmark the New Shop. However, those numbers are unreasonably low because the shop was not being actively used, though it was drawing electricity.

***The benchmark is 2008 KWH consumption.

Explanations for observed excesses and reductions were sought through interviews with personnel in the facilities. Charts showing the historical use and the benchmark calculation for each facility were provided.

Sector: Management & Safety: Administration Building, Public Safety Buildings, Public Works (Old & New shops), Port Chilkoot Fire Hall, Radio Tower

Administration, Public Safety, and the Old Public Works shop reduced kilowatt consumption the targeted amounts from the benchmark for January; however, the combination of the old and new public works shop (4245 KWH, January 2009) is 21% higher than the KWH used by both buildings in January 2008 (3518 KWH).

Administration Building. The reduction is due to a combination of conscientiousness on the part of staff (making sure equipment is not connected to a power source when not in use; turning off unnecessary lights) and to the incremental replacement of T12, magnetic ballast lights with the more efficient T-8 lights with electronic ballasts. There is room for additional reduction through the substitution of day lighting for room lighting when ever possible, the substitution of CFLs for remaining incandescent bulbs, installation of power strips that will automate the shut down of computer peripherals when computers are turned off at the end of the work period, installation of occupancy sensors in conference room, staff break room, and replacement of incandescent exit signs with LED exit signs.

Public Safety Building. Conversations with Scott Bradford, Jerry Blood, and Chief Gary Lowe indicate that savings are being realized primarily through conservation efforts. Lights are getting turned off; appliances unplugged. Using a kilowatt-meter, Chief Lowe documented the following: a charger plugged in, not charging a battery, will cost \$3-5/year; the computer, shut-off, but still plugged into the power strip will

cost \$35.00/year; a computerized digital frame (displaying pictures) will cost \$3.78 a year if left plugged in. Additional savings are anticipated by replacing incandescent exit signs and inefficient lighting, especially in dispatch.

Public Works Shop. According to a note from the Borough Accounts Payable Clerk, the “move-in” date for the new Public Works Shop was December 18, 2008. The new shop began drawing power August 2007. You can review the kilowatt-hour consumption history for new PW shop project on page 5 of this report. Given that public works just moved in to the new shop, the observed 99% increase in kilowatt consumption over last January is expected. The question is, "Is it possible to achieve a corresponding decrease in the kilowatt consumption of the old shop as a result of moving out?" There was a 14.6% decrease from the three-year January average for the old shop for the month of January 2009.

Public Works Director Bruce Smith explained that equipment now housed in the old shop would no longer need to be plugged in order to maintain engine block temperature. Additionally, manpower hours will be saved. When equipment was housed outside, operators needed two-additional hours to clear equipment of snow and ice to ready it for service. Some additional energy costs may be counter-balanced by savings in reduced personnel (maintenance) costs.

Radio Tower. The radio tower kilowatt-hour consumption exceeded its three-year January average by 6%. The kilowatt-hour consumption of the radio tower increased significantly over the December 2008 level (705 KWH in December compared to 947 KWH January 2009) but is slightly less than the 990 KWH used last January 2008.

The Chief of Police suggests that the more important question is, “Why was KWH consumption so low in December compared to previous Decembers?” The speculative answers to this question underscore just how electrical power is integral to our activities. For example, the KWH consumption of the radio tower depends on the number of radio transmissions made. The radio transmissions depend on the number of officers on duty, the status of car radios (working/not working), the number of transmissions needed (relates to number of emergencies/criminal activity encountered). And finally, the KWH consumed depends on the length of each transmission. The police department counts individual transmissions but not the length. In December 2008, there were 946 transmissions and 705 KWH consumed; in November there were only 836 transmissions, but 749 KWH consumed. In all of 2007, 23,662 transmissions correlate with 7,888 KWH for the tower; but in 2008, 19,529 transmissions correlated with 8,014 KWH.

There is an electric heater in the radio tower. Chief Lowe will determine the make and model so that the efficiency of the unit can be evaluated. It is possible that savings can be achieved with a more efficient unit.

Sector: Ports & Harbors

Ice House. Harbor Master Phil Benner explained that the Ice House and the Fuel Dock are on the same meter so it is inaccurate to attribute the total KWH now billed as “ice house” to the real KWH consumption of the facility. The icehouse electrical system is to be isolated in this year’s harbor project.

Sector: Outdoor Lighting

Streetlights. An investigation into energy saving LED streetlights is on going. Administration anticipates testing 8 streetlights to gauge efficacy and public opinion.

Sector: Water & Sewer

Borough water and sewer plant operators have taken thoughtful measures to reduce energy consumption. Assistant operator Dennis Durr outlined actions:

1. Installation of a programmable thermostat in the STP office, so the furnace pump and fan will run much less because the temperature is set to 60 on the weekends as well as when we are not here.
2. We turned off the small water heater in the shop because its use was rare, so we turn it on when we need to use it.
3. We cut back the blowers run time a few hours a day.
4. We are aware of phantom loads and unplug unused items.

There are many factors that influence energy consumption. Some are beyond human control. For example, Durr noted that, “ The STP plant flows may be less than the month you are comparing it to? The pumps would then run much less often.”

Sometimes mechanical events influence energy consumption. Mr. Durr pointed out the following: “ Our wastewater clarifier has been out of commission for a few months, this uses a small ¼ horse motor that runs 24 hours a day, once we get it back online we can compare the energy consumption again and see if this is a significant draw to the overall picture.”

Sector: Community Buildings

Every community building exceeded its benchmark. The Coordinator worked with building representatives to understand the data and to trouble shoot KWH consumption.

The Sheldon Museum. The museum has old supplemental electric heaters that were activated during the cold snap. The spike in KWH usage also led to the investigation of a possible short.

The Library. The library building committee is investigating the spike in its KWH consumption. Analysis leads them to believe that it is not associated with this year’s holiday lights. A tune of the heating and ventilation system is recommended. The committee is preparing a set of recommendations pertaining to conservation to the

full board. It has been noted that the outside lights for the library come on during daylight hours. The timing will be investigated.

The Chilkat Center. A list of actions that can be applied to conserve KWH at the Chilkat Center was provided for the Chilkat Center Advisory Board meeting. The suggestions follow:

1. Unplug the old refrigerator in the kitchen. It could be using as much as 79 KWH/month. If it is needed during events, plug it in then and only then.
2. Realize savings through manipulation of electric hot water. There is a small electric hot water heater that serves the Chilkat Center Commercial Kitchen. When I visited, it was set to 140-degrees and "on" 24/7. A hot water heater can use 4800 KWH/annually or 400 KWH/month. If it were turned off until required for an event, the Chilkat Center would move toward reduction targets.
3. In lieu of turning it off, try these three proven energy reduction steps from the Oak Ridge National Laboratory (see the full article at <http://www.homeenergy.org/archive/hem.dis.anl.gov/eehem/98/980907.html>)
4. Insulate the tank for an 11-40 KWH reduction monthly.
5. Set the hot water temperature back to 120-degrees for 11-18 KWH reduction monthly.
6. Install heat traps on the tank for an 18 KWH reduction monthly. (see apps1.eere.energy.gov/consumer/your_home/water_heating/index.cfm/mytopic=13100)
7. Check to make sure that CFLs are installed in all locations where lights are used intensively. Each CFL reduces energy consumption by 75%.
8. Put computers on power strips. Chief Lowe has established that a computer turned off, but plugged into the power source, continues to draw power and will cost at least \$35.00/year if not unplugged. Instead of pulling a plug, use a power strip and flip it off at night.

The Chilkat Center has 17 exit signs. The Borough plans to replace these with LED exit signs for an annual operation and maintenance savings of \$1,052 with a .9-year payback period.

Sector: School Buildings & Pool

Mosquito Lake School. Jim Stanford suggested that the spike in the KWH used by Mosquito Lake School might be caused by the extreme cold during the late

December-mid-January period. He explained (email 1/31/09) that although *“There is an existing heating loop that comes from the school boiler room that provides heat when the temperature is reasonable. I have noticed that below about ten degrees, it isn’t enough. Two electric heaters hang on the ceiling at the maintenance shop.”*

In response to the suggestion to replace the electric heaters with an oil-fired space heater, Mr. Stanford suggested consultation with Doug Murray, the engineer designing the new heating system for the Mosquito Lake School.

Mr. Stanford will note the make and model of the electric heaters. He characterized them as “archaic.”

A comparison of the temperature graphs of Dec-Jan, 2006, 2007, and 2008 compared to the same Dec.-Jan period 2009 shows that the current period (2009) was recorded colder than the past three years. The combination of cold weather and the high price of electricity in the Upper Chilkat Valley (>\$.60/KWH) suggest that it would be prudent to remove electrical heating units from the heat system for the building.

K-12 School, Vocational Education Building + Pool

The K-12 School, the Vocational Education Building, and the Pool all share an electrical service. During the 2007 January billing period, the high school, vocational building and pool were on one meter, the elementary school on another, and the primary school on a third. Although the new school complex seemed to consume less electrical energy than the separate buildings for this period in 2006, it exceeded January 2007 consumption in 2008 and exceed 2008 January consumption again in 2009. (See the chart on page 7.)

The Coordinator spoke with lighting engineer Barry Begenyi of Haight Associates February 13, 2009 about the apparent increase in KWH consumption. Mr. Begenyi stated that energy efficient electronic ballast T-8 fluorescent lights are used throughout the school. He suggested that the HVAC system might be responsible for the increased KWH consumption.

The Coordinator also spoke with Les Hostetler, Dawson Construction contractor for the K-12 school. Mr. Hostetler agreed that an HVAC (air exchange) system is energy consumptive. Additionally, the colder the exterior temperature, the “harder” the system needs to work to heat the fresh air coming into the building. Theoretically, then, there will be a correlation between KWH consumption and temperature. However, there should also be a correlation between KWH consumption and building use. The K-12 HVAC system can be calibrated to building occupancy and time of day. Thus, the system can be set to work “less” during weekends, evenings, vacations, and in-services. Setting the system requires collaboration between school program planners and maintenance as well as staff time needed to enter the required data.

Given that schools are technology intensive, it may be useful for the school district to launch a program to educate students, faculty, and staff about conservation measures that can be taken with respect to computer and office equipment use. A seminar for selected students in energy auditing is tentatively scheduled for March. Environmental Sciences teacher Pam Randles will conduct the seminar with assistance from the Energy & Sustainability Coordinator.

K-12 COMPLEX, HAINES TOWNSITE				
	2006	2007	2008	2009
JANUARY	76,709	78,181	80,800	86,720
FEBRUARY	90,379	92,485	106,880	
MARCH	77,373	74,354	103,040	
APRIL	83,766	90,965	95,040	
MAY	71,232	71,625	93,760	
JUNE	63,699	39,322	66,880	
JULY	45,405	25,430	41,440	
AUGUST	48,221	20,711	34,880	
SEPTEMBER	68,099	24,625	66,240	
OCTOBER	75,649	75,666	84,960	
NOVEMBER	67,655	67,707	89,760	
DECEMBER	82,054	66,220	94,720	
<p>2006 DATA REPRESENTS FULL USE OF TOWNSITE SCHOOL COMPLEX COMPOSED OF PRIMARY, ELEMENTARY, HIGHSCHOOL, POOL, & VOCATIONAL BUILDINGS</p>				
<p>JULY, AUG., SEPT. 2007 - OVERLAP WITH ELEMENTARY SCHOOL. ELEMENTARY SCHOOL CONTRIBUTED 19,680 KWH</p> <p>JULY - DECEMBER - PRIMARY SCHOOL CONTRIBUTED 8,655 KWH TO TOTAL.</p>				
<p>2008 DATA REPRESENTS KILOWATT CONSUMPTION OF NEW K-12 BUILDING (INC. POOL) AND VOCATIONAL BUILDING.</p>				