Energy Conservation for the Haines Borough

A Conservation Plan

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Introduction

Haines Borough Resolution 08-06-123, adopted June 10, 2008, established the position of Energy and Sustainability Coordinator. The resolution required the Coordinator to, "Create an energy conservation plan to reduce consumption a minimum of 5-7%, in all borough facilities. The resolution further required that, "Implementation and tracking of the conservation plan … be completed within 90-days of position start." The 90-day time line started September 15, 2008; therefore December 14 is the due date for this task.

Although the Coordinator is responsible for preparing and publishing a conservation plan, many others assisted. The Energy & Sustainability Commission provided oversight[i]. The Energy Conservation Subcommittee[ii] of the Haines Borough Energy & Sustainability Commission, and Tom Bolen, Borough Manager, consulted to establish benchmarks. Staff from the Haines Borough School District, and from the Haines Borough patiently provided information and insights. I would especially like to thank the following people: Haines Borough Manager Tom Bolen; Commissioners Tom Moody and Danny Gonce, Accounts Payable Clerk Cathy Keller, School District Administrative Secretary Ashley Sage, and Haines Borough Facilities Technician Ed Bryant. These are the people who I visited again and again, and will continue to visit as conservation efforts continue.

Borough Facilities Included

This Plan addresses the following twelve Borough facilities or functions:

Appendix B: Administration Building
Appendix C: Chilkat Center
Appendix D: Ports & Harbor (Boat Harbor, PC Dock, Lutak Dock, Ice House, NOAA Weather Station)
Appendix E: Haines Borough Public Library
Appendix F: Sheldon Museum & Cultural Center
Appendix G: Public Safety Building
Appendix H: Public Works Shop (Old & New)
Appendix I: School Buildings
Appendix J: Sewer Treatment Plant and Pumps
Appendix K: Street Lights & Parks
Appendix L: Water Treatment Plant and Pumps
Appendix M: Visitor Center
Appendix N: Monthly Energy Bills, August, September, October, November 2008

Energy data for those facilities and functions is compiled and graphically displaced in Appendices B-M to the Plan. Some elements have been grouped for illustrative purposes (i.e. plant together with pumps) but each element is separately tracked in its excel workbook.

This Plan does not include The Klehini Valley Fire Hall, the Senior Center, and the Human Resources Building. Borough Resolution 08-10-144 adopted by the Assembly October 28, 2008 removed facilities that are "…leased by non-borough organizations and/or not operated by the borough…unless the lessee or operator makes a request for participation." The Coordinator requested this action after encountering difficulty obtaining data from lessees. Each lessee received a letter November 5 inviting participation and listing data needed - historical to establish a record, and on going to evaluate efficacy of conservation measures. The lessees for the Senior Center and for the Human Resources Building have informally expressed interest in being included.

Strategy to Embed Energy Conservation in the On-Going Functioning of the Borough

The goal of this Conservation Plan is to establish a "conservation culture" within the Borough staff that allows this effort to extend beyond the term of the Coordinator. The Conservation Plan is based on active participation by Borough staff responsible for the operation of the facilities and services. Without the participation and cooperation of staff, recommendations have a much lower chance of being implemented and the likelihood that any benefits will be sustained is substantially reduced. In addition, responsible staff members have detailed knowledge of facilities and operations and are in a position to offer additional creative approaches to energy conservation. Their investment in and long-term commitment to energy conservation is critical to the success of this program.

The Coordinator and staff identified a number of initial conservation actions during site visits (see Appendix A), but discovery of additional conservation actions will be on going. The Coordinator will continue encouraging staff to implement as many of these actions as practical as well as brainstorm additional conservation actions. In subsequent visits, the Coordinator will serve as an information resource to assist staff in evaluating the merit of individual conservation actions. Finally, the Coordinator will supervise student "monitors" that will help create a "report card" to help staff evaluate actual energy savings.

Finally, on December 2, 2008, the Haines Energy & Sustainability Commission endorsed the following strategic steps toward establishing a dynamic climate of energy conservation throughout borough facilities:

a. Collect and analyze data for the existing energy use and trends for each facility and set a quantifiable conservation goals (5-7% reduction),
a. Describe these goals in terms readily related to actions (i.e., reduction in light use, temperature settings, other) likely to achieve the desired goals.
a. At the first site visit, describe conservation program to staff and managers and begin identifying initial conservation actions specific to a facility.
a. Share the conservation goals with each facility staff and/or manager and ask staff to help create additional conservation strategies (i.e. steps to take) to meet or exceed goal.
a. Check with staff on a monthly basis to help implement conservation strategies, provide cost and efficiency information, and supply feedback to measure conservation gains.
a. Collaborate with the school district high school science teacher to develop teams of high school students who could as "monitors" to report energy usage to facility staff on a bi-monthly basis.
a. Create a "report card" for individual facilities and/or the borough as a whole.

Plan Components

Existing Energy Consumption Data

September 17, 2008 the Energy Conservation Subcommittee of the Haines Energy & Sustainability Commission, the Coordinator, and the Borough Manager recommended that the Coordinator collect energy data for a three-year period for each facility and function. This Plan expressed energy consumption for heating as gallons delivered in any given month; and for electricity as kilowatt-hours (KWH) consumed in any given month.

Charts on the following page summarize three years of KWH consumption and heating fuel oil deliveries and trends for Borough facilities. Although there is an over all 17% upwards trend, there are "hot" spots that clearly call for prioritization in terms of conservation efforts.

ELECTRICAL USE BY FACILITY

January through November values only; to be updated.

	2006 Usage (kWh)	2007 Usage (kWh)	2008 Usage (kWh)	Usage trend (2006-2008) (%)
Administration Building	32,835	32,351	29,850	-9.1%
Chilkat Center	30,640	28,160	35,200	14.9%
Ports & Harbor	66,762	118,034	141,727	112.3%
Harbor Ice House	0	33,515	70,000	NA
Haines Borough Public Library	51,600	49,240	50,240	-2.6%
Sheldon Museum & Cultural Center	29,022	28,487	26,344	-9.2%
Public Safety Building	72,719	70,495	66,858	-8.1%
Public Works Shop	27,667	28,312	32,252	16.6%
Haines K-12 School & pool	684,292	593,364	776,234	13.4%
Mosquito Lake School	22,280	21,520	26,320	18.1%
Wastewater Treatment System	165,244	182,437	217,534	31.6%
Street Lights & Parks	224,833	217,692	223,381	-0.6%
Water System	98,825	61,494	66,827	-32.4%
Visitor Center	7,759	9,532	10,949	41.1%
Borough Facilities Totals	1,514,478	1,474,633	1,773,716	17.1%

HEATING OIL USE BY FACILITY

January through November values only; to be updated.

	2006 Usage (gallons delivered)	2007 Usage (gallons delivered)	2008 Usage (gallons delivered)	Usage trend (2006-2008) (%)
Administration Building	613	628	757	23.4%
Chilkat Center	6,647	7,892	7,131	7.3%
Haines Borough Public Library	1,887	1,819	2,487	31.8%
Sheldon Museum & Cultural Center	1,638	1,707	2,275	38.9%
Public Safety Building	3,563	3,078	2,703	-24.1%
Public Works Shop	2,675	2,924	3,410	27.5%
Haines K-12 School, Voc, Ed., Pool*	37,359	41,259	48,701	0
Mosquito Lake School	3,683	3,017	2,935	-20.3%
Wastewater Treatment Plant	4,794	6,196	4,558	-4.9%
Water Treatment Plant	2,691	2,992	2,319	-13.8%
Visitor Center	833	902	512	-38.5%
Borough Facilities Totals	66,383	72,415	77,787	17.2%

*2008 K-12 school data refers to new school only, therefore trend data is not applicable.

Benchmarks and Conservation Targets

Resolution 08-06-123 called for a 5-7 percent reduction of energy consumption. The first step, then, in determining the necessary actions to achieve that goal and to monitor progress is to establish benchmarks. For all facilities except the new school building, this Plan considers the monthly and quarterly three-year average energy consumption figures to be applicable benchmarks *for setting conservation targets.* The chart below, also found in Appendix B, Administration Building, is an example of the kilowatt-hour reduction target based on such a benchmark.

Administration Building Kilowatt-Hour Reduction Targets

	2008 Monthly Use	Three year Average monthly kWh Use	2009 - 5% Reduction Target	2009- 6% Reduction Target	2009 - 7% Reduction Target
January	2,857	2,878	2,734	2,705	2,677
February	2,914	2,905	2,760	2,731	2,702
March	2,837	2,768	2,630	2,602	2,574
April	2,844	3,230	3,069	3,036	3,004
May	2,704	2,892	2,747	2,718	2,690
June	2,754	2,903	2,758	2,729	2,700
July	2,470	2,882	2,738	2,709	2,680
August	2,643	2,876	2,732	2,703	2,675
September	2,684	2,858	2,715	2,687	2,658
October	2,579	2,893	2,748	2,719	2,690

Because heating oil was not delivered or billed to Borough facilities on a regular monthly schedule, quarterly volumes were used to evaluate existing usage, identify a benchmark value, and establish conservation targets. Reduction targets for heating fuel consumption are also based on a three-year quarterly average or benchmark. See the chart below also from Appendix B, Borough Administration Building, as an example.

Administration Building Fuel Oil Delivery Reduction Targets

	Quarter Fuel Oil Average	2009 - 5% Reduction Target	2009 - 6% Reduction Target	2009 -7% Reduction Target
Quarter 1	483.47	459.29	454.46	449.62
Quarter 2	134.30	127.59	126.24	124.90
Quarter 3	48.37	45.95	45.46	44.98
Quarter 4				

Quarterly and three-year averages also help “smooth” out the effect of weather and event variables on the data.[iii] For example, fuel oil use is heavily dependent on ambient temperatures and will increase during cold winters and decrease in mild winters. However, this climate variable will make the task of identifying conservation strategies and tracking progress more difficult.

The 3-year average used as the “benchmark” may not be optimum. Benchmarks can and should be changed if the Borough identifies a more useful measure.

Individual Facility Conservation Goals

The Coordinator will provide baseline information will be provided to individual facility managers. The Coordinator will also provide facility managers with conservation goals established at 5%, 6%, and 7% of the benchmark as illustrated on page 5.

Site Visits

The Coordinator and Commission members have conducted initial site visits at most of the facilities. During these visits the Coordinator described the program and conservation targets. The Coordinator also discussed the importance of behavioral actions, (power strips, phantom loads, etc.) and Identified a set of initial conservation actions that could be easily and inexpensively implemented.

Facility staff provided valuable insights into facility equipment and operations. Working together, the Coordinator and facility staff identified a variety of additional conservation actions that require additional assessment were identified. Finally, the Coordinator requested staff, as time permits, to inventory all energy users (lights, appliances, furnaces, etc) to collect data on energy use, age, and estimated weekly use. The Coordinator and facility staff will use this inventory data to evaluate the potential for cost-effective additional conservation opportunities.

Types of conservation actions (Appendix A)

- No Cost: Turn off lights, power strips, unplug unnecessary appliances, signs for public to turn off lights, remove old unused appliances, enable power management features, remove screen saver from computer, etc. These were most commonly identified in initial site visit.

- Low Cost: Replace lights, purchase more efficient appliances, install timers, occupancy sensors, install or replace weather-stripping, etc.

- Capital Improvements: Replace or install insulation, replace windows, upgrade or replace heating and ventilation systems, replace street and dock lights with energy efficient LEDs, etc.

Some actions primarily reduce electricity consumption; some primarily reduce the cost of heating. Appendix A sorts the actions by the major source of energy that the action is intended to conserve, as well as by type of action: no cost, low cost, capital investment.

The Coordinator and members of the Commission will conduct follow-up visits to each facility on a monthly basis to assess conservation gains, discuss additional actions suggested by staff, answer questions, and provide additional information. Coordinator, Commission members, and student monitors will assist facility staff in gathering cost, efficiency, or other data necessary to evaluate new conservation actions.

Student "Monitors"

As part of a parallel energy conservation curriculum integrated into the High School science classes, student teams will read electric meters bi-monthly and report results to facility staff. Students will record energy savings, discuss existing or new conservation actions with facility staff, and conduct research into energy efficiencies and conservation.

Progress Reports

A monthly "report card" will be prepared by the Coordinator and student monitors to assist facility staff and managers assess their progress toward meeting energy conservation goals. The report card should serve as a useful and positive tool for staff to assess progress on a facility-by-facility basis. This reporting tool will not be useful in comparing one facility's progress with another's because some facilities are currently more efficient and lack the potential for large conservation gains, while others have greater potential for improvement and may show greater gains.

The Coordinator will summarize the results in monthly progress reports to the Assembly and Borough Manager.

Related Plan Components

Facility Energy Audits

Resolution HB 08-06-123 stipulated that three facilities should receive professional energy audits to identify, quantify, and prioritize actions that could help meet conservation targets. Based on site visits, the Coordinator recommends that the Water Treatment Plant, the Sewer Treatment Plant, the Public Safety Building, and the Visitor Center be considered for professional energy audits. The Energy & Sustainability Commission, tasked with making a recommendation to the manager, will consider this matter at its December 23

meeting. Such audits, if authorized, should not replicate the Heat Loss Analysis performed for the Sheldon Museum by AK Warm Energy Rater Geoff Feiler in 1998; the Condition Survey performed for the Chilkat Center by PND Engineers in 2008; or the information collected and reported on the Visitor's Center by Ed Bryant, Borough Facilities Maintenance Technician June 2008.

Monthly Municipal Energy Bill

A monthly municipal "Energy Bill" reports the current month's expenditures in gallons of fuel oil delivered, kilowatt-hours consumed, and gallons of vehicle fuel consumed. Comparisons are made graphically for past months. Regular and easy access to public energy consumption data helps keep the importance of energy conservation in the public sector in the public eye, thus contributing to a positive climate for energy conservation.

High School Student Energy Audit

At the invitation of Superintendent Byer, the Coordinator met with high school science teacher Mark Fontenot and Commissioners Melissa Aronson and Frank Holmes to plan to engage students in an analysis of the energy consumption of key sections of the K-12 school building. The first focus will be on the energy consumption of the pool.

KHNS Energy Forum

The Coordinator, with guidance and approval from the Commission, produces *Energy Talk*, a weekly 15-minute radio show. Each show features a resident of Haines who is knowledgeable about energy conservation and local applications of renewable energy technology.

A sentiment often expressed is that energy conservation is not "rocket science," and that we do not need to hire outside experts to tell us how to conserve or how to capitalize on renewable sources of energy. There are in fact, local experts in these areas. *Energy Talk* is designed as a forum for these local experts so that neighbors know to whom they can turn for answers and advice.

Individual Energy Commendations

Borough staff has already taken an initiative to conserve energy and reduce related costs. It is important to publicly commend this initiative because: 1) signals that energy conservation is important to the Borough; 2) recognizes initiative; and 3) broadens the notion of the "energy conservation 'expert'. The last reason is particularly important because it teaches the community that truly, energy conservation is everyone's responsibility.

To date, the Energy & Sustainability Commission has recognized and commended Cathy Keller, Accounts Payable Clerk, and Ed Bryant, Facilities Maintenance Technician for their efforts to reduce costs and conserve energy. Ms. Keller recouped nearly $10,000.00 in Power Cost Equalization Credits for the

Borough; and Mr. Bryant initiated a re-lamping program, changing T12 magnetic ballast lamps to energy efficient electronic ballast T8s.

Institutionalizing Energy Conservation

Energy conservation can become a strong and long-term part of the Haines Borough government. Site visits revealed that individuals on staff are already making significant contributions. There are many examples. Here are four:

Visitor Center staff installed CFLs in 7 lights March 2005. The lights are on at least 8 hours a day, 5 days a week, not counting events on weekends. From 2005 to the present, they have changed each light just once. A little simple math shows that staff initiative **reduced the cost** associated with this particular lighting requirement at the Visitor Center by **77%** for more than three years running!

Electrical consumption at the Administration building has **trended down** from 2006 to 2008, sometimes by as much as **17%.** See trend data in Appendix B. Staff in this building has absolutely no qualms about turning lights off whenever they are not necessary.

Winterization of the public restrooms next to the Visitor Center in 2007 resulted in a **36% decrease** in fuel consumption first quarter (2007 v. 2008) and a **56% decrease** second quarter (2007 v. 2008). The Borough Facilities Maintenance Technician performed the work.

The Harbor Master disassembled one of the lights at the PC dock to discover whether or not an energy efficient light could replace it. Research by a local supplier found that it could not be replaced.

But there are also examples of actions taken that inadvertently maintain or increase energy consumption levels. Here are a few:

Installation of T12 fluorescent bulbs and magnetic ballasts in place of the more efficient electronic ballast T8s.

Accepting the donation of old appliances; the need was documented but the long-term cost of energy consumption compared to current models was not considered.

Chargers plugged in but nothing being charged, screen savers installed on modern LCD monitors that no longer benefit – screen savers are energy consuming eye candy with current computer monitors.

Decisions regarding settings for room and water temperatures.

Conclusion

Energy conservation, if it is to become a permanent part of the culture of the Haines Borough, should be stated as a broad public policy through a resolution of the Haines Borough Assembly and reflected in its annual budget process, and further supported by the administrative directives of the Borough Manager. If a policy of energy conservation and energy efficiency is formally adopted, energy conservation and efficiency become formal factors in making all decisions – decisions about purchases, decisions about operations. In the absence of a policy position, energy conservation and efficiency criteria may be arbitrarily applied or overlooked altogether. In the absence of authorization by Borough management and endorsement by Borough leaders, the actions in Appendix A, as well as those that continue to emerge from analysis, risk remaining paper tigers.

Appendix A: Conservation Actions – A Beginning

"Conservation is your first fuel."

-Steve Haggenson, Executive Director of the Alaska Energy Authority, addressing the Community at the Energy Town Hall Meeting, Summer, 2008, Haines Borough Public Library

Actions are labeled for ease of identification. Borough management and the Assembly may wish to establish priorities.

All Purpose No Cost Action

A. Assemble and keep current energy-related information; Appoint a person in each facility to be the Energy Consumption monitor. There is an old management adage: "You Can't Manage What You Don't Measure." The first step is an inventory of all powers users with a facility. The inventory should include power user, power use, hours of use, and age. According to Building Operation Management, April 2008, "Facilities that maintain computerized energy data are often among those with the lowest energy costs"[iv]. When needed the Coordinator will transfer up-to-date energy-data excel workbooks for each department or function to individuals designated by borough management. Since the Coordinator position is temporary it is important to transfer the tracking and measurement task to permanent staff.

B. Adopt a purchasing policy that prioritizes energy conservation and efficiency. For example, purchase only ENERGY STAR[v] products; or require energy consumption and efficiency data for requested purchases; or require evidence that the most efficient, least consumptive product is requested for purchase.

C. Include Energy Efficiency Standards in Requests for Proposals (RFPs). For example, require RFP respondents to specify energy consumption and efficiency levels. RFPs that address energy efficiency such as efficient thermal envelops, efficient space and water heating, lighting, controls and monitoring, and appliances are sometimes called "Green RFPs"[vi]. Communicate that more efficient, less consumptive projects may be more favorably considered.

Electricity

No Cost Action

A. Switch Off All Unnecessary Lights. Use common sense and personal responsibility, dimmers, motion sensors, or occupancy sensors to automatically turn off lighting when not in use to reduce energy use and costs. There are many dimmers, motion sensors, or occupancy sensors, but the US DOE, EERE publishes an interesting rule of thumb: *Better energy savings are usually attained from sensors that are manual-on/automatic-off. These avoid unneeded turn-ons*[vii]. The idea that lights use extra electricity to start up is a myth. Electricity (measured in KWH) will be saved every time a light is turned off, no matter how short the duration, no matter whether it's an incandescent, a compact fluorescent, a tubular fluorescent, a halogen, or an LED. Although it is true that fluorescents do get worn out by cycling off and on, the effect is so small it is negligible. Remember: *"The cheapest unit of energy is the one you do not use."*

Example: Staff at the **Public Safety Building** stated that they frequently return to the building to find the lights in the hallways and restrooms left on after a public event. Here is the typical range of energy savings in various types of spaces afforded by occupancy sensors[viii].

Savings range by a factor of two or three in most applications, with the exception of open-plan offices. Actual savings may differ.	
Type of room	**Energy savings (%)**
Private office	13 to 50
Open-plan office	20 to 28
Classroom	40 to 46
Conference room	22 to 65
Restroom	30 to 90
Corridors	30 to 80
Storage area/closet	45 to 80

B. Minimize Streetlights. Ask the Public Safety Commission to work with the Police Department to determine the minimum number of streetlights that required for public safety. This will be especially important during an emergency power reduction.

Haines pays the electric bill for 324 streetlights: 210 100-watt lights and 114 250-watt lights (however, a "handful" of the 250-watt lights are 175-watt

mercury vapor lamps, billed at the higher 250-watt rate because of higher use.)[ix]

Here is the usage data for streetlights:

	210 lamps, 100-watt	Cost at current (11/2008) KWH rate ($.1444)	**114 lamps, 250-watt**	Cost at current (11/2008) KWH rate ($.1444)
2006 Annual KWH	108,471		143,301	
2007 Annual KWH	103,841		138,735	
2008 Annual KWH YTD (Jan-Nov.)	94,920	$13,706.45	125,400	$18,107.77

The Borough currently pays $.1444/KWH for streetlights. Rates have changed over time. Recently electricity rates are trending down.

Here is a chart showing the estimated potential savings to the Borough if some lights had been turned off during the first 11-months of 2008.

% Reduction	**100-watt lamps (210)**	**250-watt lamps (114)**
1%	Save $137, turn off 2	Save $181, turn off 2
5%	Save $685, turn off 11	Save, $905, turn off 6
6%	Save $822, turn off 13	Save $1086, turn off 7
7%	Save $959, turn off 15	Save $1268, turn off 8

C. Unplug equipment that drains energy when not in use (i.e. cell phone chargers, battery chargers, coffeemakers, microwaves, desktop printers, radios, speakers, etc. Unfortunately, the only way to know if an appliance or office equipment is drawing power is to test it. Therefore, the Borough should purchase hand-held electricity usage meters – at least one for each facility. There are several on the market. For example, the P3 Kill-a-Watt EZ, registers power as low as 1 watt. It is easily programmed with the rate per KWH. It will project the cost so users can see how much it is actually costing the Borough to power any particular item for a day, a month, a week, or a year. Supply each facility with as many power strips as needed in order to make it convenient to cut the power supply to items that would otherwise drain power if plugged in overnight or over the weekend.

D. Turn off computer and monitors at the end of the workday; remove screen savers. If away from station for an extended time, turn off monitor. A typical desktop computer uses 65 to 250 watts. An old CRT 17-inch monitor uses about 80 watts, whereas the typical LCD monitor uses 35-63 watts, with Apple monitors tending towards the high end. A monitor turned

off at the switch uses 0-10 watts. A monitor on a screen saver uses as much power as a monitor "on." The only way to tell how much power a computer is using is to plug it into a wattmeter. The label on the computer tells the theoretical maximum not the typical amount used. A computer processing graphics or crunching numbers with all its drives working will use more than when it is word-processing or checking email.

E. Enable all power management features. A sleeping computer or a computer on standby uses 1-6 watts compared to 60-250 watts when in use. A sleeping monitor uses 0-15 watts (dark screen). Here's how to enable power management:

- In **Windows XP** go to **Start** > **Control Panel** > **Power Options**
- On a **Mac** go to **Systems Preferences** > **Energy Saver**

F. Go offline when not using the Internet. Computers use more power online than offline. A sleeping monitor uses 0-15 watts (dark screen)

G. Turn off photocopier at night or make sure low standby feature is enabled.

H. Use task lighting at workstations, focusing light where needed instead of lighting an entire room. On average, workstations are illuminated by two or more tubular fluorescent lamps. One task light is less expensive to operate than two ceiling mounted tubular fluorescents, even assuming that the more efficient T8s are installed.

> Here's the math:
>
> Two T8s = 256 KWH = $36.97
> One 23-watt CFL task light = 46 KWH = $6.64
>
> **Estimated Savings**: An **82%** savings in operating costs, and an 82% reduction in KWH consumption.

I. Turn down the thermostat setting on your water heater. For each 10°F reduction in water temperature, you can save between 3%–5% in energy costs.

Although some manufacturers set water heater thermostats at 140°F, most of the Borough hot water use is only requires 120°F. Water heated at 140°F also poses a safety hazard—scalding.

Reducing water temperature to 120°F also slows mineral buildup and corrosion in water heater and pipes. This helps a water heater last longer

and operate at its maximum efficiency.[x] If the office is closed for at least 3-days, turn the thermostat down to the lowest temperature or turn it off altogether. Turn it off at the circuit breaker.

If necessary, install an automatic timer to turn the hot water heater off at night and over weekends. Timers can cost as little as $30.00.

J. Drain water tank periodically to maintain efficiency. *Drain a quart of water from your water tank every 3 months to remove sediment that impedes heat transfer and lowers the efficiency of your heater. The type of water tank you have determines the steps to take, so follow the manufacturer's advice.*[xi] If this is to be effective, someone must be tasked with maintaining a maintenance schedule.

Low Cost

A. Replace all incandescent lights and fixtures and magnetic ballast fluorescent lamps with energy efficient lighting technology. Prioritize the re-lamping program by targeting lights that are used continuously as are the lights in Dispatch, some lights in the emergency vehicle bay at the Public Safety Building, streetlights, dock lights, harbor lights.

The US Department of Energy released a report September 2008 that shows that lighting accounts for 38% of the kilowatt-hours consumed in non-mall buildings[xii]. The only use that comes close to that is refrigeration, which accounts for 10% of the end use in the sample over all. This holds true no matter where in the country the building is located, no matter how large or small the building, no matter when constructed (from before 1920 to 2003), no matter what the climate. The only time lighting does not account for the greatest consumption is if the building activity is primarily food sales or food service. Then refrigeration tops lighting. There is no reason to assume that the municipal buildings in Haines have any different energy consumption pattern. Therefore, the most cost effective response to reducing energy consumption is to reduce the kilowatt-hours consumed by lighting. This does not necessarily mean turn off all lights, although installing motion detectors in areas where lights are chronically left on is reasonable. What it does mean is to replace inefficient lights with more efficient lights. It means investing upfront in the usually more expensive lighting technology in order to reap the savings long term.

As recommended by the *Energy Star Guide for Small Business* [xiii], implement this step by installing energy efficient lights especially where

lights are left on the longest.

Example #1: Replace Incandescent Exit Signs in the **Public Safety Building** with LED Exit Signs. See important End Note on formula for calculating kilowatt hour (KWH) consumption and costs.[xiv]

Exit signs must be lit 24 hours a day, 365 days a year. Six of the 8 exit signs in the public safety building are lit with incandescent bulbs. An LED exit sign draws 5 watts; a traditional incandescent exit sign draws 36 watts. If the Borough changes the 6 incandescent exit signs in the Public Safety Building to LEDs, the Borough will save $372 in a year. Given initial additional cost of the unit of $57 (estimated retail), the simple payback period is .9 years or between 10 and 11 months. These figures are easily verified using the US Department of Energy, Energy Star Life Cycle Cost Estimator for LED Exit Signs[xv].

Since rates may change, the Borough conservation plan measures progress toward targets in the units of energy consumed. Exit signs consume kilowatt-hours. Six incandescent signs consume 315.36 kilowatt hours compared to 43.8 kilowatt hours consumed by the LED signs – **an estimated 86% annual reduction** in consumption.

Example #2: Complete replacement of the T12 magnetic ballast lamps in the **Administration Building** with T8 electronic ballast lamps.

There are 40 two-lamp T12 magnetic ballast lamps in the Administration Building. During 2008 half of them have been replaced by T8s that probably accounts for the downward trend of kilowatt consumption in this building. Assuming that 1) the lamps are on 8 hours a day, 250 days a year (50 5-day weeks); 2) a two-lamp 4-foot T12 uses 94 watts; a two-lamp 4-foot T8 uses 64 watts; 3) electric rate of $.1444/KWH[xvi], then 20 T12s changed to T8s represents a reduction of in annual KWH consumption of 1360 KWH.

Here's the math:

((94*8)/1000) * 250 * 20) = 3920 KWH for 20 T12s = $566.05
((64*8)/1000) *250 * 20) = 2560 KWH for 20 T8s = $369.66

Estimated savings: 35% savings in operating costs, a 35% reduction in KWH consumption

Example #3: Replace incandescent bulbs in **task lights** at workstations with Energy Star Qualified compact fluorescent (CFL) bulbs, which come with a 2-year warranty. Task lighting lights the work area instead of brightly lighting an entire room.

CFLs use 2/3 less energy than standard incandescent light bulbs and last up to 10 times longer. They produce 70% less heat so they are safer. They come in different sizes and shapes to fit almost any fixture. For concerns about the mercury content and disposal see Energy Star FAQ[xvii] and the EPA Fact Sheet[xviii].

Using the Energy Star CFL Cost Calculator[xix], the Borough can quickly calculate the savings to the Borough of replacing incandescent bulbs with CFLs. The initial cost difference ($3.50 for a CFL v. $0.50 for an incandescent) is recouped in 6 weeks of use and then savings continue to accrue. The bulb will last 10,000 hours compared to the 1000-hour life of the incandescent, so to maintain an incandescent lighting regime the Borough will ultimately pay $3.00 for the 10 bulbs that it will need to the one CFL, and the Borough will be paying more for the illumination.

Here's the math comparing the operating costs of three 100-watt task lights on 8 hours a day, 250 days a year to a 23-watt CFL that gives the same amount of illumination.

((100*8)/1000)*250*3) = 660 KWH for 3 incandescent 100-watt lights = $95.30
((23*8/1000)*250*3) = 138 KWH for 3 CFLs = $19.93

Estimated savings: A **79%** savings in operating costs, a 79% reduction in KWH Consumption.

Example #4. Replace all incandescent holiday lights with LED (Light Emitting Diodes) holiday lights. Even though the energy for the holiday lights on Main Street are paid for by the State of Alaska, the calculation below of the energy the incandescent lights consume compared to the energy consumed by equivalently bright LEDs is a good example of the savings a municipality can experience by establishing a policy of LED only holiday lights.

The week of December 1, the Haines Borough Public Works Department prepared 11 40-bulb strings of incandescent holiday lights for display. They are on throughout the night, and into the morning. They are still on at 10 AM. A fair estimate of time "on" is 16 hours. A

traditional incandescent C9 or C7 bulb consumes 5-7 watts. Using the smaller number of watts, a 40-bulb string draws 200 watts. One string of 25 equivalently sized LED lights draws 2.4 watts; so two strings draw 4.8 watts.

Here's the math:

11, 40-bulb strings of incandescent holiday lights on for 16 hours a day, for 30 days = ((200*16)/1000) *11*30 = 1056 KWH = $152.49
18, 25-bulb strings of LED holiday lights on for 16 hours a day, 30 days = 2.4*16/1000*18*30 = 207.4 KWH = $29.94.

Estimated Savings: 80%.

The 18 strings of lights, purchased locally @ $13.99 = $251.82, $122.55 of which is paid for in the energy savings from year one. They will be fully paid for 20 days into the year 2 displays. LED lights have the added advantage of a longer life cycle than incandescent, they are not hot, and they don't break – no more annoying and time consuming bulb replacement. Therefore, the Borough saves in labor costs as well as energy costs.

B. Replace old appliances (refrigerators, microwaves, coffeemakers, stoves) with ENERGY STAR products. Refrigerators run 24/7 so old, inefficient refrigerators are particularly expensive to operate. An Energy Star qualified refrigerator uses about 425 kWh/year. Here are some estimates of the KWH consumed by refrigerators by year made:

A fridge made this year..	Uses about this much energy…	And replacing it with an Energy Star model saves about…
<1977	1800 kWh	$198.55/year
1976-86	1400 kWh	$140.79/year
1987-89	950 kWh	$75.81/year
1990-92	900 kWh	$68.59/year
1993-00	700 kWh	$39.71/year
2001+	500 kWh	$10.83/year

kWh source: EcoMall
http://www.ecomall.com/greenshopping/icebox2.htm
Assume $.1444/kWh

Use the *Refrigerator and Freezer Energy Data Base Search Tool* at http://www.kouba-cavallo.com/refmods.htm to check the wattage of old appliances.

C. Replace old office equipment with ENERGY STAR products.

D. Insulate electric hot water heaters; install heat traps. (Chilkat Center, Wastewater Treatment Plant, Public Safety Building, others as identified.) If the tank is warm to the touch, insulate it. A precut R-5 blanket can be purchased locally (Haines) for $17. Insulation can reduce standby heat loss by 25-45% and save about 4%-9% in hot water heating costs.

Insulate the first 6 feet of the hot and cold water pipes connected to the water heater. Insulate the space occupied by the water heater. Install heat traps – valves or loops of pipe that allow water to flow into the water heater tank but prevent unwanted hot-water flow out of the tank. A pair of heat traps costs about $30. Shop for a new Energy Star Qualified water heater if the heater is more than 7 years old.[xx]

The U.S. Department of Energy – Energy Efficiency and Renewable Energy, Consumer's Guide to Energy Efficiency and Renewable Energy[xxi] is an excellent source for detailed information about hot water heating efficiencies.

Capital Improvements

A. Replace streetlights, harbor lights with LED lights. Replace 100-watt and 250-watt high-pressure sodium streetlights with 23 and 50-watt LEDs. A relamping program may reduce the cost of lighting streets by 75%. The 324 streetlights consume between 242,000 kWh and 252,000 kWh annually (data tracked from January 2006 to present). At today's rates ($.1444/kWh), that's between $34,944 and $36,388. A 75% savings would reduce the power cost of the streetlights to an estimated $8700-$9097. Some reports estimate an 80% savings and a 17-month pay back period. [xxii]

B. Replace and rewire Port Chilkoot (PC) dock and lights; and install sensors. The PC dock is wired in such a way that all lights must be on if any electricity at all is used on the dock. For example, charging the People Mover requires that all lights be on. Moreover, sensors do not control the lights and that also contributes to unintended and unnecessary usage. Rewiring the dock to mitigate this problem is cost

prohibitive ($500,000 estimate was offered by PND according to the Harbor Master – 12/10/08 telephone call). But the retrofit could be managed in the context of dock repairs. The PC dock kWh consumption soared in 2007 but dropped in 2008. The lights on the PC dock are 65-watt lamps.

PC Dock KWh Consumption
2006: 807 kWh
2007: 8728 kWh
2008: 1596 kWh.

C. On-demand, tankless hot water heaters for single source applications. According to the Department of Energy's webpage on demand hot water heaters if the use is …

41 gallons or less of hot water daily, demand water heaters can be 24%–34% more energy efficient than conventional storage tank water heaters. They can be 8%–14% more energy efficient for homes that use a lot of hot water—around 86 gallons per day. You can achieve even greater energy savings of 27%–50% if you install a demand water heater at each hot water outlet.[xxiii]

However, on demand electric hot water heaters require significantly more amperage than electric storage heaters (2 40-amp breakers vs. 1 30-amp breaker), and may "waste" water. As with propane fired hot water heaters, electric on demand hot water heaters produce a momentary "cold water sandwich" between the old and new hot water, thus users may run water longer than they would if the water were hot when the faucet was opened.

Tom Andriesen, Lutak Lumber, suggests that a single-source on demand hot water heater might be the most efficient alternative.

In the event that electric rates drop, and the capacity of the hydro-based electric grid is amplified by new infrastructure, electric on-demand hot water heaters should be reconsidered.

Heating Fuel

No Cost

A. Turn down hot water heater thermostats to minimum temperatures. Most hot water heaters are only used for short periods to wash a few dishes or hands. The hot water only needs to be just above 120 degrees to prevent bacteria from building up.

B. Drain the hot water heater every 3 months to keep sediment from building up and to increase efficiency.

C. Keep thermostats at 68˚ during business hours and at 50˚ or below during off hours. Purchase and install programmable thermostats where applicable.

D. Turn down thermostats in rooms that are not used frequently and/ install programmable thermostats for meeting rooms.

E. Maintain the swimming pool at 80-degrees. According to the US Department of Energy, *the energy consumption for each degree rise in temperature will cost 10%-30% more in energy costs.* However, the US DOE also contributes this myth-breaking information: *Turn the temperature down or turn off the heater whenever the pool won't be used for several days. This will save energy and money. It's a myth that it takes more energy to heat a pool back up to a desired temperature than you save by lowering the temperature or turning off the heater.* [xxiv]

How Much Can You Save By Turning Down the Thermostat?
A Local Example.

Opinion #1: You can save about 1% on your heating bill for every degree you regularly set the temperature back for an eight-hour period. (http://www.mge.com/home/saving/faq.htm#3 Madison Gas and Electric, Madison Wisconsin)

Opinion #2: For each degree you turn the thermostat down in the winter (around the clock) you save about 2% on your bill. (http://www.efficiencyvermont.com/pages/Residential/SavingEnergy/EnergySavingTips/HeatingYourHome/)

Assumptions:
#1, At least #1 is true,
#2, the old shop was kept at approximately 65 degrees
#3, on average across 2 years, the shop used 4130.70 gallons of fuel oil
#3, the shop will be kept at 40 degrees
#4, fuel oil sells $4.730/gallon (the price 9/29/08 when this analysis was first created.)

then the cost of heating the shop for one year to 65 degrees will be $17,762.01; this cost will be reduced by at least 25% (@1% reduction per degree) if the heat is kept at 40 degrees, so it might cost $13,321.51 at that price.

Low Cost

A. Track the status of facility boilers with periodic efficiency testing. Provide Facilities Maintenance Technician with training and tools required for this work. Regular efficiency testing is important because:

- *a large fraction of a facility's total energy consumption flows through its boilers, so even a small drop in efficiency represents a large amount of energy and cost in absolute terms. In facilities where boilers have operated for long periods without being tested, it is not uncommon to find that efficiency has fallen by five or ten percent, which may represent a very large cost.*

- *efficiency testing is the most accurate indicator for adjusting the boiler and its auxiliary equipment, such as adjusting the air-fuel ratio (covered in Subsection 1.3). Efficiency testing tells you the "bottom line" economic performance of the boiler, unlike indirect clues, such as flame color. You can localize most boiler problems by knowing how to exploit the full range of efficiency test methods. Efficiency tests are to boilers what blood tests are to human beings.*

- *efficiency testing is the first step in estimating the benefit of potential boiler improvements, such as adding an economizer or an air-fuel control system.*[xxv]

B. Insulate water heaters and pipes with low cost, easily installed insulation.

C. Install weather-stripping around leaking windows and doors. Replace inefficient windows.

D. Replace existing window blinds with insulating cellular window blinds. These average as little as $100 per window depending on the size and can effectively decrease heat loss. These would be most effective in meeting rooms that are infrequently used though all rooms would benefit during nighttime hours. A reminder: blinds have to be manually lowered to work.

E. Add Insulation. Old buildings must be made more efficient while planning for new construction. The Visitor Center and the Sewer Treatment Plant can benefit from added insulation in the wall (Visitor Center) and in the ceiling (Sewer Treatment Center). Use the Department of Energy's Zip Code Insulation Program[xxvi] to help determine savings.

Capital Improvements

These actions require substantial capital expenditures and planning. In most cases it will involve an evaluation of the entire facility and one action may be linked to others. Energy cost savings, capital costs, installation costs, and repayment periods for these actions should be evaluated on a case-by-case basis.

A. Consider replacing aging water heaters with electric on-demand water heaters. Efficiencies are greater than 99% and, given the intermittent use of hot water in Borough facilities, savings could be 50% or greater. Most of these heaters use 240 volts and will require rewiring depending on the facility.

B. More efficient, cost-effective heating alternatives should be a considered on a case-by-case basis. Energy efficiency and cost benefits must be balanced against capital cost and repayment period.

C. Replace existing furnaces with new, efficient units: Depending on the age and of the existing heating unit, new more efficient heating units may be a cost-effective alternative. Many of the existing furnaces are 10-15 years old.

D. Split and reduce heating areas: Larger facilities often have areas with different heating needs. While originally it may have been more economical to heat all areas with a single unit, with higher energy prices it might be more economical to heat different areas with separate systems. Local radiant heat in flooring areas would be more efficient and potentially cost effective. Facilities such as the Administration, Public Safety, and Museum are constantly used by people and require a uniform heat level.

   However, portions of other facilities including the water and sewer treatment plants only require heating of smaller, specific spaces such as water pipes or small shop areas. Currently these facilities are inefficiently heated by aging forced air furnaces that heat the entire building. Warm air rising to the high ceilings further reduces the efficiency.
   Example: Wastewater treatment plant shop area.

E. Change heating types: An alternative to be considered is to replace existing forced air furnaces with smaller radiant floor heating that could target specific spaces. A shallow 2-inch mortar floor could be poured in strategic areas and heated with electric on-demand hot water heaters. Tanks, pipes, and other infrastructure could be protected with heated tubing surrounded with insulation.
   Examples: Shop areas of water treatment plant. wastewater treatment

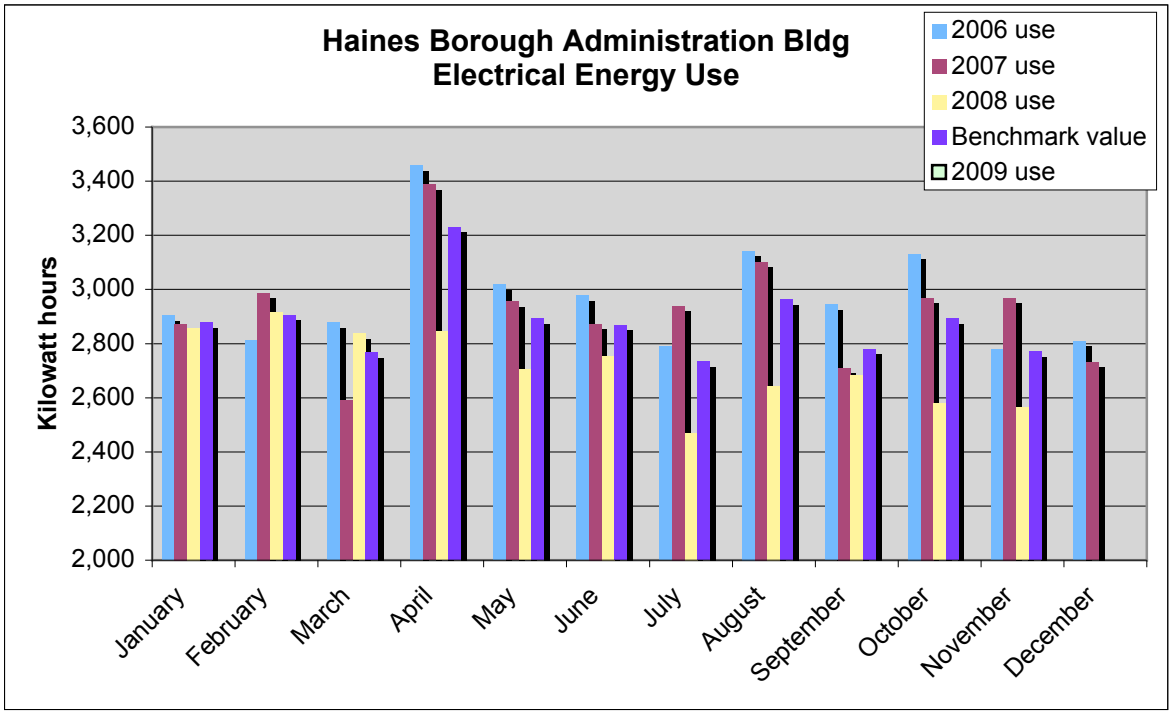
plant, and fire engine bays.

Appendix B: Administration Building

HISTORIC ELECTRICAL USE

HAINES BOROUGH ADMINISTRATION BUILDING

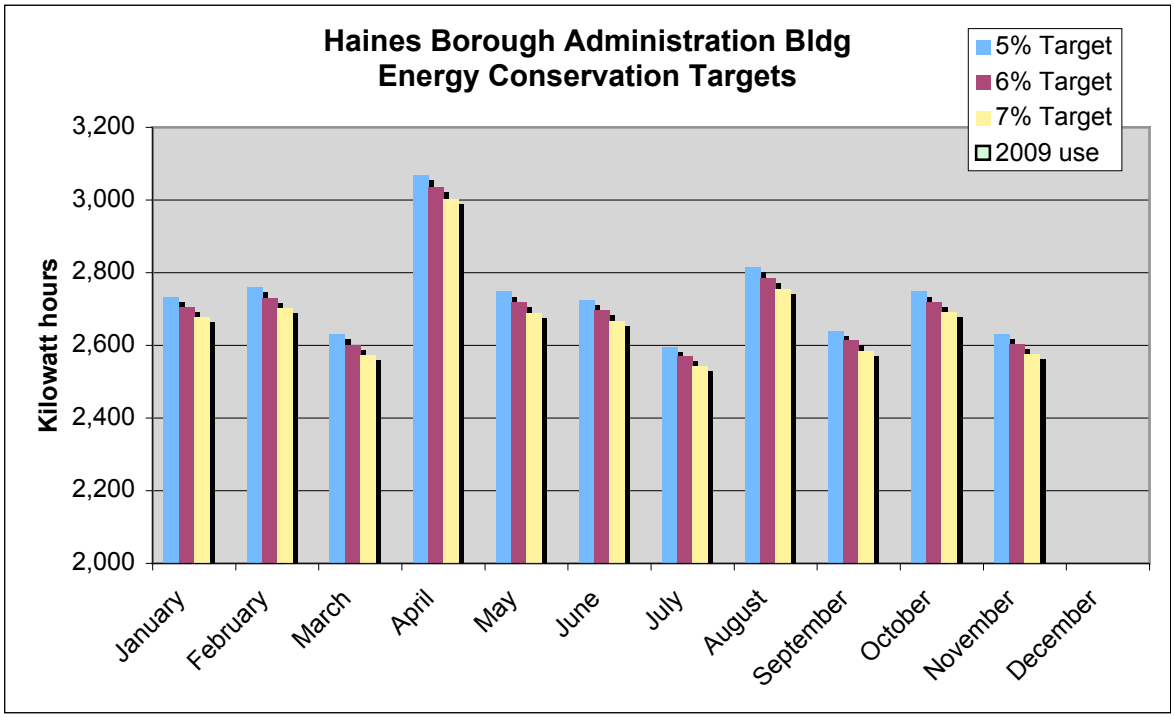
	2006 Usage (kWh)	2007 Usage (kWh)	2008 Usage (kWh)	Usage trend (2006-2008) (%)	Benchmark (3-year average) (kWh)
January	2,903	2,873	2,857	-1.6%	2,878
February	2,813	2,987	2,914	3.6%	2,905
March	2,878	2,589	2,837	-1.4%	2,768
April	3,458	3,387	2,844	-17.8%	3,230
May	3,018	2,955	2,704	-10.4%	2,892
June	2,977	2,873	2,754	-7.5%	2,868
July	2,790	2,939	2,470	-11.5%	2,733
August	3,142	3,102	2,643	-15.9%	2,962
September	2,945	2,710	2,684	-8.9%	2,780
October	3,132	2,968	2,579	-17.7%	2,893
November	2,779	2,968	2564	-7.7%	2,770
December	2,809	2,731			
Totals	35,644	35,082			



ELECTRICAL CONSERVATION TARGETS

HAINES BOROUGH ADMINISTRATION BUILDING

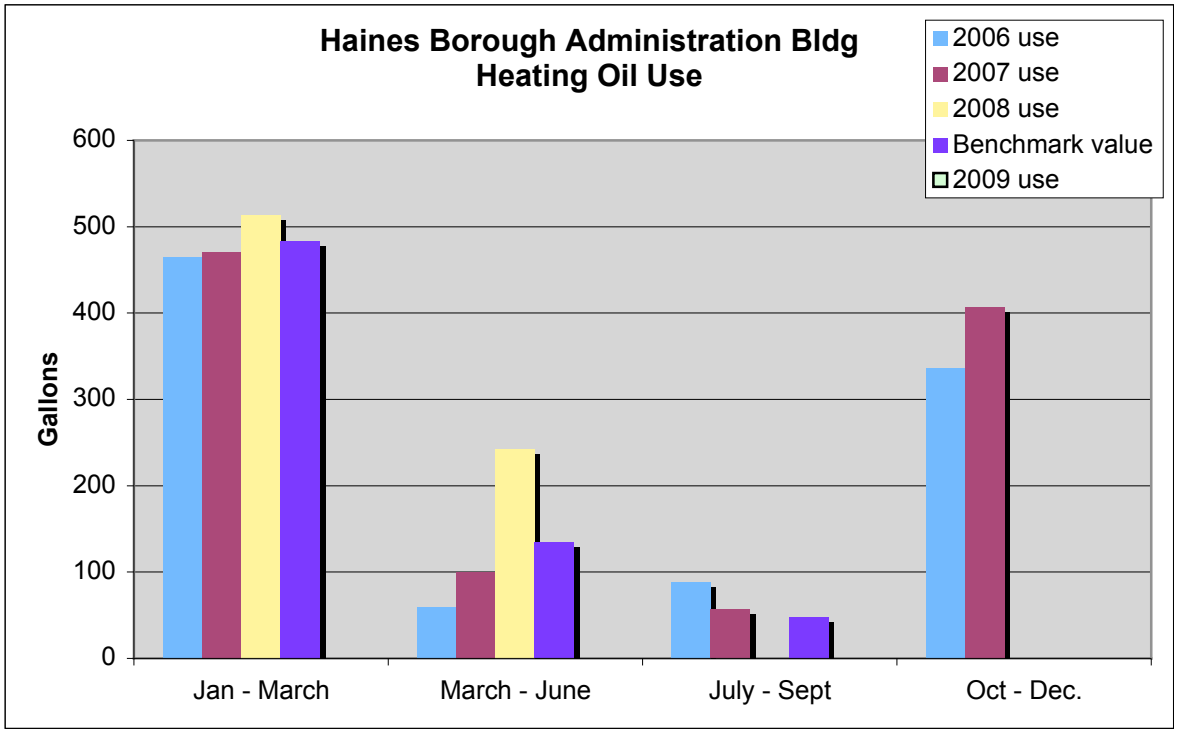
	2009 Usage (kWh)	5% Target (kWh)	6% Target (kWh)	7% Target (kWh)	% Change from Benchmark (%)
January		2,734	2,705	2,676	
February		2,759	2,730	2,701	
March		2,630	2,602	2,574	
April		3,068	3,036	3,004	
May		2,748	2,719	2,690	
June		2,725	2,696	2,667	
July		2,596	2,569	2,542	
August		2,814	2,785	2,755	
September		2,641	2,613	2,585	
October		2,748	2,719	2,690	
November		2,632	2,604	2,576	
December					
Totals					



HISTORIC HEATING OIL USE

HAINES BOROUGH ADMINISTRATION BUILDING

	2006 Usage (gallons)	2007 Usage (gallons)	2008 Usage (gallons)	Usage trend (2006-2008) (%)	Benchmark (3-year average) (gallons)
Jan - March	465	471	514	10.5%	483
March - June	60	101	243	306.5%	134
July - Sept	88	57	0	-100.0%	48
Oct - Dec.	337	407			
Totals	950	1,035			

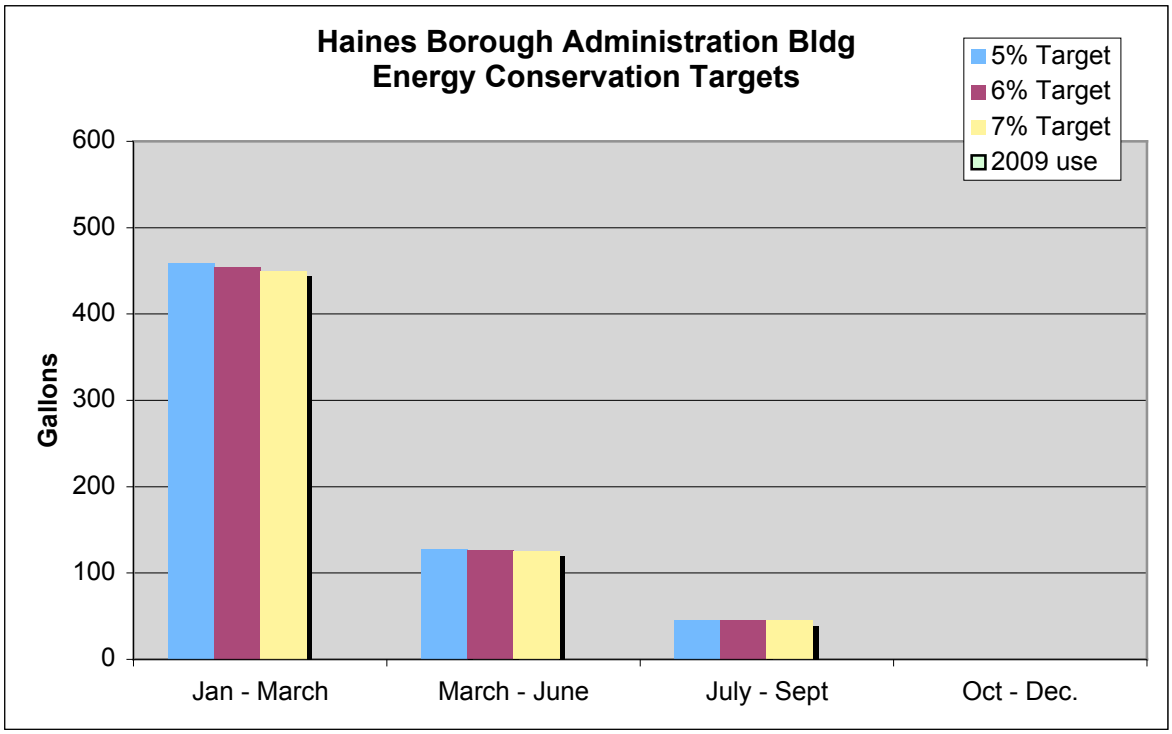


Jan-Nov	613	628	757	23.4%

HEATING OIL CONSERVATION TARGETS

HAINES BOROUGH ADMINISTRATION BUILDING

	2009 Usage (gallons)	5% Target (gallons)	6% Target (gallons)	7% Target (gallons)	% Change from Benchmark (%)
Jan - March		459	454	450	
March - June		128	126	125	
July - Sept		46	45	45	
Oct - Dec.					
Totals					

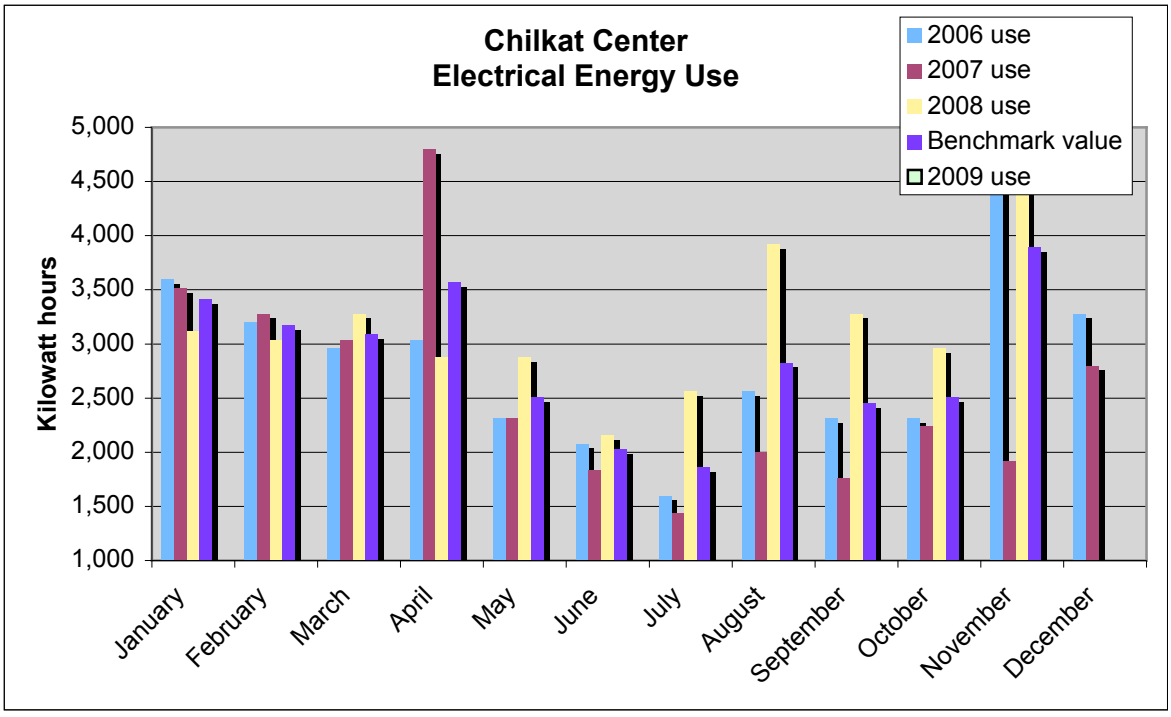


Appendix C: Chilkat Center

HISTORIC ELECTRICAL USE

CHILKAT CENTER

	2006 Usage (kWh)	2007 Usage (kWh)	2008 Usage (kWh)	Usage trend (2006-2008) (%)	Benchmark (3-year average) (kWh)
January	3,600	3,520	3,120	-13.3%	3,413
February	3,200	3,280	3,040	-5.0%	3,173
March	2,960	3,040	3,280	10.8%	3,093
April	3,040	4,800	2,880	-5.3%	3,573
May	2,320	2,320	2,880	24.1%	2,507
June	2,080	1,840	2,160	3.8%	2,027
July	1,600	1,440	2,560	60.0%	1,867
August	2,560	2,000	3,920	53.1%	2,827
September	2,320	1,760	3,280	41.4%	2,453
October	2,320	2,240	2,960	27.6%	2,507
November	4,640	1,920	5120	10.3%	3,893
December	3,280	2,800			
Totals	33,920	30,960			

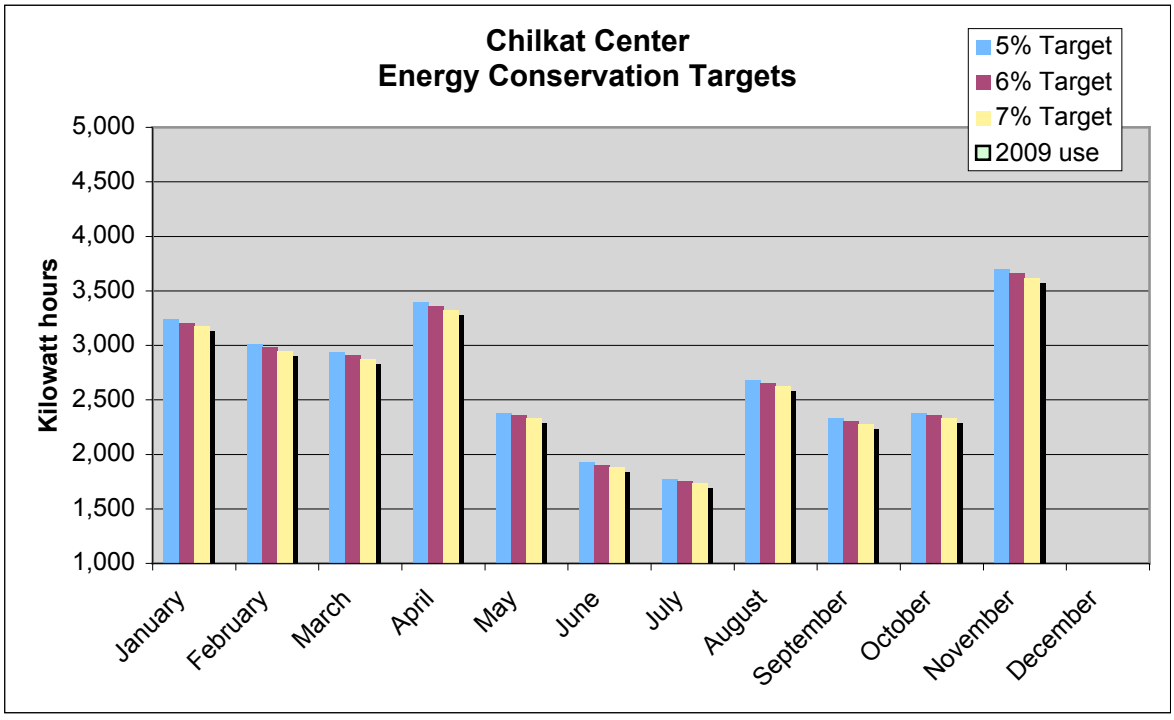


Jan-Nov	30,640	28,160	35,200	14.9%

ELECTRICAL CONSERVATION TARGETS

CHILKAT CENTER

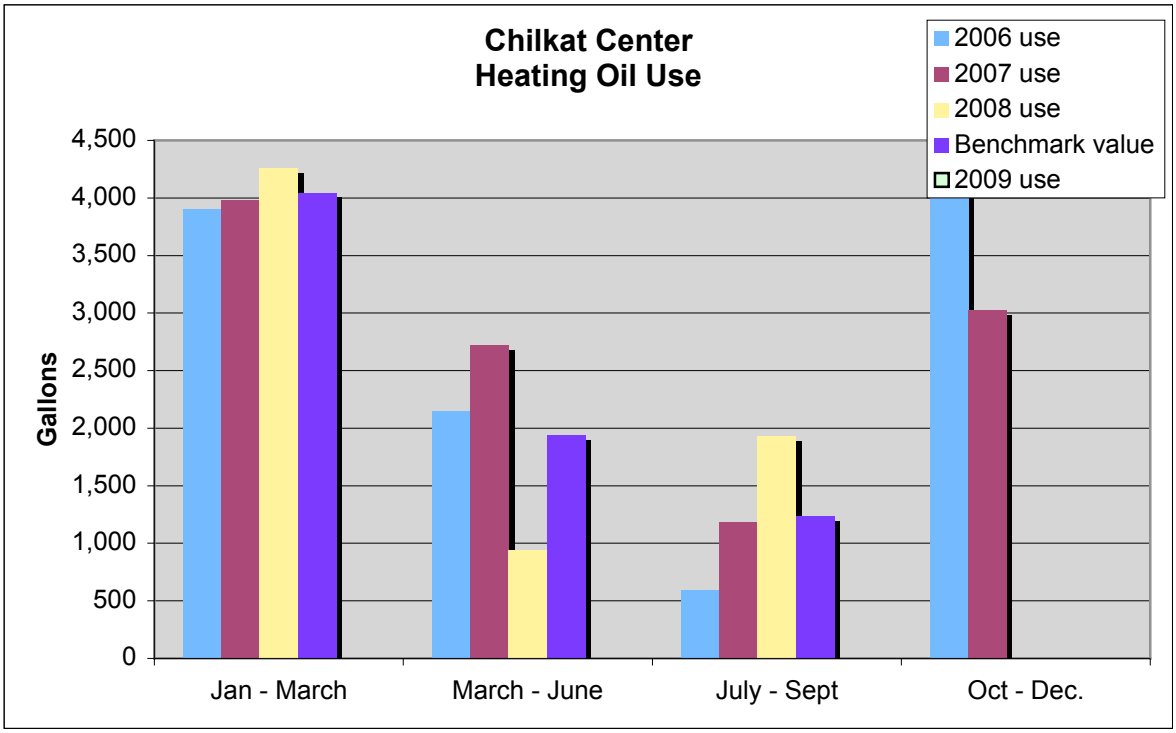
	2009 Usage (kWh)	5% Target (kWh)	6% Target (kWh)	7% Target (kWh)	% Change from Benchmark (%)
January		3,243	3,209	3,174	
February		3,015	2,983	2,951	
March		2,939	2,908	2,877	
April		3,395	3,359	3,323	
May		2,381	2,356	2,331	
June		1,925	1,905	1,885	
July		1,773	1,755	1,736	
August		2,685	2,657	2,629	
September		2,331	2,306	2,282	
October		2,381	2,356	2,331	
November		3,699	3,660	3,621	
December					
Totals					



HISTORIC HEATING OIL USE

CHILKAT CENTER

	2006 Usage (gallons)	2007 Usage (gallons)	2008 Usage (gallons)	Usage trend (2006-2008) (%)	Benchmark (3-year average) (gallons)
Jan - March	3,899	3,981	4,263	9.3%	4,048
March - June	2,151	2,723	939	-56.3%	1,938
July - Sept	597	1,188	1,929	223.4%	1,238
Oct - Dec.	4,104	3,024			
Totals	10,751	10,916			

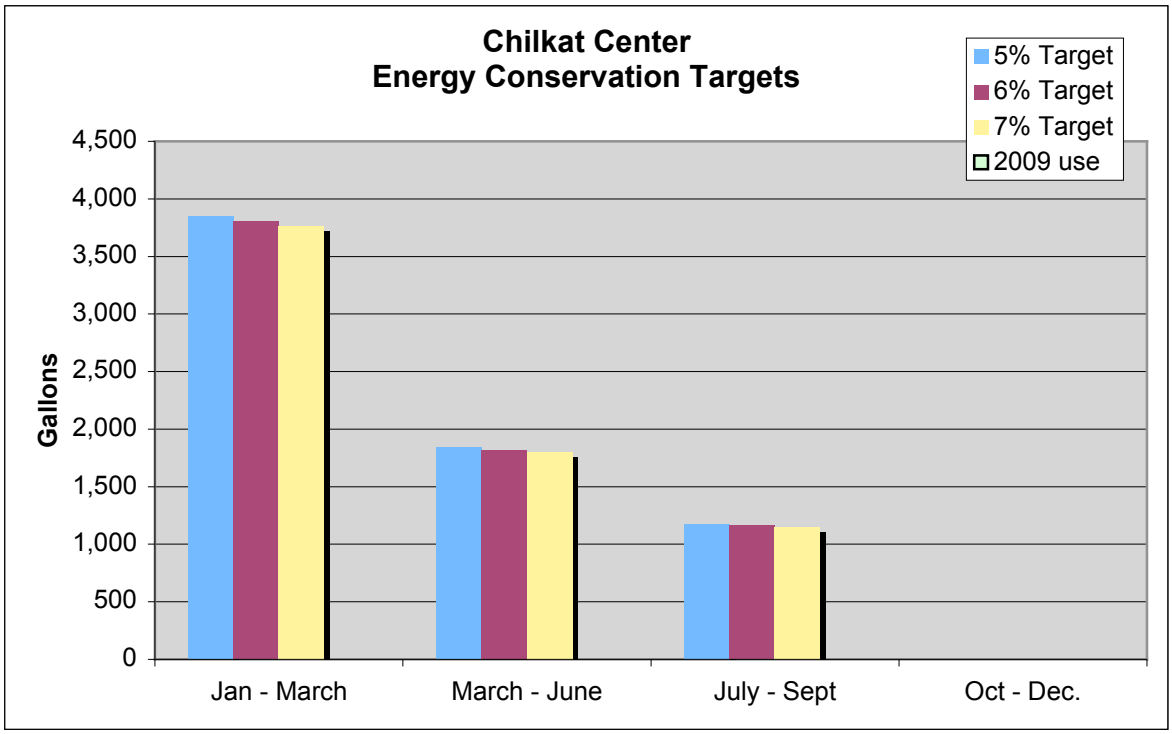


Jan-Nov	6,647	7,893	7,132	7.3%

HEATING OIL CONSERVATION TARGETS

CHILKAT CENTER

	2009 Usage (gallons)	5% Target (gallons)	6% Target (gallons)	7% Target (gallons)	% Change from Benchmark (%)
Jan - March		3,846	3,805	3,765	
March - June		1,841	1,821	1,802	
July - Sept		1,176	1,164	1,151	
Oct - Dec.					
Totals					



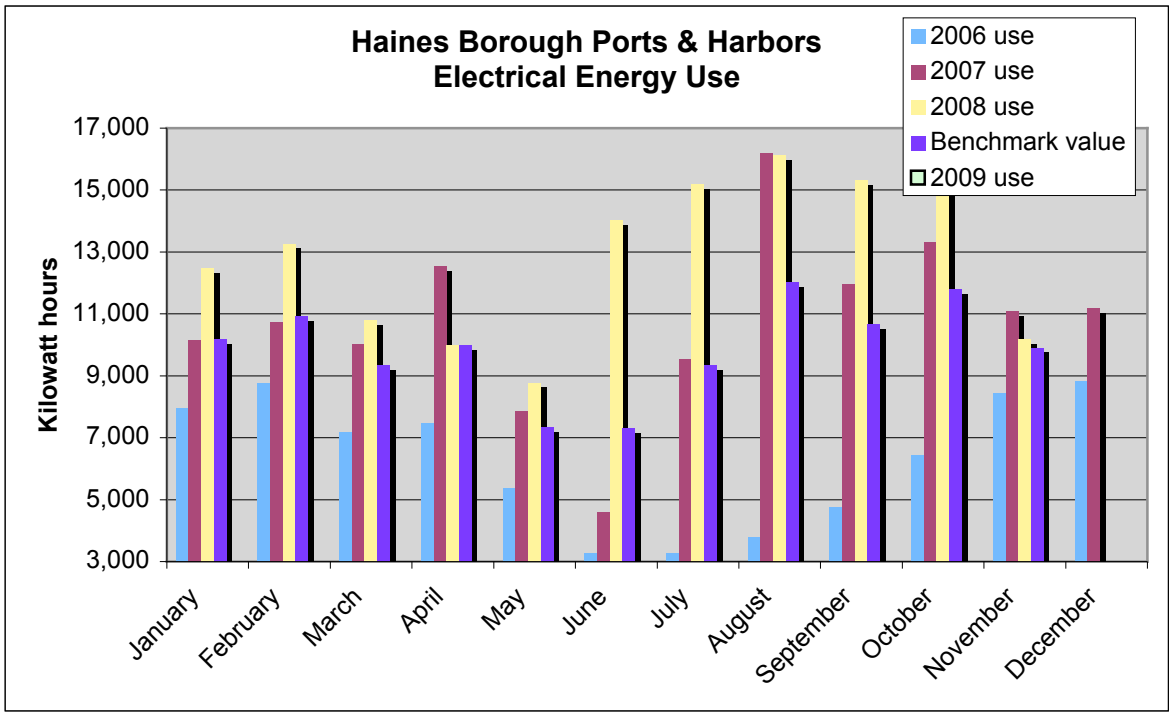
Appendix D: Ports & Harbor (Boat Harbor, PC Dock, Lutak Dock, Ice House, NOAA Weather Station)

HISTORIC ELECTRICAL USE

Ports & Harbor

Includes boat harbor lights, Port Chilkoot dock lights, transient/fuel dock, floats, Lutak dock, radio tower, NOAA weather station.

	2006 Usage (kWh)	2007 Usage (kWh)	2008 Usage (kWh)	Usage trend (2007-2008)* (%)	Benchmark (3-year average) (kWh)
January	7,939	10,160	12,467	29.1%	10,189
February	8,775	10,748	13,267	28.7%	10,930
March	7,190	10,032	10,791	10.6%	9,338
April	7,464	12,529	9,992	-34.0%	9,995
May	5,372	7,868	8,776	16.9%	7,339
June	3,294	4,606	14,029	286.1%	7,310
July	3,293	9,544	15,180	171.2%	9,339
August	3,791	16,179	16,122	-1.5%	12,031
September	4,746	11,954	15,322	71.0%	10,674
October	6,445	13,330	15,603	35.3%	11,793
November	8,453	11,084	10,178	-10.7%	9,905
December	8,837	11,177			
Totals	75,599	129,211			



Jan-Nov	66,762	118,034	141,727	112.3%
		37155	56400	
w/o ice house	66,762	80,879	85,327	27.8%

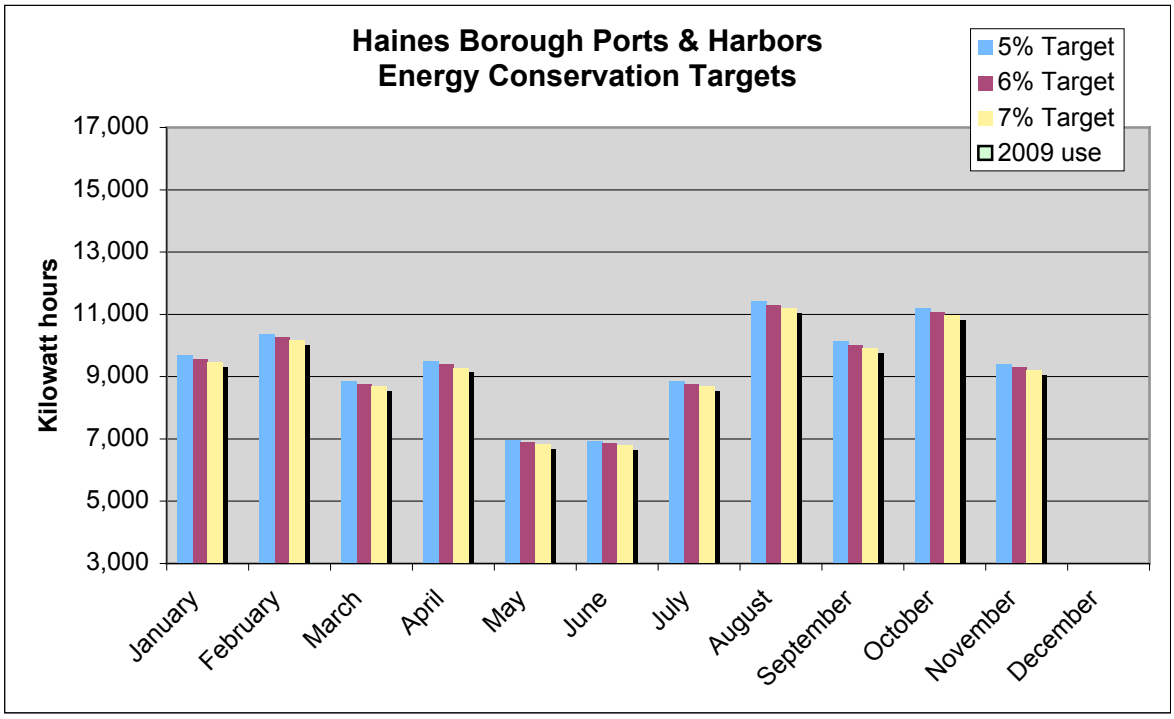
ELECTRICAL CONSERVATION TARGETS

Ports & Harbor

Includes boat harbor lights, Port Chilkoot dock lights, transient/fuel dock, floats, Lutak dock, radio tower, NOAA weather station.

	2009 Usage (kWh)	5% Target* (kWh)	6% Target* (kWh)	7% Target* (kWh)	% Change from Benchmark (%)
January		9,679	9,577	9,475	
February		10,384	10,274	10,165	
March		8,871	8,777	8,684	
April		9,495	9,395	9,295	
May		6,972	6,898	6,825	
June		6,944	6,871	6,798	
July		8,872	8,779	8,685	
August		11,429	11,309	11,189	
September		10,140	10,034	9,927	
October		11,203	11,085	10,967	
November		9,410	9,311	9,212	
December					
Totals					

* Trend and benchmark value based on 2007 & 2008 due to addition of ice house in 2007.



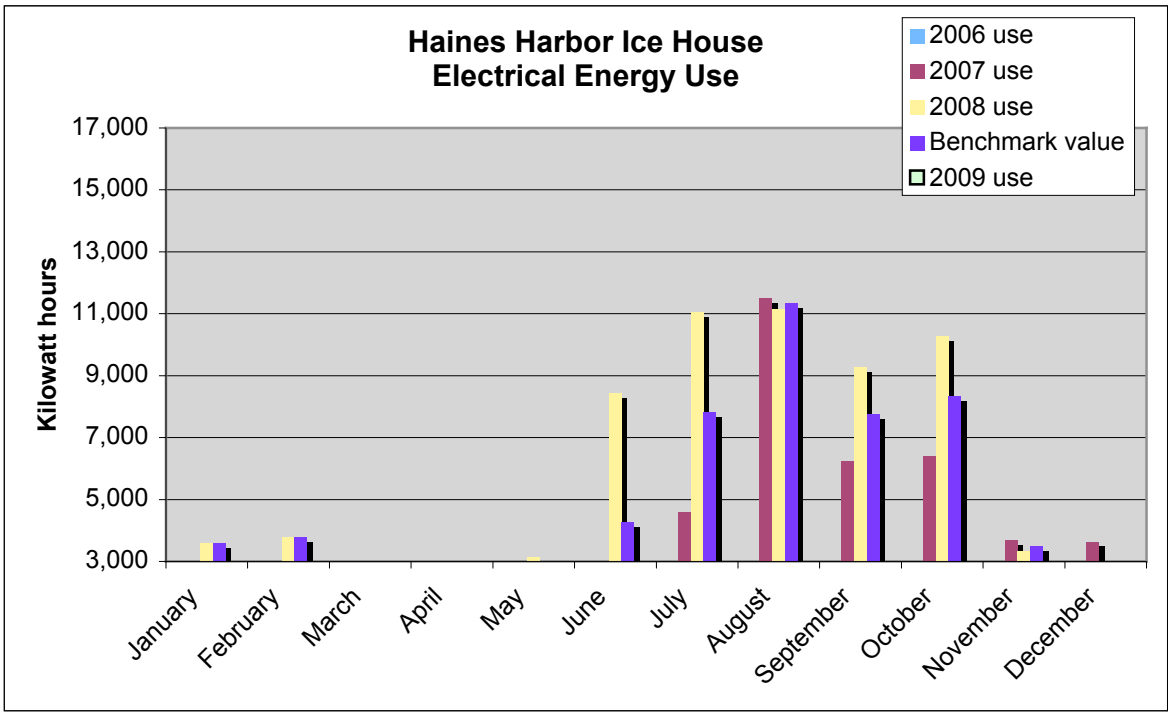
HISTORIC ELECTRICAL USE

Harbor Ice House

Harbor ice house was opened May 2007

	2006 Usage (kWh)	2007 Usage (kWh)	2008 Usage (kWh)	Usage trend (2007-2008)* (%)	Benchmark (2008)* (kWh)
January			3,600	NA	3,600
February			3,800	NA	3,800
March			3,000	NA	3,000
April			2,920	NA	2,920
May		960	3,160	NA	2,060
June		115	8,440	NA	4,278
July		4,600	11,040	NA	7,820
August		11,520	11,160	NA	11,340
September		6,240	9,280	NA	7,760
October		6,400	10,280	NA	8,340
November		3,680	3,320	NA	3,500
December		3,640		NA	
Totals	0	37,155			

* Trend and benchmark value based on 2008



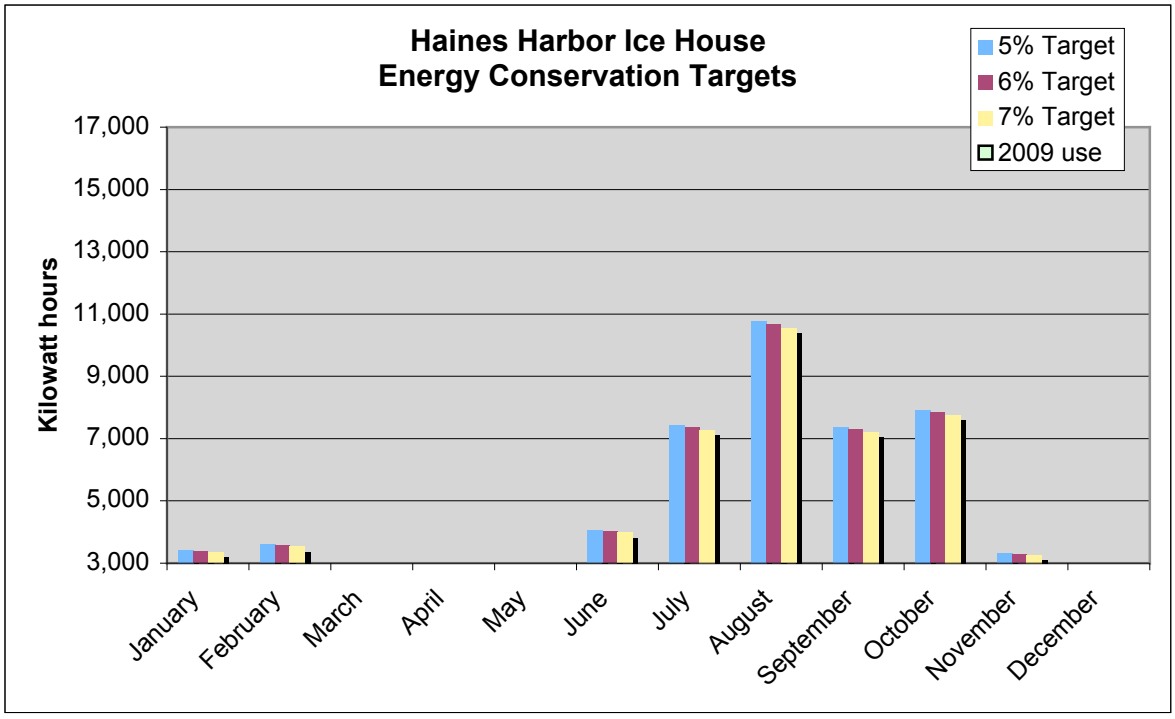
ELECTRICAL CONSERVATION TARGETS

Harbor Ice House

Harbor ice house was opened May 2007

	2009 Usage (kWh)	5% Target* (kWh)	6% Target* (kWh)	7% Target* (kWh)	% Change from Benchmark (%)
January		3,420	3,384	3,348	
February		3,610	3,572	3,534	
March		2,850	2,820	2,790	
April		2,774	2,745	2,716	
May		1,957	1,936	1,916	
June		4,064	4,021	3,978	
July		7,429	7,351	7,273	
August		10,773	10,660	10,546	
September		7,372	7,294	7,217	
October		7,923	7,840	7,756	
November		3,325	3,290	3,255	
December					
Totals					

* Trend and benchmark value based on 2007 & 2008 due to addition of ice house in 2007.

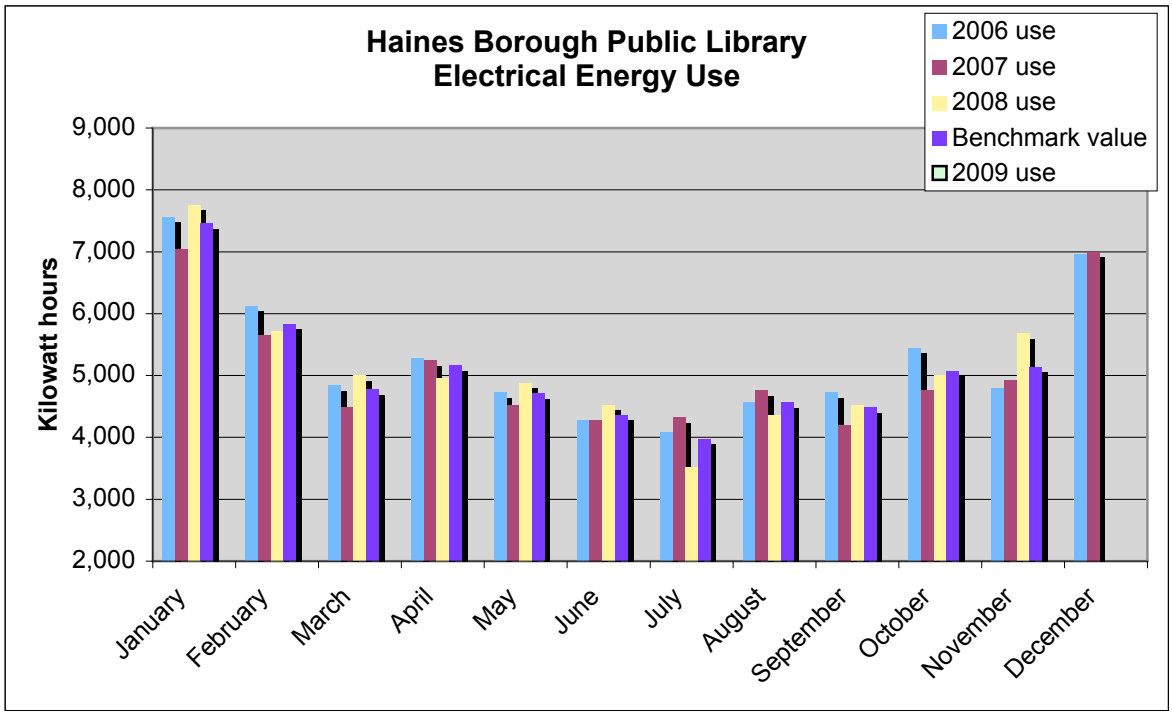


Appendix E: Haines Borough Public Library

HISTORIC ELECTRICAL USE

HAINES BOROUGH PUBLIC LIBRARY

	2006 Usage (kWh)	2007 Usage (kWh)	2008 Usage (kWh)	Usage trend (2006-2008) (%)	Benchmark (3-year average) (kWh)
January	7,560	7,040	7,760	2.6%	7,453
February	6,120	5,640	5,720	-6.5%	5,827
March	4,840	4,480	5,000	3.3%	4,773
April	5,280	5,240	4,960	-6.1%	5,160
May	4,720	4,520	4,880	3.4%	4,707
June	4,280	4,280	4,520	5.6%	4,360
July	4,080	4,320	3,520	-13.7%	3,973
August	4,560	4,760	4,360	-4.4%	4,560
September	4,720	4,200	4,520	-4.2%	4,480
October	5,440	4,760	5,000	-8.1%	5,067
November	4,800	4,920	5,680	18.3%	5,133
December	6,960	7,000			
Totals	63,360	61,160			

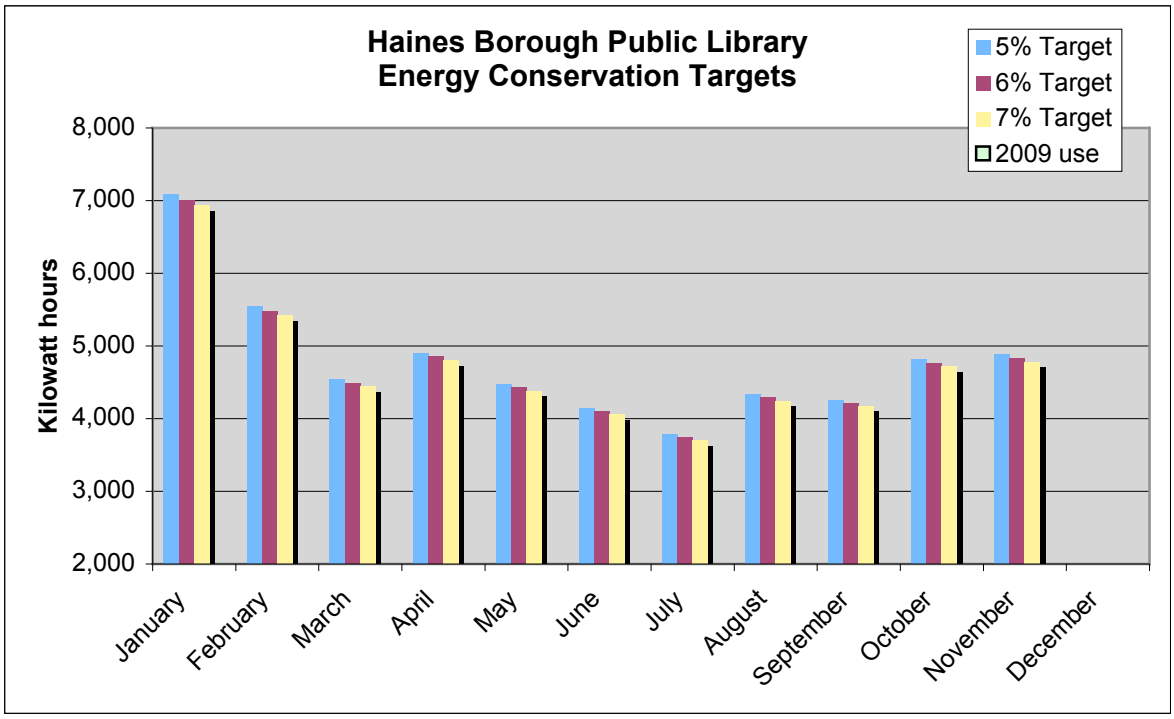


Jan-Nov	51,600	49,240	50,240	-2.6%

ELECTRICAL CONSERVATION TARGETS

HAINES BOROUGH PUBLIC LIBRARY

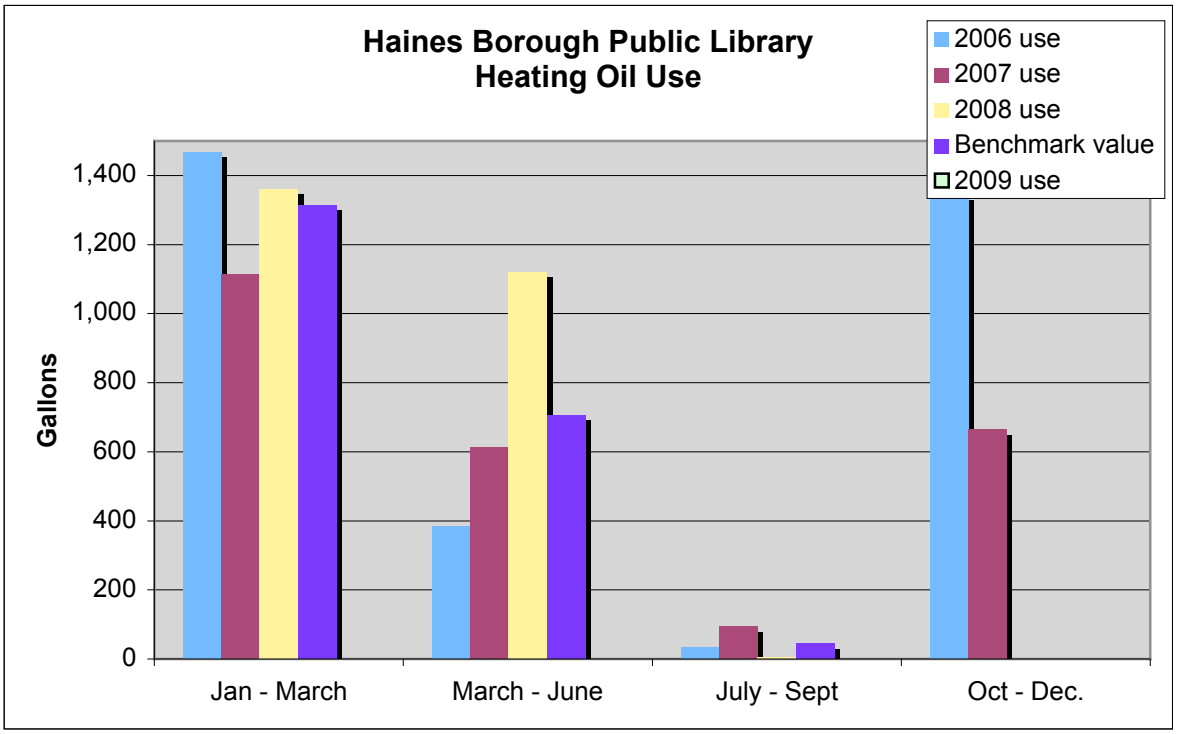
	2009 Usage (kWh)	5% Target (kWh)	6% Target (kWh)	7% Target (kWh)	% Change from Benchmark (%)
January		7,081	7,006	6,932	
February		5,535	5,477	5,419	
March		4,535	4,487	4,439	
April		4,902	4,850	4,799	
May		4,471	4,424	4,377	
June		4,142	4,098	4,055	
July		3,775	3,735	3,695	
August		4,332	4,286	4,241	
September		4,256	4,211	4,166	
October		4,813	4,763	4,712	
November		4,877	4,825	4,774	
December					
Totals					



HISTORIC HEATING OIL USE

HAINES BOROUGH PUBLIC LIBRARY

	2006 Usage (gallons)	2007 Usage (gallons)	2008 Usage (gallons)	Usage trend (2006-2008) (%)	Benchmark (3-year average) (gallons)
Jan - March	1,468	1,112	1,361	-7.3%	1,314
March - June	385	613	1,120	191.0%	706
July - Sept	34	94	6	-83.3%	44
Oct - Dec.	1,344	664			
Totals	3,231	2,482			

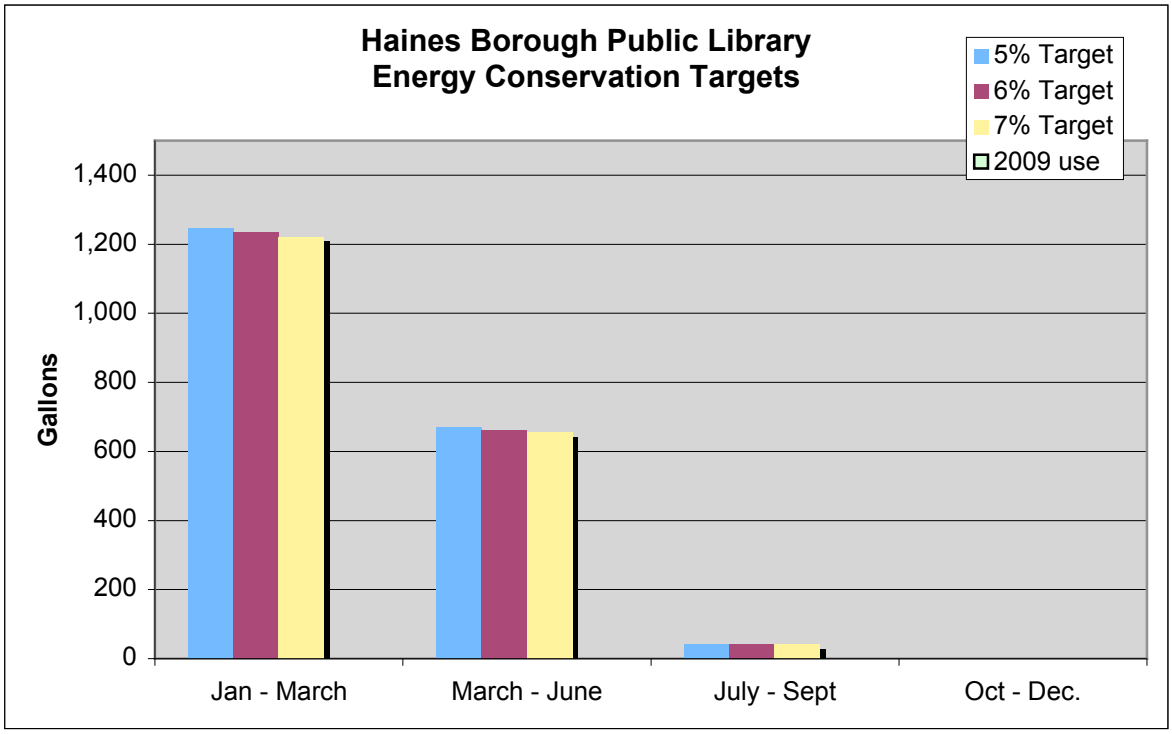


Jan-Nov	1,887	1,818	2,487	31.8%

HEATING OIL CONSERVATION TARGETS

HAINES BOROUGH PUBLIC LIBRARY

	2009 Usage (gallons)	5% Target (gallons)	6% Target (gallons)	7% Target (gallons)	% Change from Benchmark (%)
Jan - March		1,248	1,235	1,222	
March - June		670	663	656	
July - Sept		42	42	41	
Oct - Dec.					
Totals					

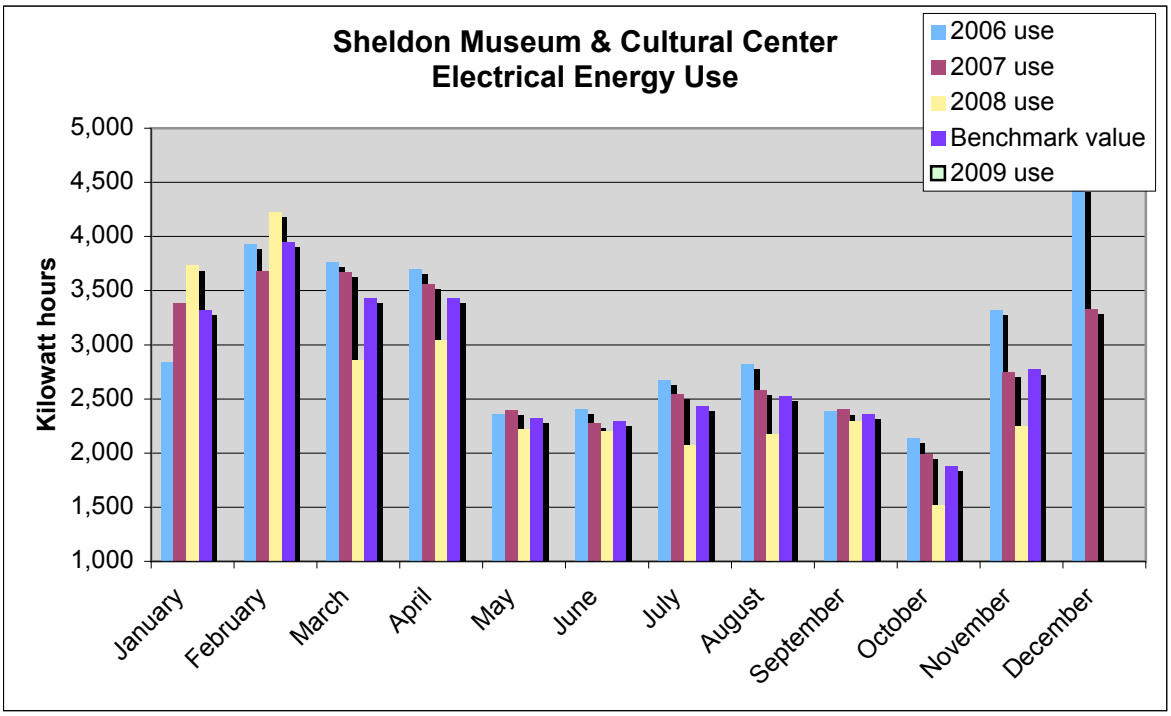


Appendix F: Sheldon Museum & Cultural Center

HISTORIC ELECTRICAL USE

SHELDON MUSEUM & CULTURAL CENTER

	2006 Usage (kWh)	2007 Usage (kWh)	2008 Usage (kWh)	Usage trend (2006-2008) (%)	Benchmark (3-year average) (kWh)
January	2,843	3,389	3,732	31.3%	3,321
February	3,930	3,680	4,225	7.5%	3,945
March	3,765	3,673	2,864	-23.9%	3,434
April	3,700	3,556	3,045	-17.7%	3,434
May	2,358	2,397	2,217	-6.0%	2,324
June	2,409	2,275	2,200	-8.7%	2,295
July	2,676	2,547	2,075	-22.5%	2,433
August	2,822	2,582	2,170	-23.1%	2,525
September	2,385	2,400	2,294	-3.8%	2,360
October	2,134	1,988	1,522	-28.7%	1,881
November	3,321	2,747	2,244	-32.4%	2,771
December	4,457	3,331			
Totals	36,800	34,565			

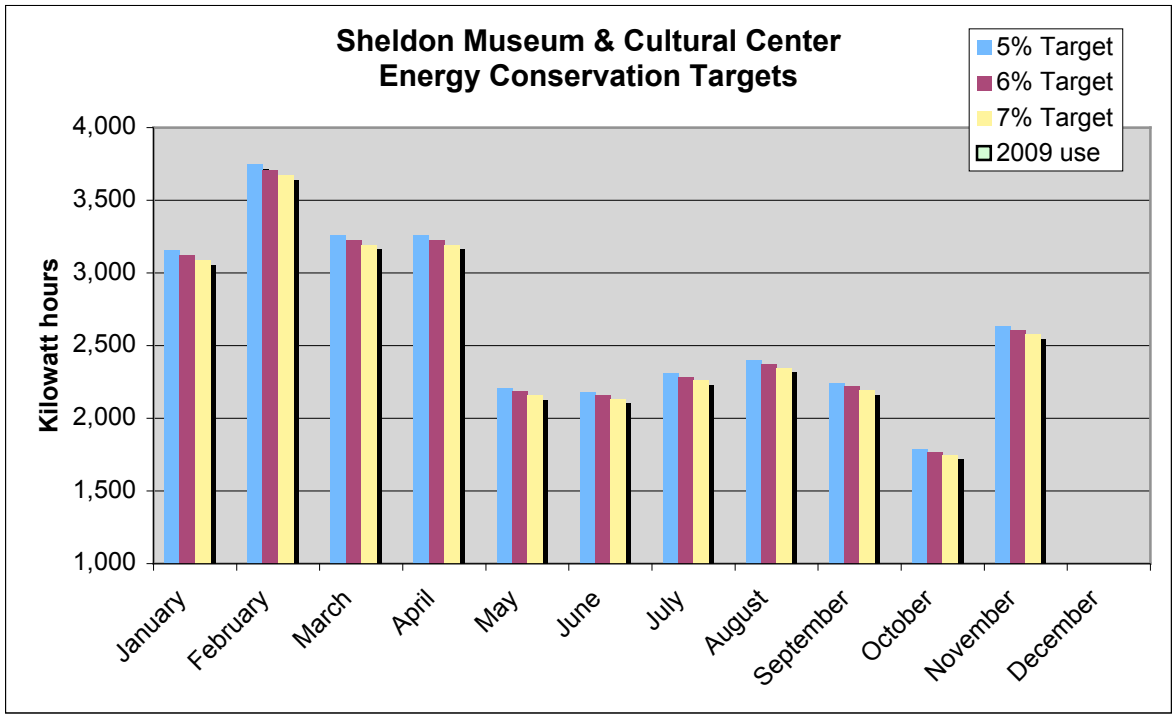


Jan-Nov	29,022	28,487	26,344	-9.2%

ELECTRICAL CONSERVATION TARGETS

SHELDON MUSEUM & CULTURAL CENTER

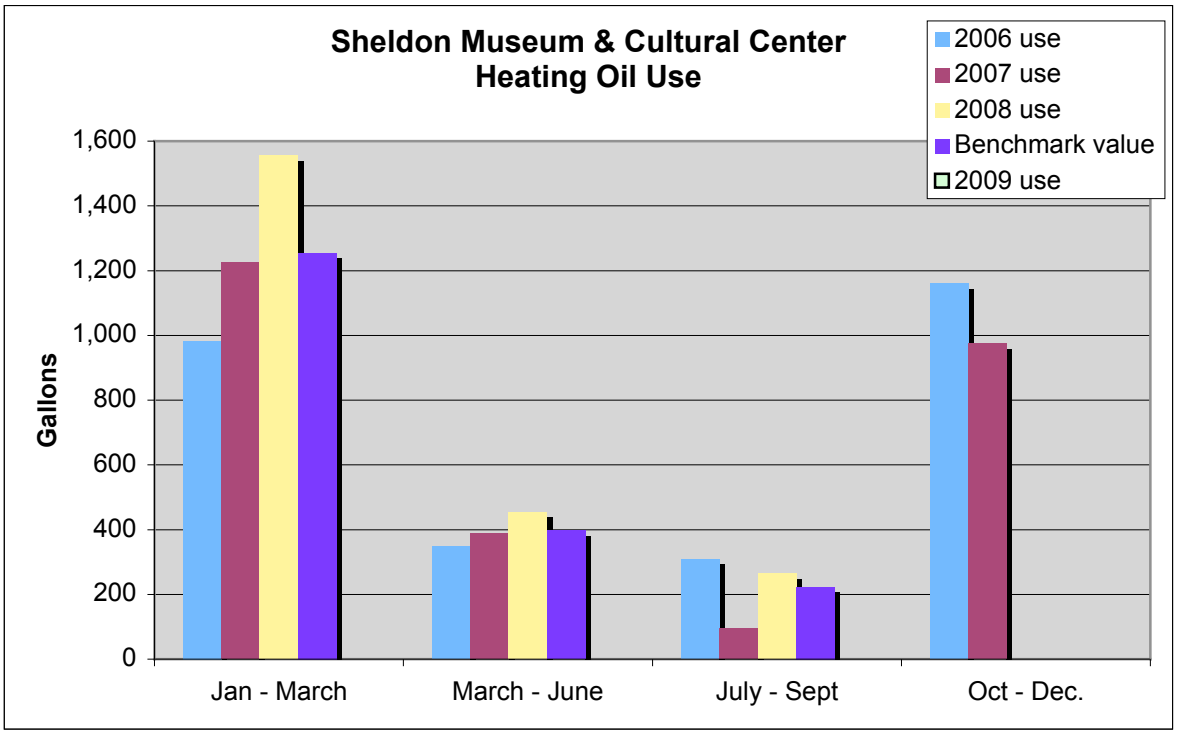
	2009 Usage (kWh)	5% Target (kWh)	6% Target (kWh)	7% Target (kWh)	% Change from Benchmark (%)
January		3,155	3,122	3,089	
February		3,748	3,708	3,669	
March		3,262	3,228	3,194	
April		3,262	3,228	3,193	
May		2,208	2,185	2,161	
June		2,180	2,157	2,134	
July		2,311	2,287	2,262	
August		2,398	2,373	2,348	
September		2,242	2,218	2,194	
October		1,787	1,768	1,750	
November		2,632	2,604	2,577	
December					
Totals					



HISTORIC HEATING OIL USE

SHELDON MUSEUM & CULTURAL CENTER

	2006 Usage (gallons)	2007 Usage (gallons)	2008 Usage (gallons)	Usage trend (2006-2008) (%)	Benchmark (3-year average) (gallons)
Jan - March	983	1,224	1,556	58.3%	1,254
March - June	347	389	454	30.9%	396
July - Sept	308	94	265	-14.2%	222
Oct - Dec.	1,160	975			
Totals	2,798	2,682			

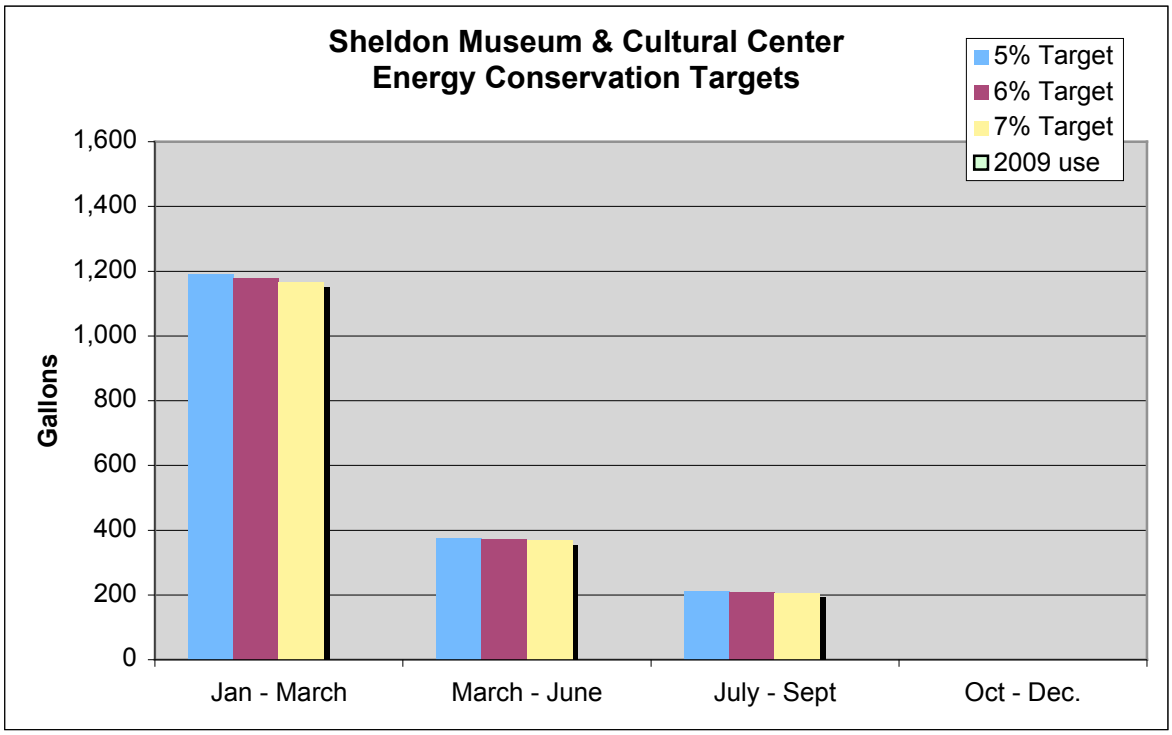


Jan-Nov	1,638	1,707	2,274	38.8%

HEATING OIL CONSERVATION TARGETS

SHELDON MUSEUM & CULTURAL CENTER

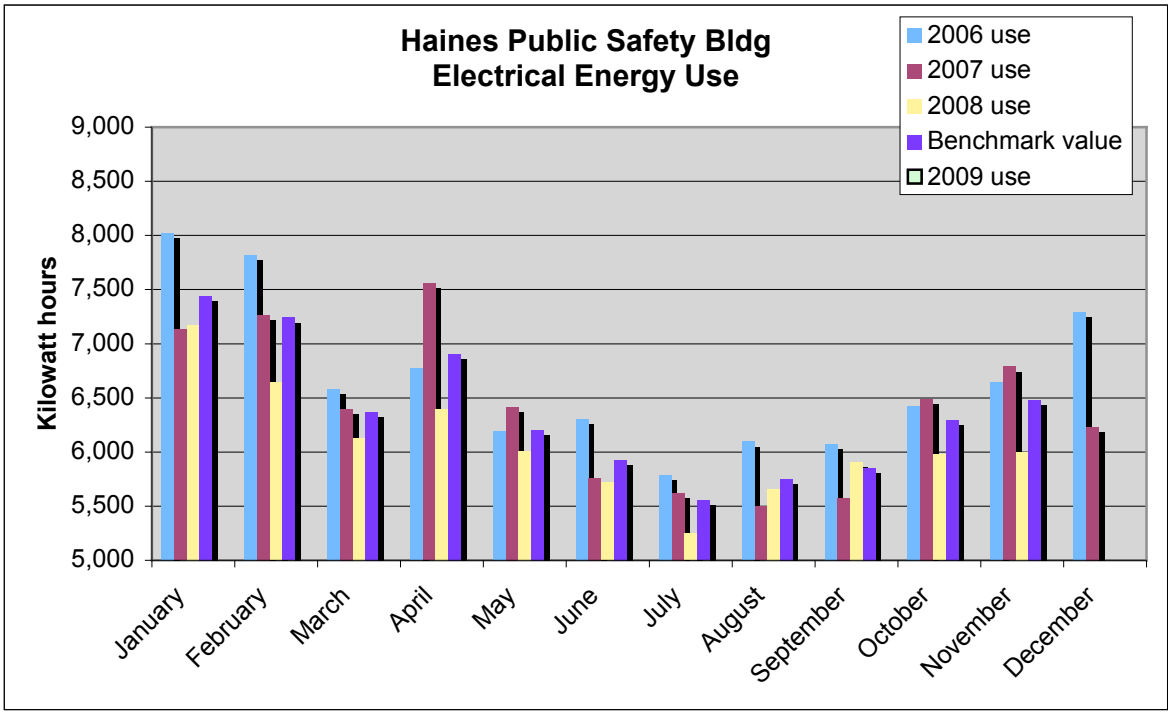
	2009 Usage (gallons)	5% Target (gallons)	6% Target (gallons)	7% Target (gallons)	% Change from Benchmark (%)
Jan - March		1,192	1,179	1,167	
March - June		377	373	369	
July - Sept		211	209	207	
Oct - Dec.					
Totals					



Appendix G: Public Safety Building

PUBLIC SAFETY BUILDING

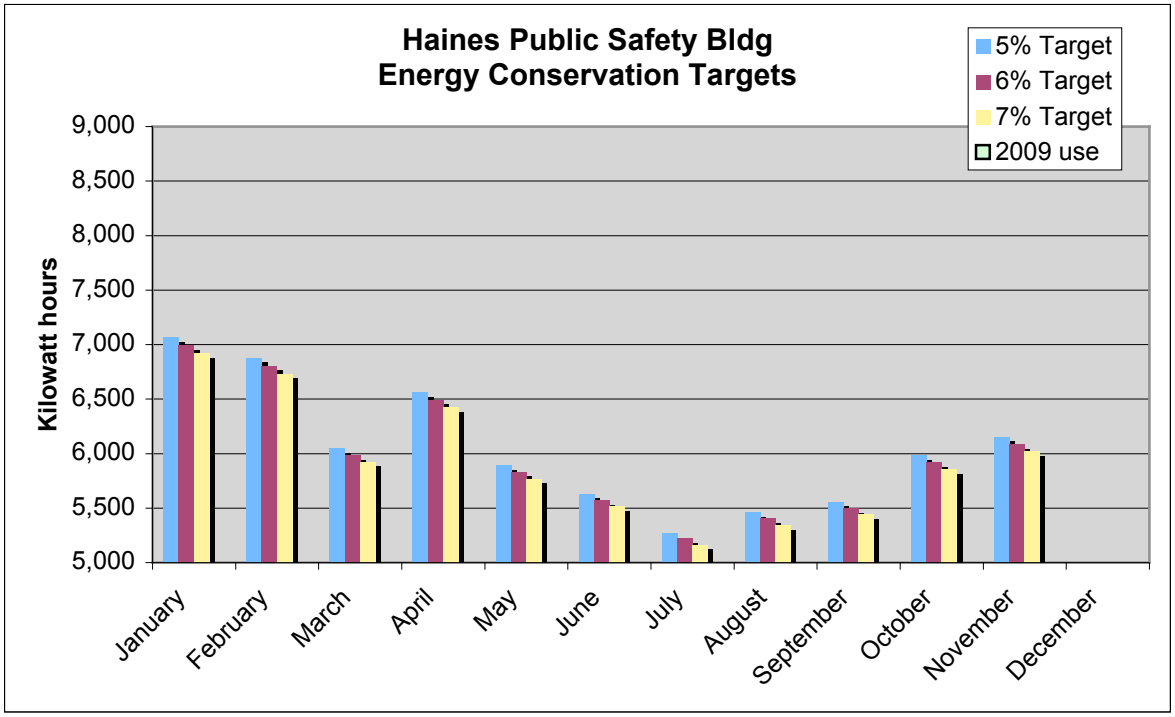
	2006 Usage (kWh)	2007 Usage (kWh)	2008 Usage (kWh)	Usage trend (2006-2008) (%)	Benchmark (3-year average) (kWh)
January	8,021	7,133	7,172	-10.6%	7,442
February	7,817	7,265	6,641	-15.0%	7,241
March	6,584	6,394	6,131	-6.9%	6,370
April	6,771	7,557	6,396	-5.5%	6,908
May	6,190	6,414	6,011	-2.9%	6,205
June	6,307	5,762	5,719	-9.3%	5,929
July	5,789	5,620	5,247	-9.4%	5,552
August	6,097	5,497	5,657	-7.2%	5,750
September	6,072	5,574	5,907	-2.7%	5,851
October	6,426	6,489	5,977	-7.0%	6,297
November	6,645	6,790	6,000	-9.7%	6,478
December	7,291	6,230			
Totals	80,010	76,725			



Jan-Nov	72,719	70,495	66,858	-8.1%

PUBLIC SAFETY BUILDING
CONSERVATION TARGETS

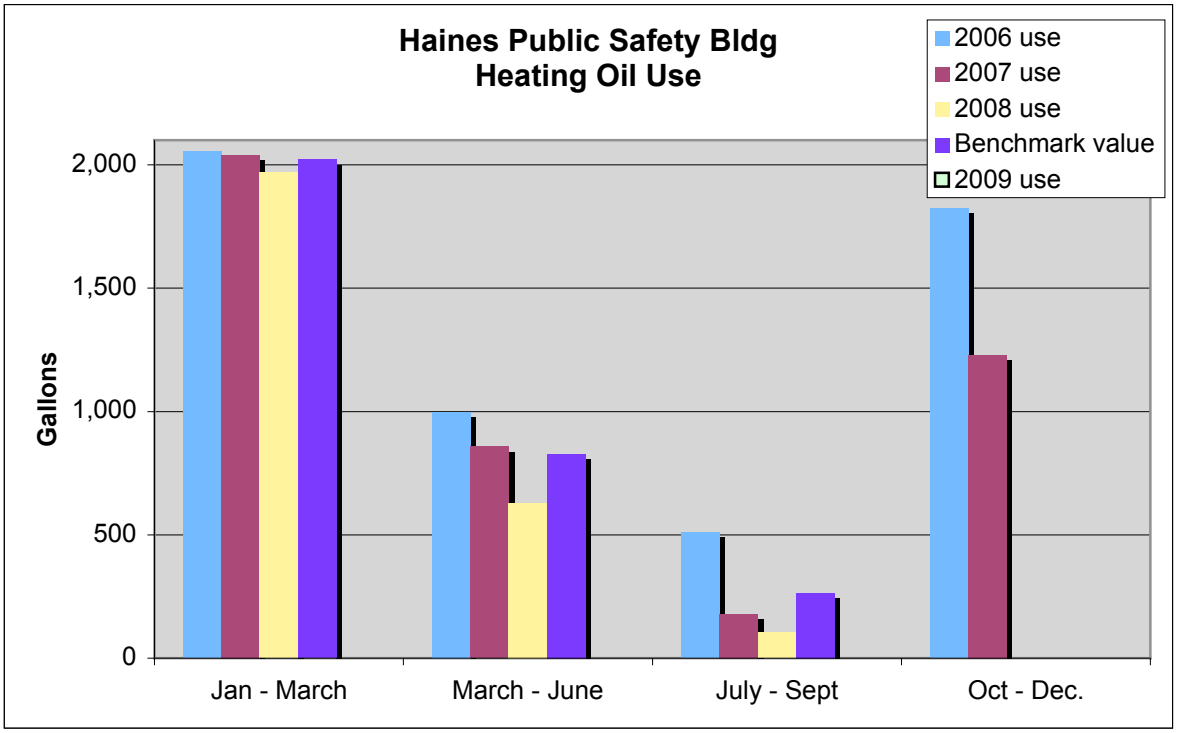
	2009 Usage (kWh)	5% Target (kWh)	6% Target (kWh)	7% Target (kWh)	% Change from Benchmark (%)
January		7,070	6,995	6,921	
February		6,879	6,807	6,734	
March		6,051	5,987	5,924	
April		6,563	6,494	6,424	
May		5,895	5,833	5,771	
June		5,633	5,574	5,514	
July		5,274	5,219	5,163	
August		5,463	5,405	5,348	
September		5,558	5,500	5,441	
October		5,982	5,919	5,857	
November		6,154	6,090	6,025	
December					
Totals					



HISTORIC HEATING OIL USE

PUBLIC SAFETY BUILDING

	2006 Usage (gallons)	2007 Usage (gallons)	2008 Usage (gallons)	Usage trend (2006-2008) (%)	Benchmark (3-year average) (gallons)
Jan - March	2,054	2,041	1,969	-4.1%	2,021
March - June	999	858	629	-37.0%	829
July - Sept	510	179	105	-79.4%	265
Oct - Dec.	1,823	1,229			
Totals	5,385	4,307			

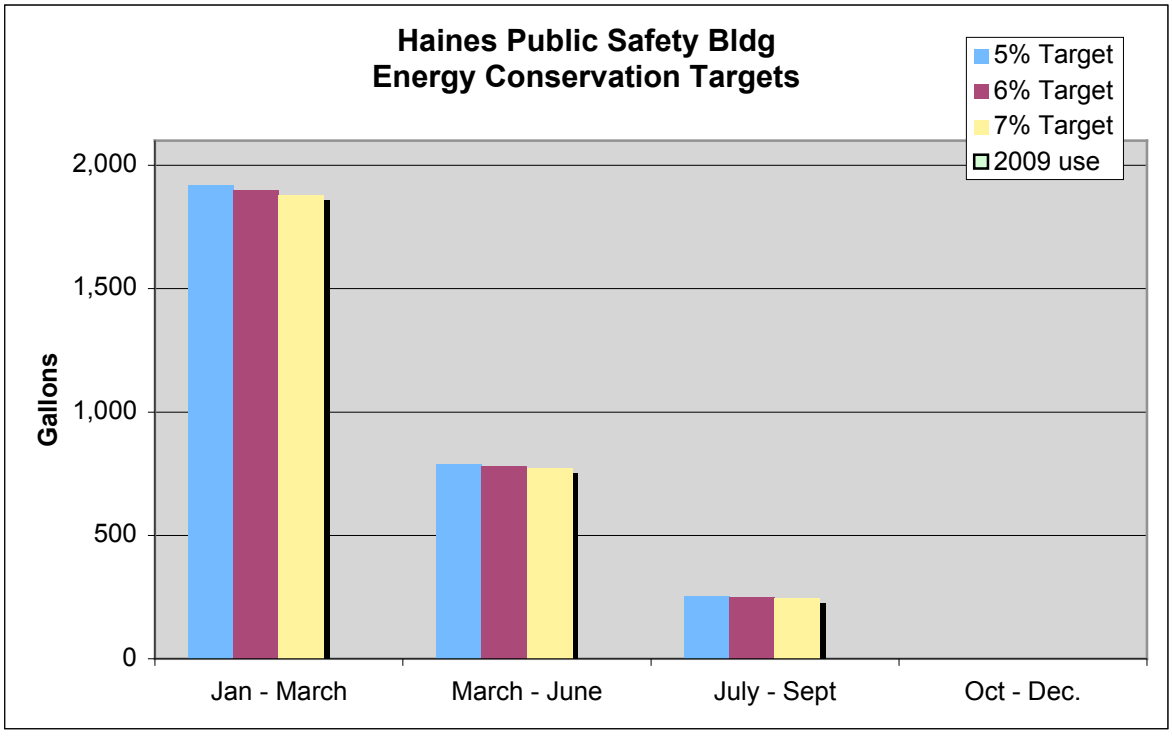


Jan-Nov	3,562	3,078	2,703	-24.1%

HEATING OIL CONSERVATION TARGETS

PUBLIC SAFETY BUILDING

	2009 Usage (gallons)	5% Target (gallons)	6% Target (gallons)	7% Target (gallons)	% Change from Benchmark (%)
Jan - March		1,920	1,900	1,880	
March - June		787	779	771	
July - Sept		252	249	246	
Oct - Dec.					
Totals					

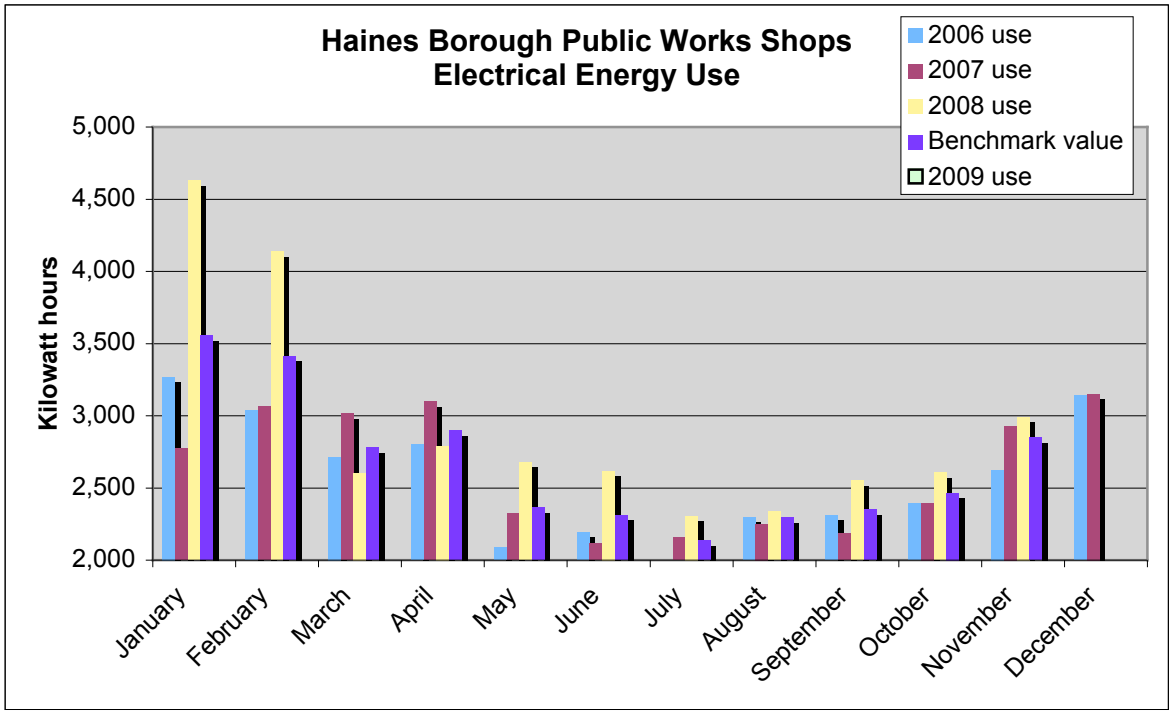


Appendix H: Public Works Shop, Old & New

HISTORIC ELECTRICAL USE

PUBLIC WORKS SHOP
Includes old and new shops

	2006 Usage (kWh)	2007 Usage (kWh)	2008 Usage (kWh)	Usage trend (2006-2008) (%)	Benchmark (3-year average) (kWh)
January	3,268	2,773	4,630	41.7%	3,557
February	3,038	3,064	4,137	36.2%	3,413
March	2,713	3,016	2,604	-4.0%	2,778
April	2,803	3,098	2,792	-0.4%	2,898
May	2,088	2,322	2,678	28.3%	2,363
June	2,193	2,118	2,618	19.4%	2,310
July	1,940	2,158	2,307	18.9%	2,135
August	2,297	2,251	2,334	1.6%	2,294
September	2,310	2,186	2,553	10.5%	2,350
October	2,391	2,397	2,608	9.1%	2,465
November	2,626	2,929	2991	13.9%	2,849
December	3,139	3,151			
Totals	30,806	31,463			



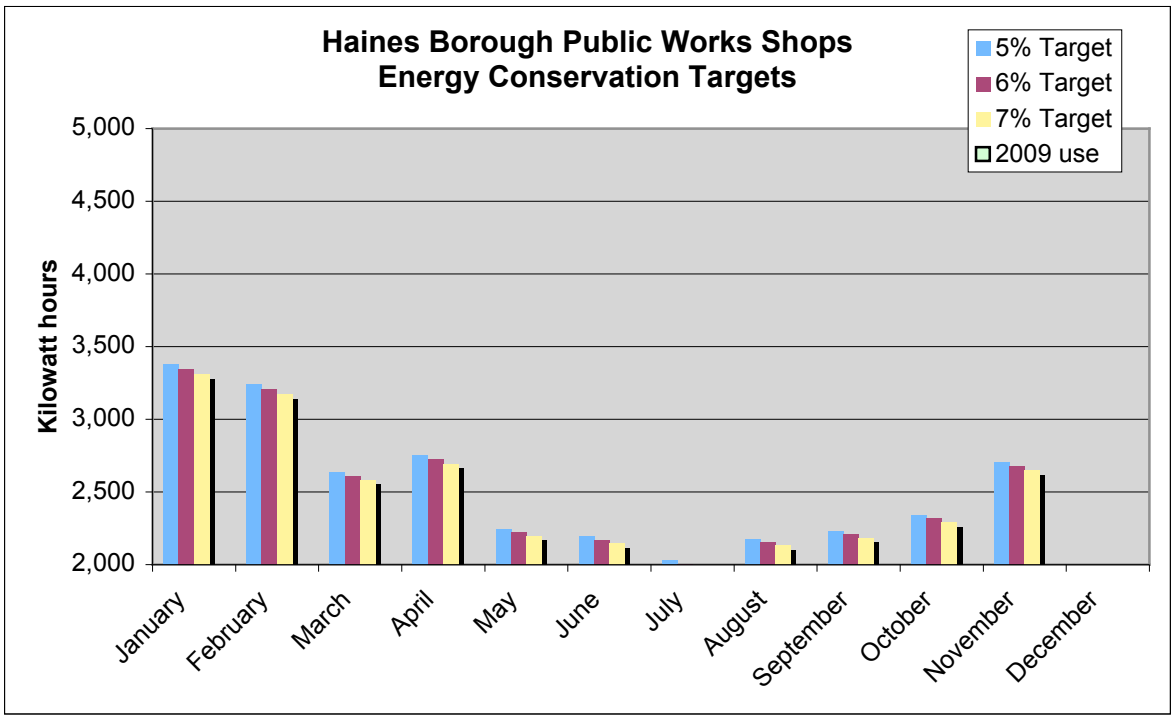
Jan-Nov	27,667	28,312	32,252	16.6%

ELECTRICAL CONSERVATION TARGETS

PUBLIC WORKS SHOP

Includes old and new shops

	2009 Usage (kWh)	5% Target (kWh)	6% Target (kWh)	7% Target (kWh)	% Change from Benchmark (%)
January		3,379	3,344	3,308	
February		3,242	3,208	3,174	
March		2,639	2,611	2,583	
April		2,753	2,724	2,695	
May		2,245	2,221	2,197	
June		2,194	2,171	2,148	
July		2,028	2,007	1,986	
August		2,179	2,156	2,133	
September		2,232	2,209	2,185	
October		2,342	2,317	2,293	
November		2,706	2,678	2,649	
December					
Totals					

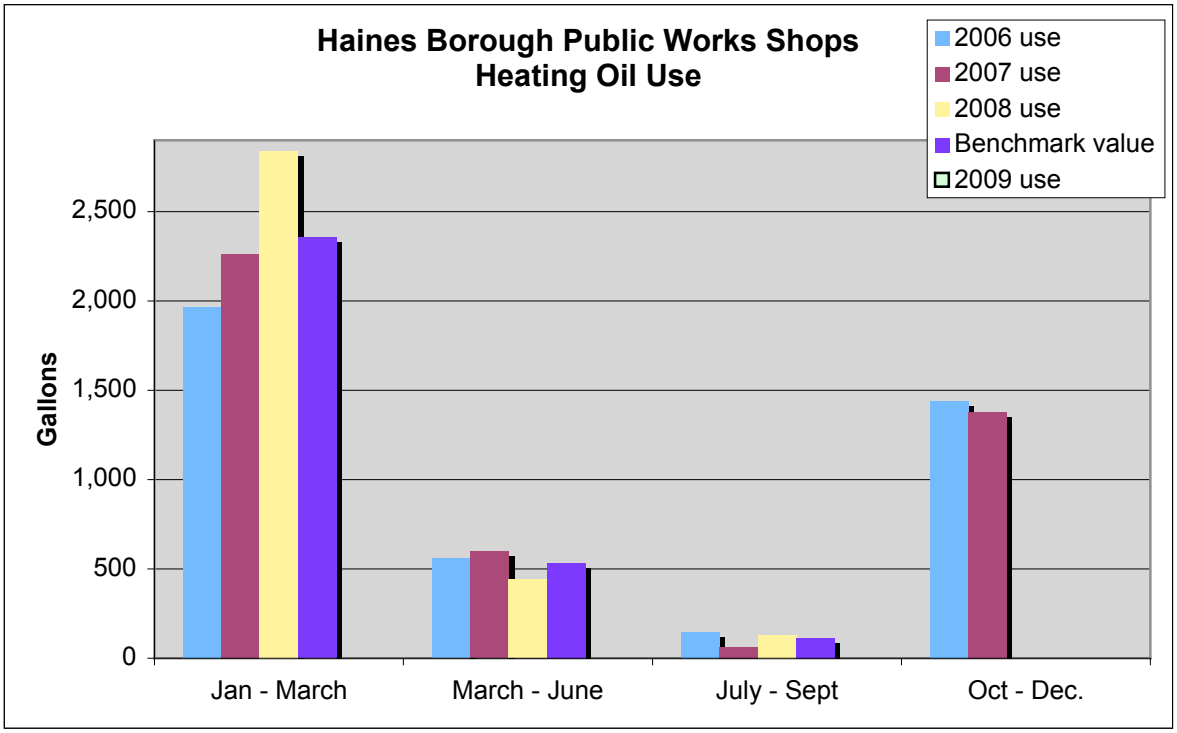


HISTORIC HEATING OIL USE

PUBLIC WORKS SHOP

Includes old and new shops

	2006 Usage (gallons)	2007 Usage (gallons)	2008 Usage (gallons)	Usage trend (2006-2008) (%)	Benchmark (3-year average) (gallons)
Jan - March	1,967	2,263	2,841	44.4%	2,357
March - June	560	599	441	-21.2%	533
July - Sept	148	62	128	-13.2%	113
Oct - Dec.	1,442	1,379			
Totals	4,116	4,304			



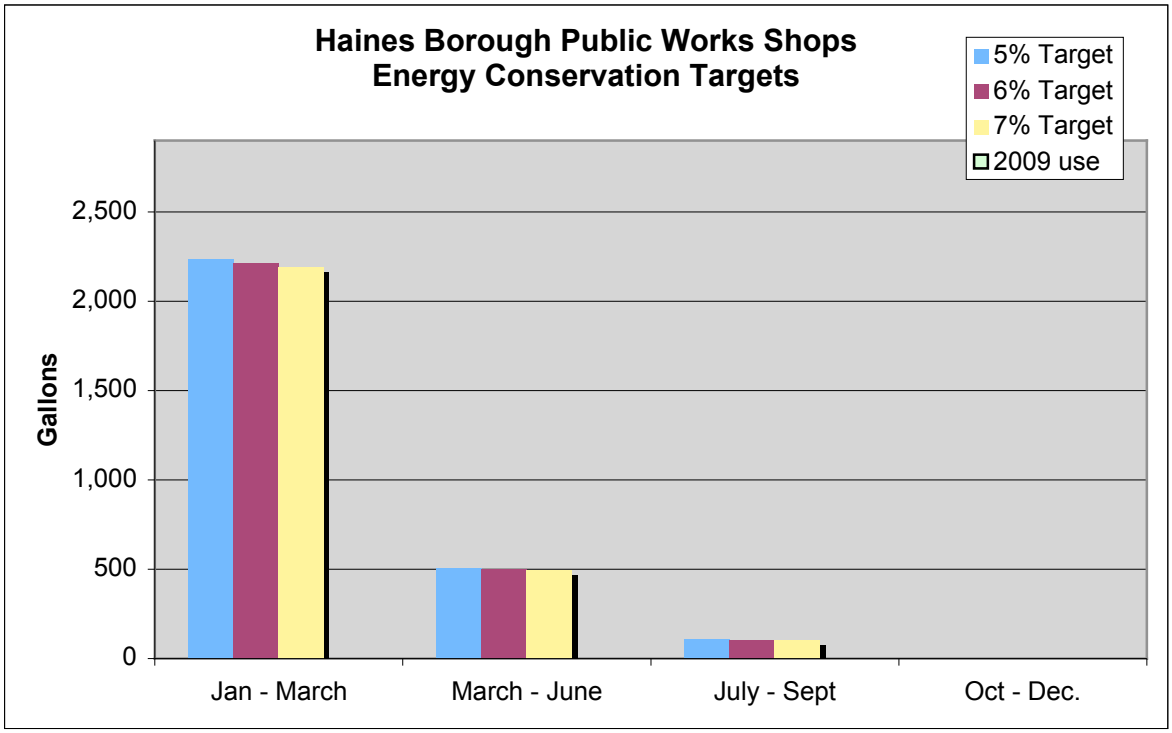
Jan-Nov	2,674	2,925	3,410	27.5%

HEATING OIL CONSERVATION TARGETS

PUBLIC WORKS SHOP

Includes old and new shops

	2009 Usage (gallons)	5% Target (gallons)	6% Target (gallons)	7% Target (gallons)	% Change from Benchmark (%)
Jan - March		2,239	2,216	2,192	
March - June		507	501	496	
July - Sept		107	106	105	
Oct - Dec.					
Totals					



Appendix I: School Buildings: K-12 Town

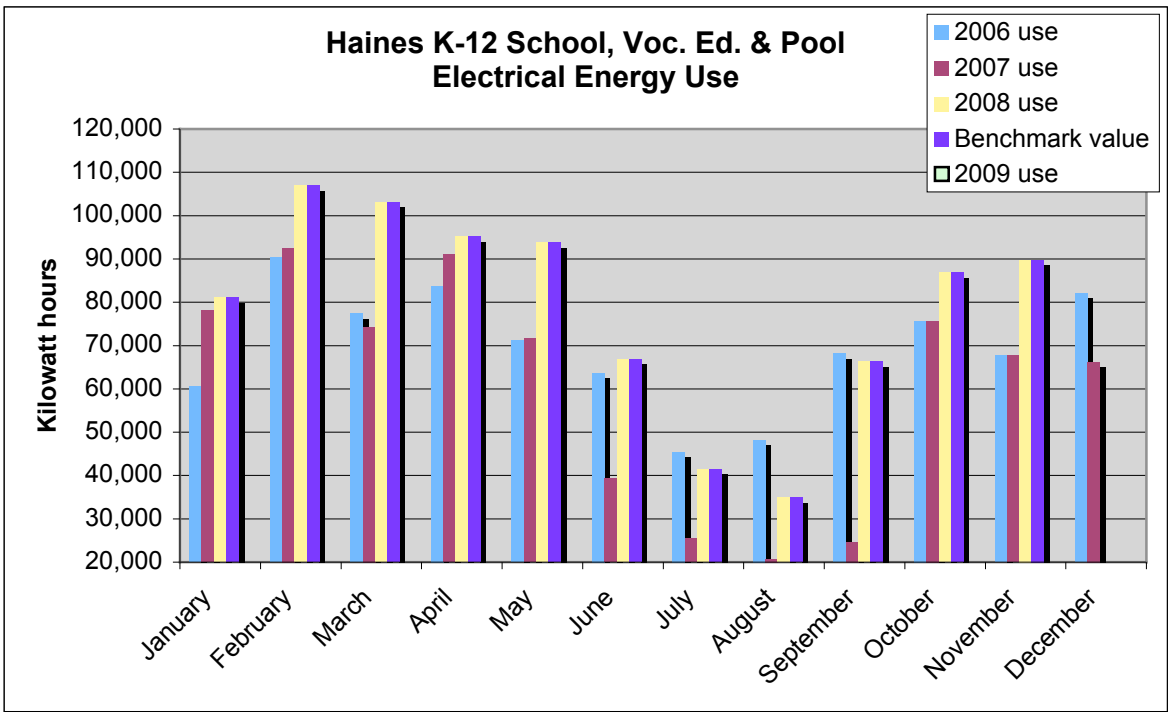
HISTORIC ELECTRICAL USE

HAINES BOROUGH SCHOOL

Includes K - 12 school, vocational ed. Bldg., & pool

	2006 Usage (kWh)	2007 Usage (kWh)	2008 Usage (kWh)	Usage trend (2006-2008) (%)	Benchmark (2008) * (kWh)
January	60,469	78,181	81,045	34.0%	81,045
February	90,379	92,485	106,949	18.3%	106,949
March	77,373	74,354	103,049	33.2%	103,049
April	83,766	90,965	95,190	13.6%	95,190
May	71,232	71,625	93,760	31.6%	93,760
June	63,699	39,322	66,880	5.0%	66,880
July	45,405	25,430	41,440	-8.7%	41,440
August	48,221	20,711	34,881	-27.7%	34,881
September	68,099	24,625	66,240	-2.7%	66,240
October	75,649	75,666	86,800	14.7%	86,800
November	67,655	67,707	89,760	32.7%	89,760
December	82,054	66,220			0
Totals	834,001	727,291			

* 2008 useage of new school used as benchmark.



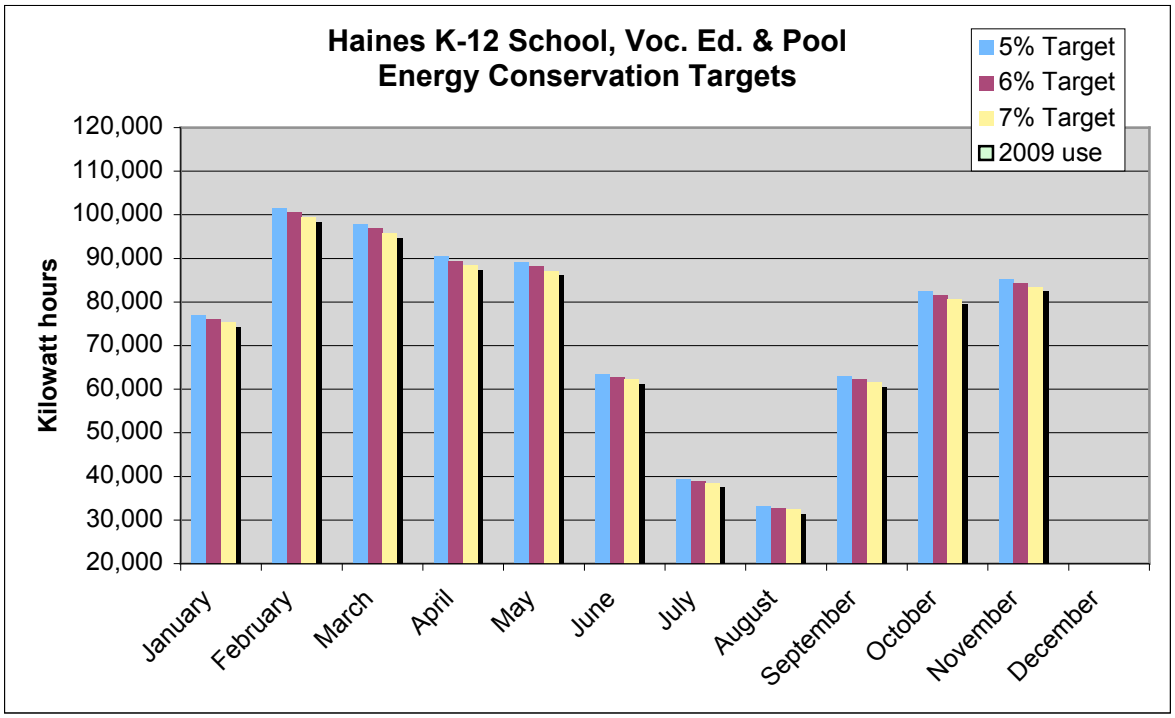
Jan-Nov	684,292	593,364	776,234	13.4%

ELECTRICAL CONSERVATION TARGETS

HAINES BOROUGH SCHOOL

Includes K - 12 school, vocational ed. Bldg., & pool

	2009 Usage (kWh)	5% Target (kWh)	6% Target (kWh)	7% Target (kWh)	% Change from Benchmark (%)
January		76,993	76,182	75,372	
February		101,602	100,532	99,463	
March		97,897	96,866	95,836	
April		90,431	89,479	88,527	
May		89,072	88,134	87,197	
June		63,536	62,867	62,198	
July		39,368	38,954	38,539	
August		33,137	32,788	32,439	
September		62,928	62,266	61,603	
October		82,460	81,592	80,724	
November		85,272	84,374	83,477	
December		0	0	0	
Totals					



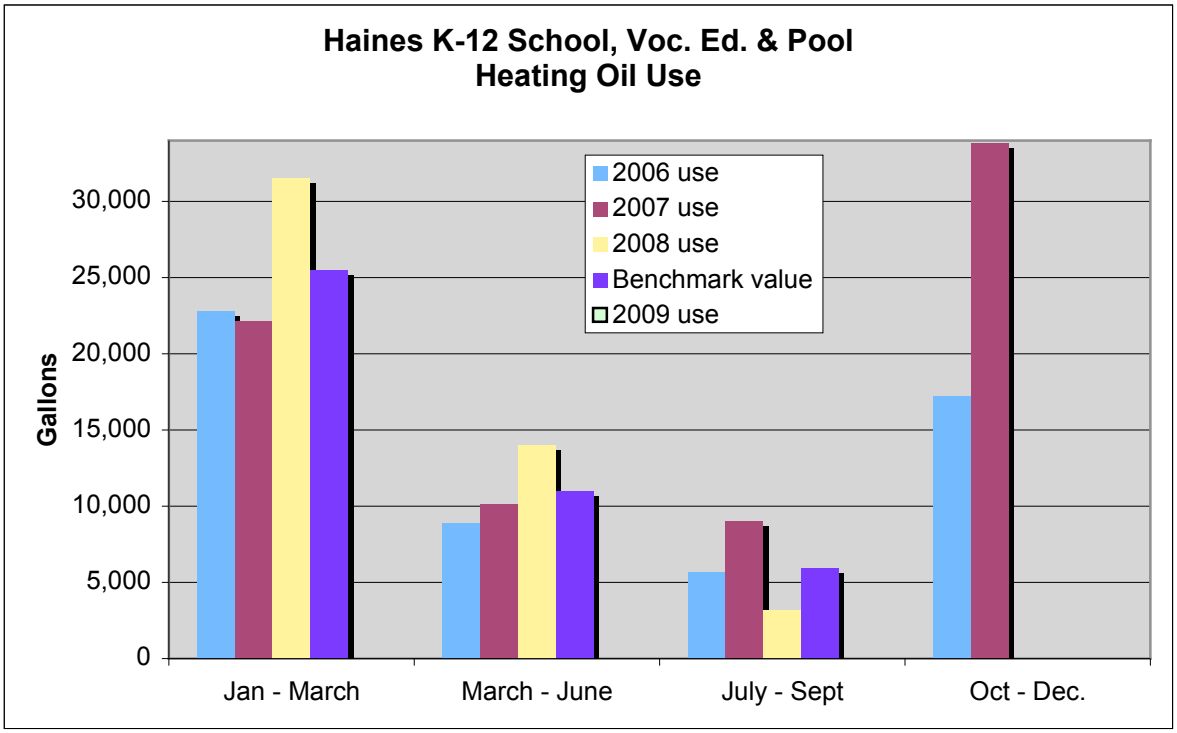
HISTORIC HEATING OIL USE

HAINES BOROUGH SCHOOL

Includes K - 12 school, vocational ed. Bldg., & pool

	2006 Usage (gallons)	2007 Usage (gallons)	2008 Usage (gallons)	Usage trend (2006-2008) (%)	Benchmark (2008) * (gallons)
Jan - March	22,813	22,154	31,545	38.3%	25,504
March - June	8,874	10,119	14,003	57.8%	10,999
July - Sept	5,672	8,986	3,153	-44.4%	5,937
Oct - Dec.	17,214	33,843			
Totals	54,573	75,102			

* 2008 useage of new school used as benchmark.



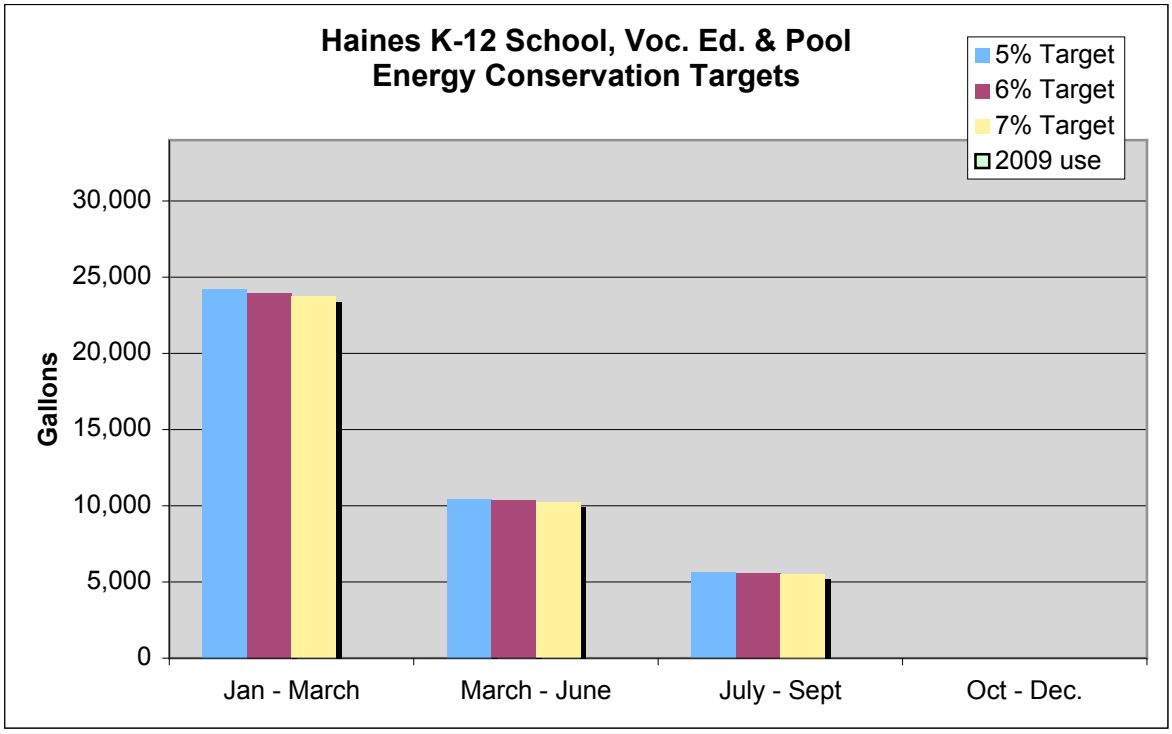
Jan-Nov	37,359	41,259	48,701	30.4%

HEATING OIL CONSERVATION TARGETS

HAINES BOROUGH SCHOOL

Includes K - 12 school, vocational ed. Bldg., & pool

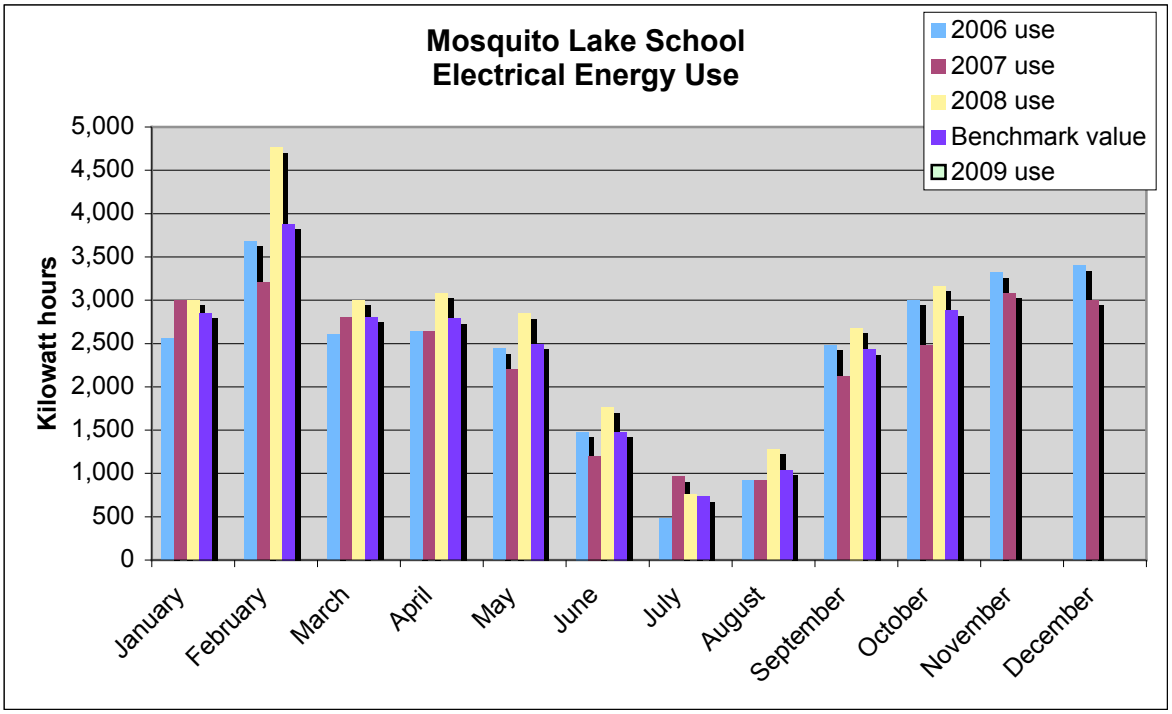
	2009 Usage (gallons)	5% Target (gallons)	6% Target (gallons)	7% Target (gallons)	% Change from Benchmark (%)
Jan - March		24,229	23,974	23,719	
March - June		10,449	10,339	10,229	
July - Sept		5,640	5,581	5,521	
Oct - Dec.					
Totals					



HISTORIC ELECTRICAL USE

MOSQUITO LAKE SCHOOL

	2006 Usage (kWh)	2007 Usage (kWh)	2008 Usage (kWh)	Usage trend (2006-2008) (%)	Benchmark (3-year average) (kWh)
January	2,560	3,000	3,000	17.2%	2,853
February	3,680	3,200	4,760	29.3%	3,880
March	2,600	2,800	3,000	15.4%	2,800
April	2,640	2,640	3,080	16.7%	2,787
May	2,440	2,200	2,840	16.4%	2,493
June	1,480	1,200	1,760	18.9%	1,480
July	480	960	760	58.3%	733
August	920	920	1,280	39.1%	1,040
September	2,480	2,120	2,680	8.1%	2,427
October	3,000	2,480	3,160	5.3%	2,880
November	3,320	3,080			
December	3,400	3,000			
Totals	29,000	27,600			

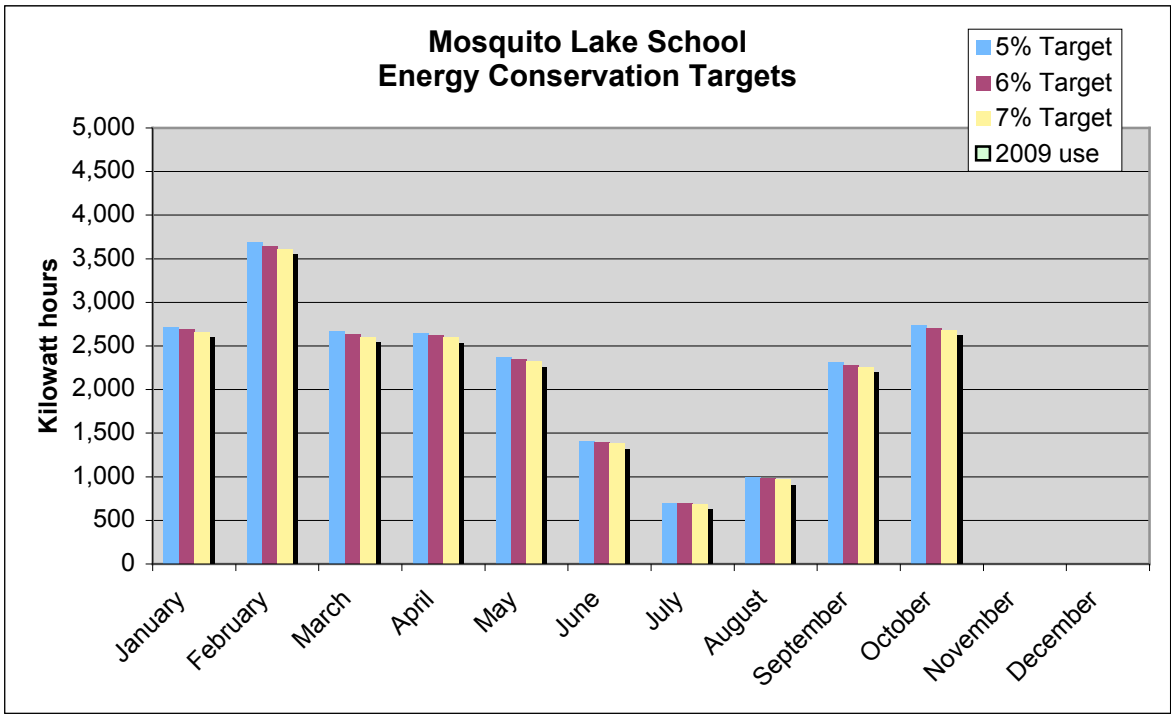


Jan-Oct	22,280	21,520	26,320	18.1%

ELECTRICAL CONSERVATION TARGETS

MOSQUITO LAKE SCHOOL

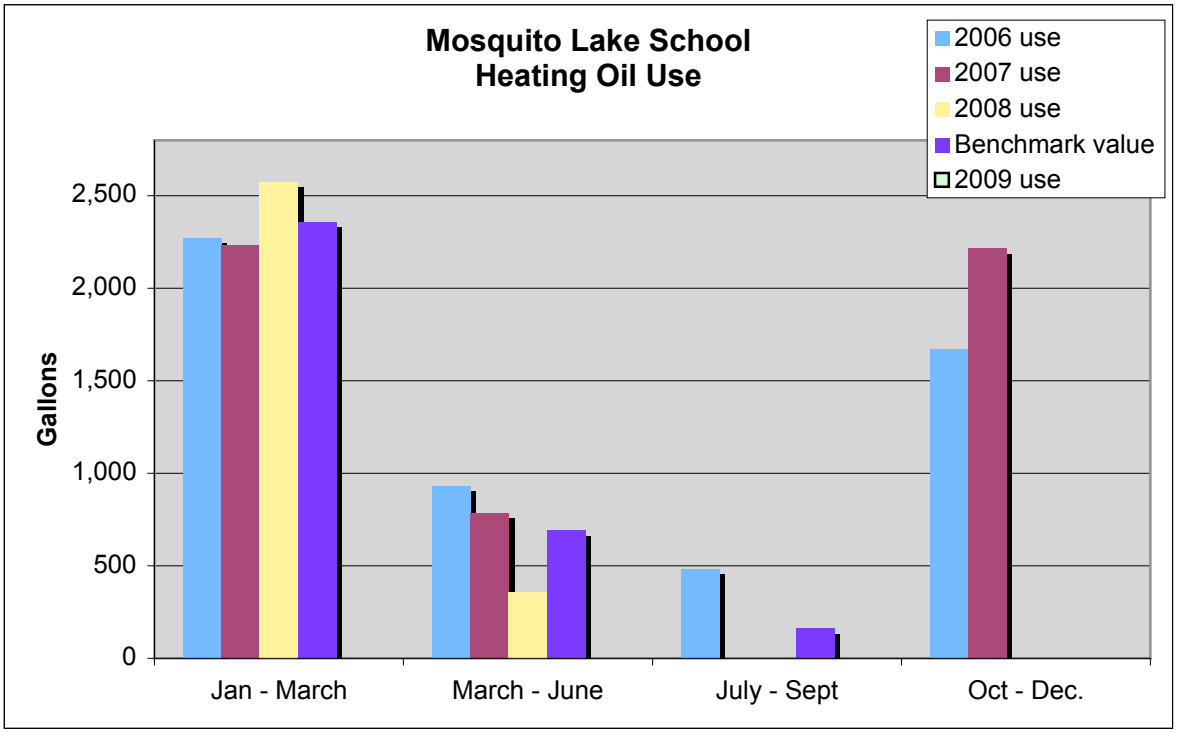
	2009 Usage (kWh)	5% Target (kWh)	6% Target (kWh)	7% Target (kWh)	% Change from Benchmark (%)
January		2,711	2,682	2,654	
February		3,686	3,647	3,608	
March		2,660	2,632	2,604	
April		2,647	2,619	2,592	
May		2,369	2,344	2,319	
June		1,406	1,391	1,376	
July		697	689	682	
August		988	978	967	
September		2,305	2,281	2,257	
October		2,736	2,707	2,678	
November					
December					
Totals					



HISTORIC HEATING OIL USE

MOSQUITO LAKE SCHOOL

	2006 Usage (gallons)	2007 Usage (gallons)	2008 Usage (gallons)	Usage trend (2006-2008) (%)	Benchmark (3-year average) (gallons)
Jan - March	2,270	2,233	2,575	13.4%	2,359
March - June	930	784	360	-61.3%	691
July - Sept	484	0	0	-100.0%	161
Oct - Dec.	1,670	2,215			
Totals	5,352	5,232			

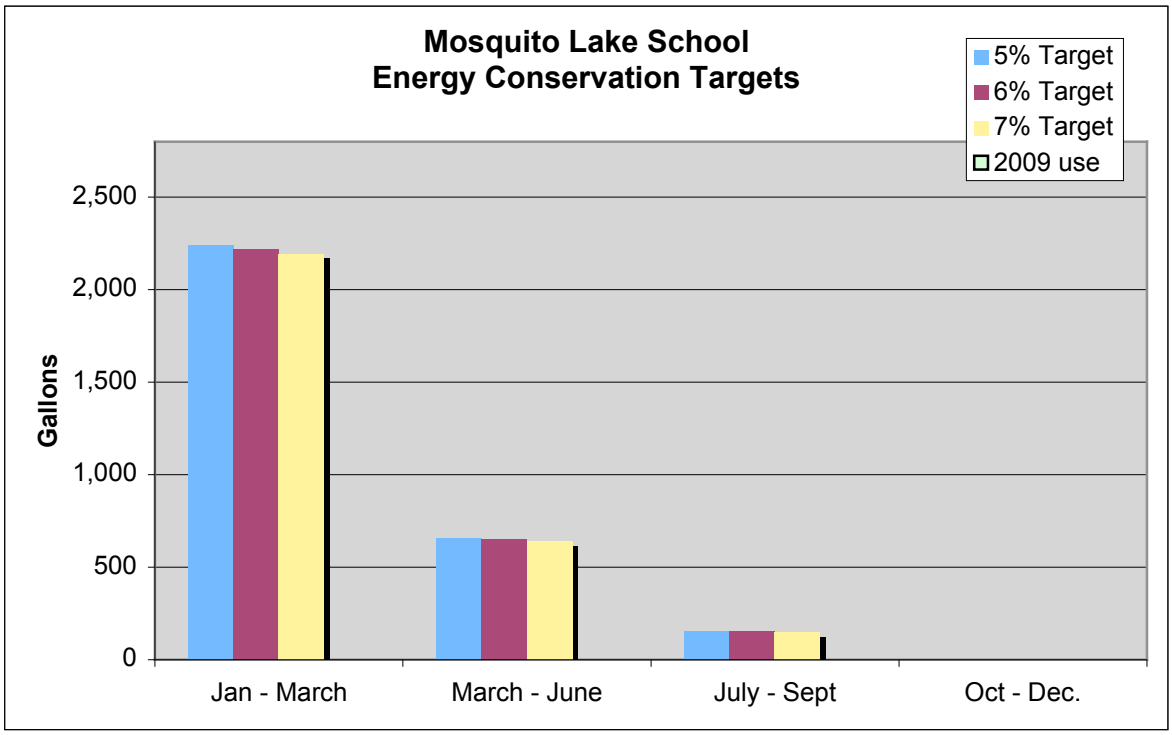


Jan-Nov	3,683	3,017	2,935	-20.3%

HEATING OIL CONSERVATION TARGETS

MOSQUITO LAKE SCHOOL

	2009 Usage (gallons)	5% Target (gallons)	6% Target (gallons)	7% Target (gallons)	% Change from Benchmark (%)
Jan - March		2,241	2,218	2,194	
March - June		657	650	643	
July - Sept		153	152	150	
Oct - Dec.					
Totals					



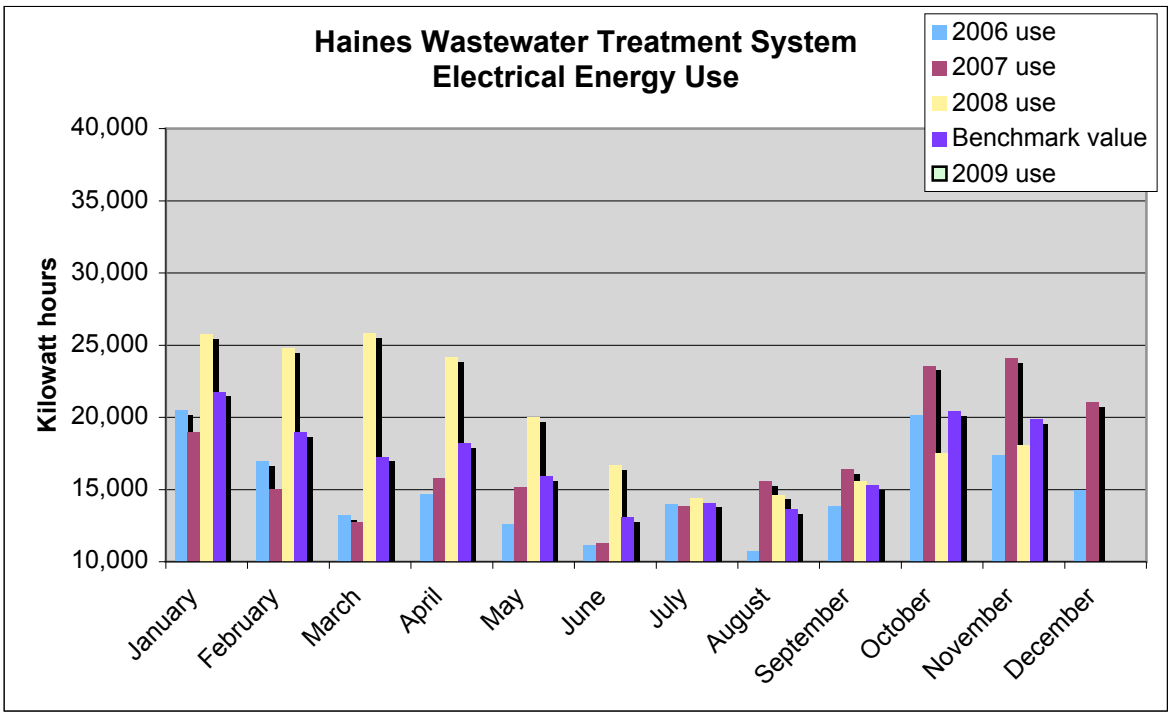
Appendix J: Sewer Treatment Plant and Pumps

HISTORIC ELECTRICAL USE

HAINES WASTEWATER TREATMENT SYSTEM

Includes Wastewater Treatment plant, sewage pump, Skyline lift pump, & Beach Rd. lift pump

	2006 Usage (kWh)	2007 Usage (kWh)	2008 Usage (kWh)	Usage trend (2006-2008) (%)	Benchmark (3-year average) (kWh)
January	20,515	19,004	25,770	25.6%	21,763
February	16,972	15,008	24,804	46.1%	18,928
March	13,244	12,732	25,827	95.0%	17,268
April	14,666	15,767	24,184	64.9%	18,206
May	12,587	15,199	20,015	59.0%	15,934
June	11,181	11,282	16,685	49.2%	13,049
July	13,983	13,846	14,396	3.0%	14,075
August	10,740	15,566	14,644	36.4%	13,650
September	13,833	16,390	15,607	12.8%	15,277
October	20,166	23,562	17,530	-13.1%	20,419
November	17,357	24,081	18072	4.1%	19,837
December	14,920	21,045			
Totals	180,164	203,482			



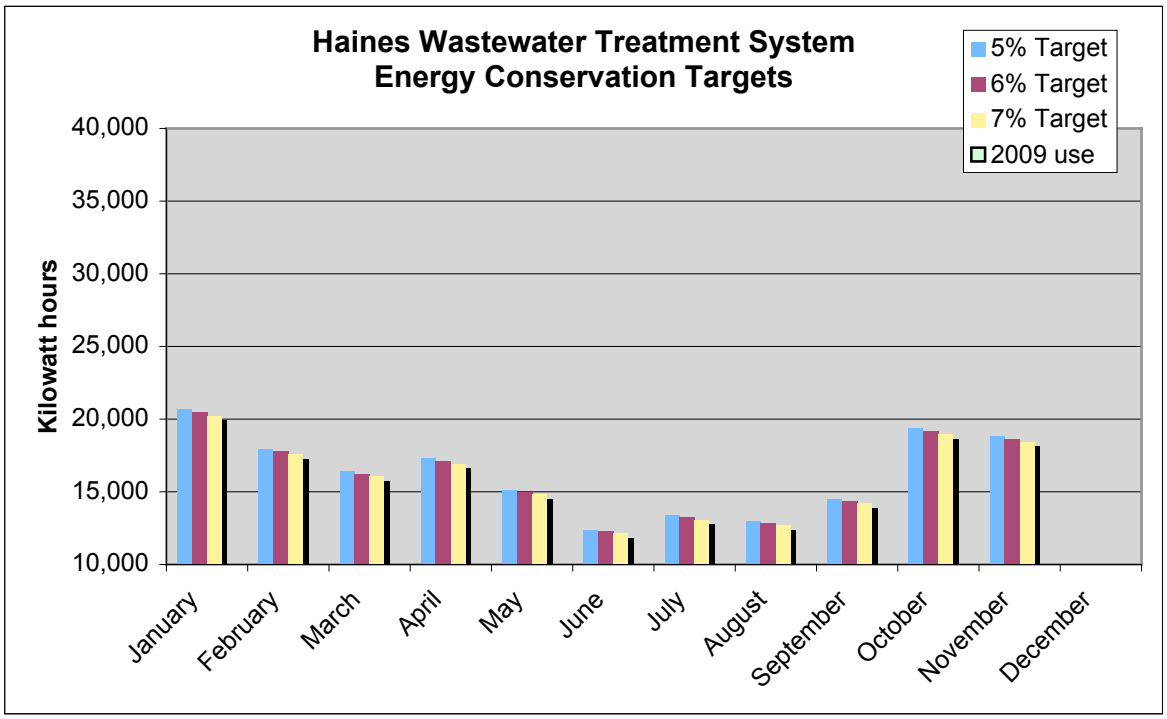
Jan-Nov	165,244	182,437	217,534	31.6%

ELECTRICAL CONSERVATION TARGETS

HAINES WASTEWATER TREATMENT SYSTEM

Includes Wastewater Treatment plant, sewage pump, Skyline lift pump, & Beach Rd. lift pump

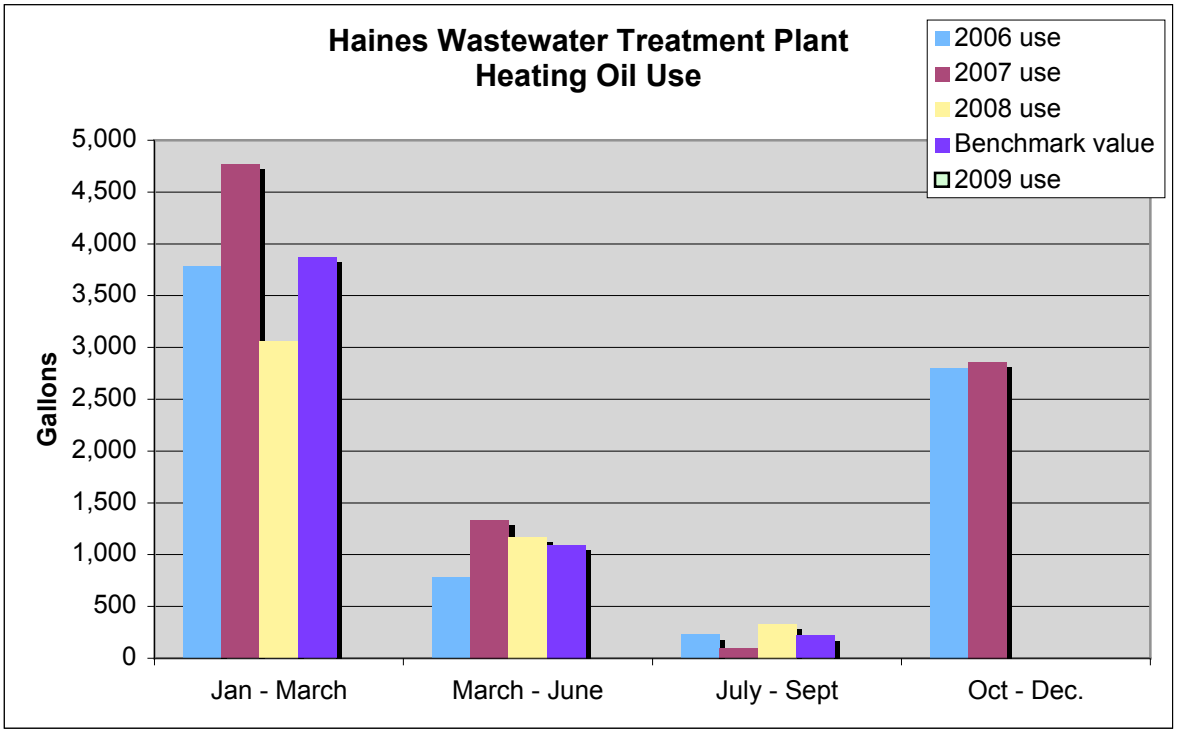
	2009 Usage (kWh)	5% Target (kWh)	6% Target (kWh)	7% Target (kWh)	% Change from Benchmark (%)
January		20,675	20,457	20,240	
February		17,982	17,792	17,603	
March		16,404	16,232	16,059	
April		17,295	17,113	16,931	
May		15,137	14,978	14,818	
June		12,397	12,266	12,136	
July		13,371	13,231	13,090	
August		12,968	12,831	12,695	
September		14,513	14,360	14,207	
October		19,398	19,194	18,990	
November		18,845	18,646	18,448	
December					
Totals					



HISTORIC HEATING OIL USE

WASTEWATER TREATMENT PLANT

	2006 Usage (gallons)	2007 Usage (gallons)	2008 Usage (gallons)	Usage trend (2006-2008) (%)	Benchmark (3-year average) (gallons)
Jan - March	3,783	4,768	3,058	-19.2%	3,869
March - June	781	1,335	1,168	49.5%	1,095
July - Sept	230	94	332	44.2%	219
Oct - Dec.	2,799	2,861			
Totals	7,593	9,058			

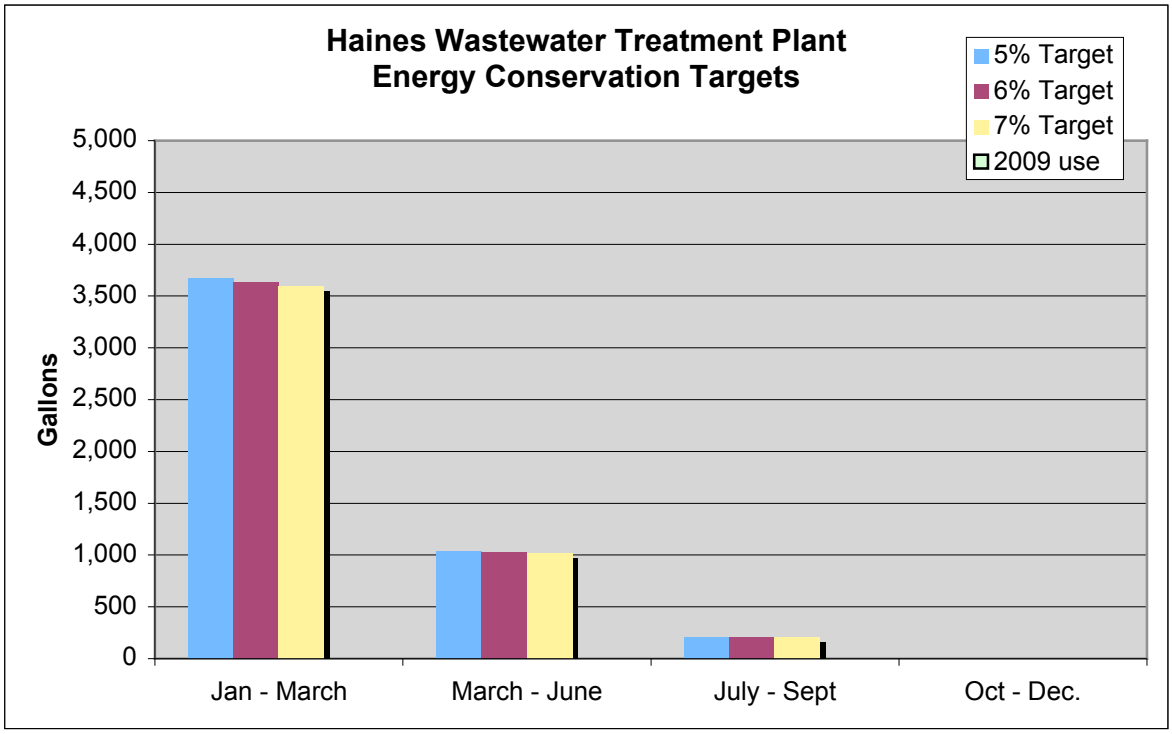


Jan-Nov	4,794	6,196	4,558	-4.9%

HEATING OIL CONSERVATION TARGETS

WASTEWATER TREATMENT PLANT

	2009 Usage (gallons)	5% Target (gallons)	6% Target (gallons)	7% Target (gallons)	% Change from Benchmark (%)
Jan - March		3,676	3,637	3,599	
March - June		1,040	1,029	1,018	
July - Sept		208	205	203	
Oct - Dec.					
Totals					



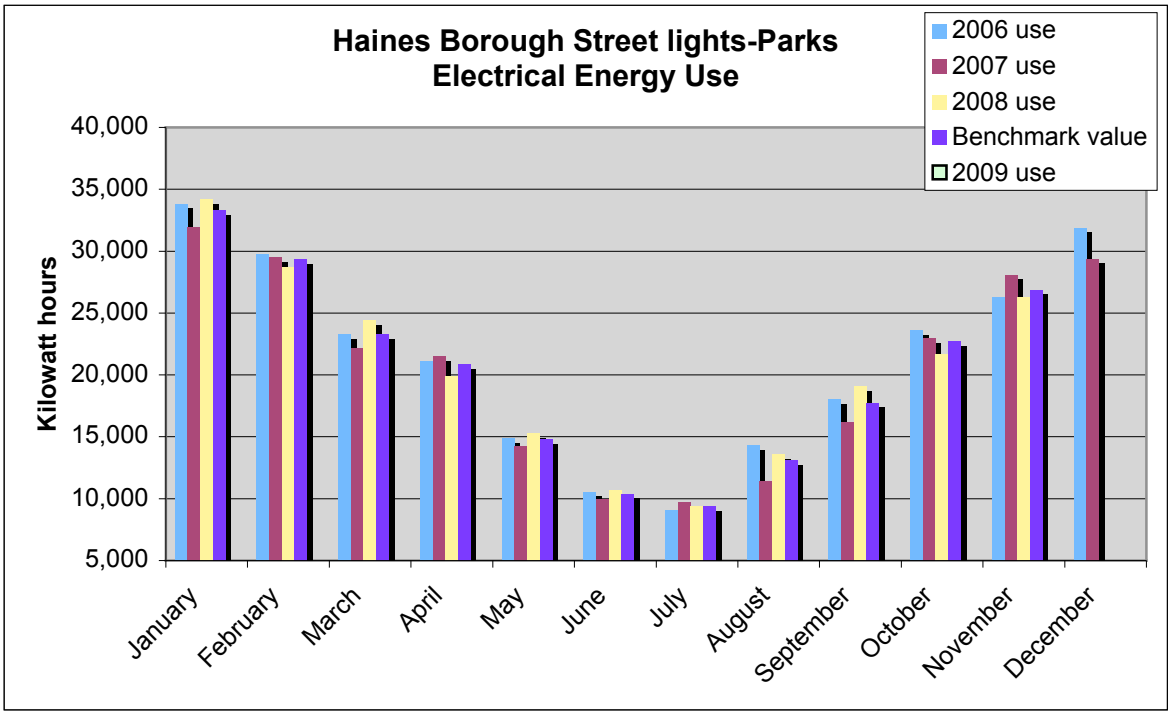
Appendix K: Street Lights & Parks

HISTORIC ELECTRICAL USE

STREET LIGHTS & PARKS

Includes all 100w and 250 wstreet lights, Tlingit Park, & Oslund Park

	2006 Usage (kWh)	2007 Usage (kWh)	2008 Usage (kWh)	Usage trend (2006-2008) (%)	Benchmark (3-year average) (kWh)
January	33,851	31,924	34,208	1.1%	33,328
February	29,773	29,524	28,758	-3.4%	29,352
March	23,311	22,148	24,436	4.8%	23,298
April	21,144	21,509	19,914	-5.8%	20,856
May	14,890	14,246	15,282	2.6%	14,806
June	10,566	9,977	10,708	1.3%	10,417
July	9,060	9,706	9,431	4.1%	9,399
August	14,334	11,410	13,609	-5.1%	13,118
September	18,007	16,199	19,081	6.0%	17,762
October	23,601	22,942	21,680	-8.1%	22,741
November	26,296	28,107	26274	-0.1%	26,892
December	31,900	29,402			
Totals	256,733	247,094			



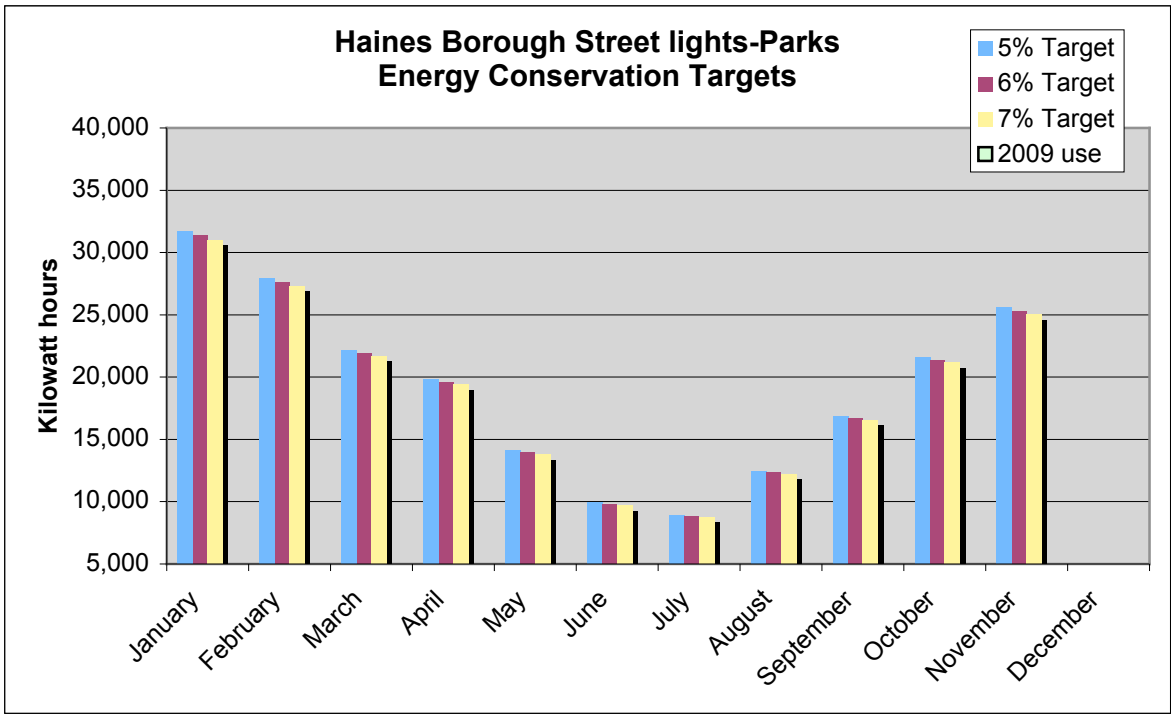
Jan-Nov	224,833	217,692	223,381	-0.6%

ELECTRICAL CONSERVATION TARGETS

STREET LIGHTS & PARKS

Includes all 100w and 250 wstreet lights, Tlingit Park, & Oslund Park

	2009 Usage (kWh)	5% Target (kWh)	6% Target (kWh)	7% Target (kWh)	% Change from Benchmark (%)
January		31,661	31,328	30,995	
February		27,884	27,591	27,297	
March		22,133	21,900	21,667	
April		19,813	19,604	19,396	
May		14,066	13,918	13,770	
June		9,896	9,792	9,688	
July		8,929	8,835	8,741	
August		12,462	12,331	12,199	
September		16,874	16,697	16,519	
October		21,604	21,377	21,149	
November		25,548	25,279	25,010	
December					
Totals					



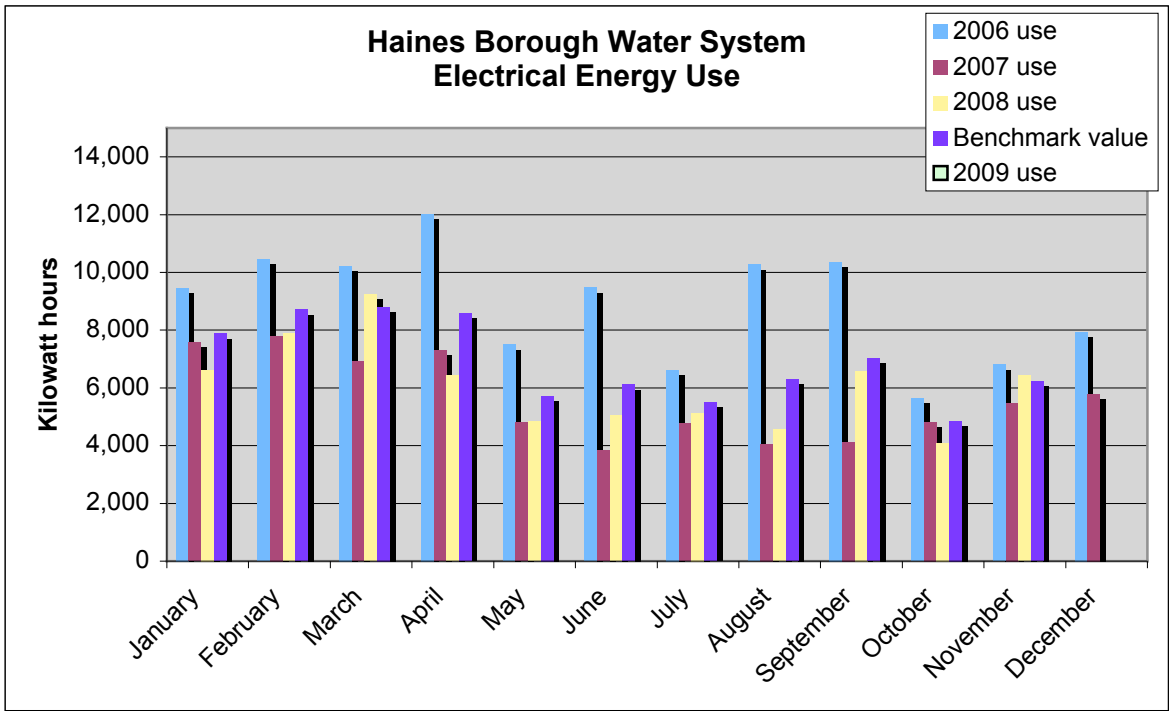
Appendix L: Water Treatment Plant & Pumps

HISTORIC ELECTRICAL USE

HAINES WATER SYSTEM

Includes water treatment plant, Skyline Dr lift station, Barnett Dr pump, FAA Rd tank, Piedad Rd. tank

	2006 Usage (kWh)	2007 Usage (kWh)	2008 Usage (kWh)	Usage trend (2006-2008) (%)	Benchmark (3-year average) (kWh)
January	9,453	7,588	6,615	-30.0%	7,885
February	10,458	7,795	7,890	-24.6%	8,714
March	10,226	6,922	9,248	-9.6%	8,799
April	12,023	7,307	6,427	-46.5%	8,586
May	7,505	4,810	4,833	-35.6%	5,716
June	9,470	3,831	5,039	-46.8%	6,113
July	6,619	4,752	5,134	-22.4%	5,502
August	10,263	4,059	4,555	-55.6%	6,292
September	10,365	4,125	6,580	-36.5%	7,023
October	5,639	4,827	4,088	-27.5%	4,851
November	6,804	5,478	6418	-5.7%	6,233
December	7,941	5,786			
Totals	106,766	67,280			



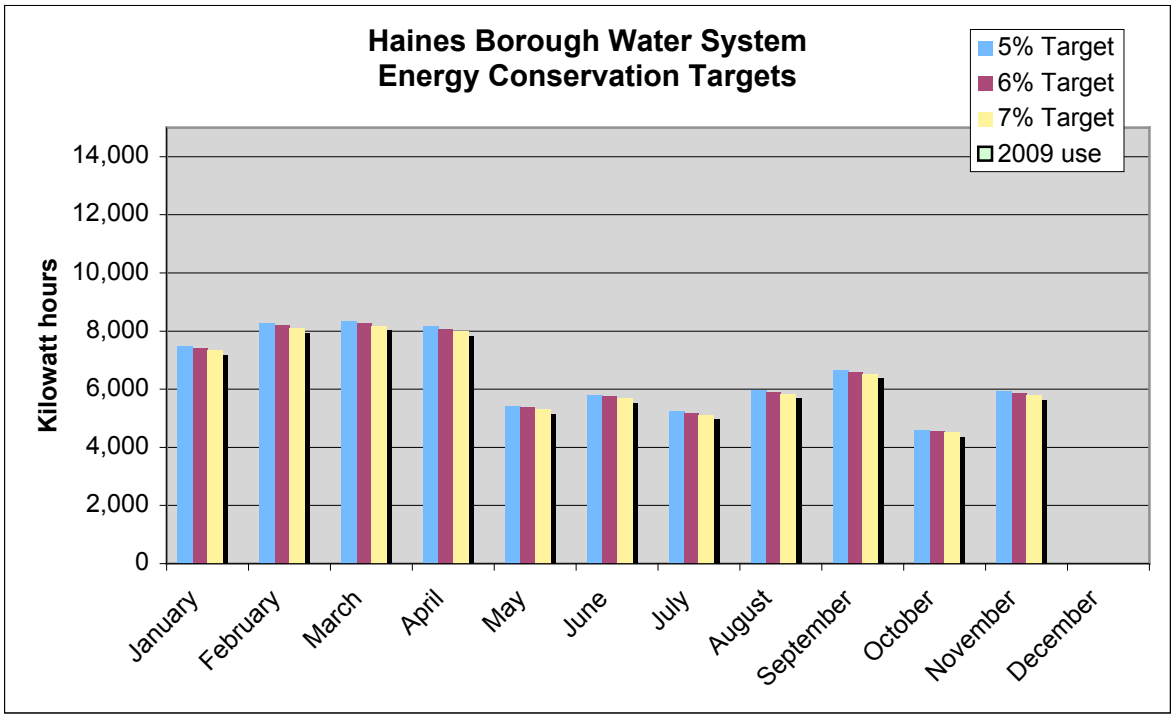
Jan-Nov	98,825	61,494	66,827	-32.4%

ELECTRICAL CONSERVATION TARGETS

HAINES WATER SYSTEM

Includes water treatment plant, Skyline Dr lift station, Barnett Dr pump, FAA Rd tank, Piedad Rd. tank

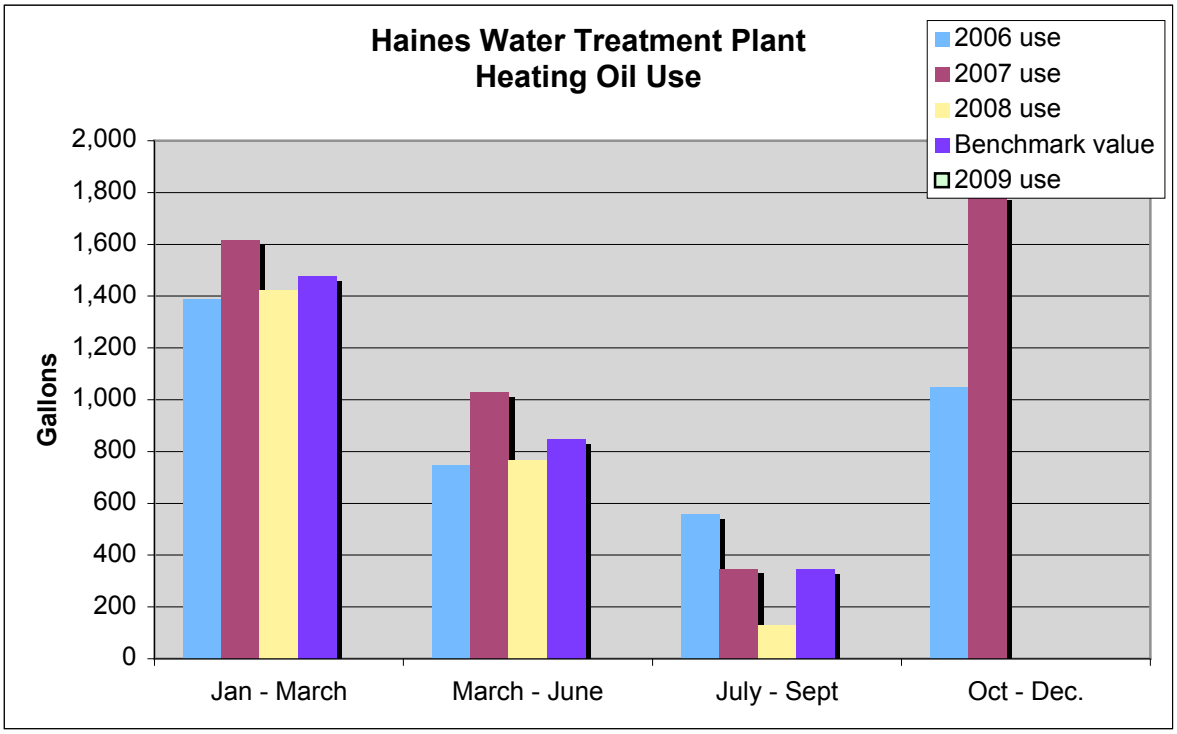
	2009 Usage (kWh)	5% Target (kWh)	6% Target (kWh)	7% Target (kWh)	% Change from Benchmark (%)
January		7,491	7,412	7,333	
February		8,279	8,191	8,104	
March		8,359	8,271	8,183	
April		8,156	8,071	7,985	
May		5,430	5,373	5,316	
June		5,808	5,747	5,685	
July		5,227	5,172	5,117	
August		5,978	5,915	5,852	
September		6,672	6,602	6,532	
October		4,609	4,560	4,512	
November		5,922	5,859	5,797	
December					
Totals					



HISTORIC HEATING OIL USE

WATER TREATMENT PLANT

	2006 Usage (gallons)	2007 Usage (gallons)	2008 Usage (gallons)	Usage trend (2006-2008) (%)	Benchmark (3-year average) (gallons)
Jan - March	1,389	1,617	1,422	2.4%	1,476
March - June	745	1,027	767	2.9%	846
July - Sept	558	347	130	-76.7%	345
Oct - Dec.	1,047	1,788			
Totals	3,739	4,780			

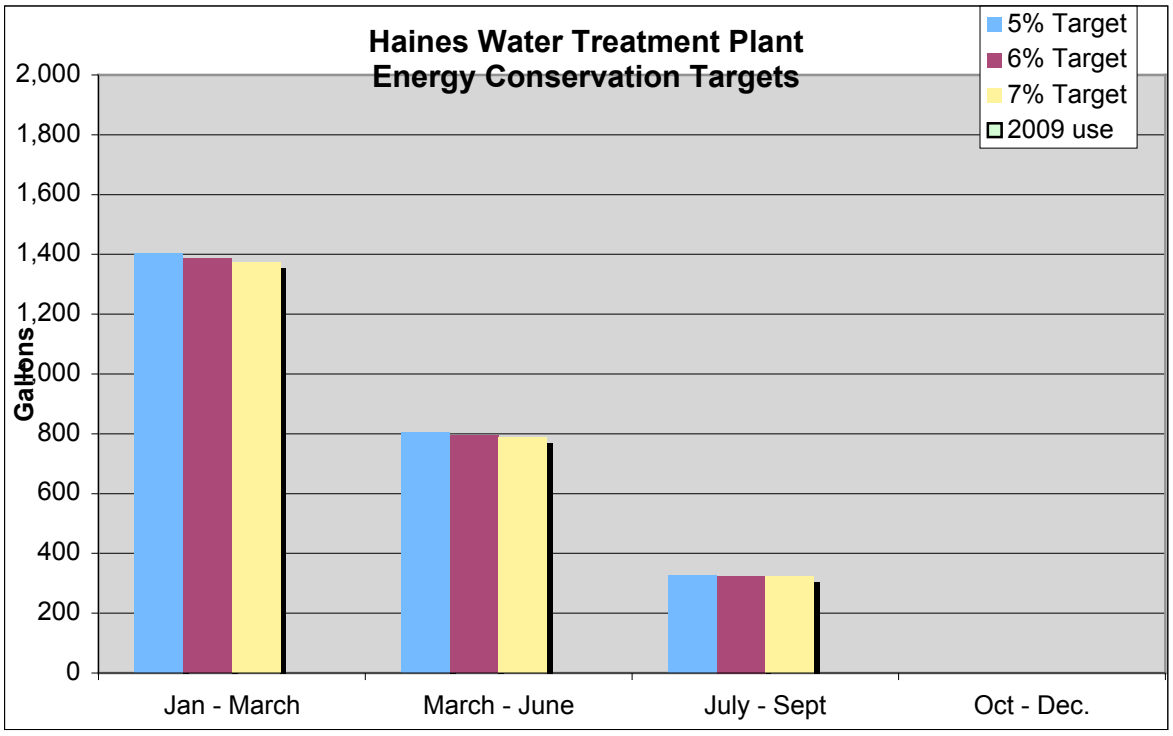


Jan-Nov	2,691	2,992	2,319	-13.8%

HEATING OIL CONSERVATION TARGETS

WATER TREATMENT PLANT

	2009 Usage (gallons)	5% Target (gallons)	6% Target (gallons)	7% Target (gallons)	% Change from Benchmark (%)
Jan - March		1,402	1,387	1,373	
March - June		804	796	787	
July - Sept		328	324	321	
Oct - Dec.					
Totals					

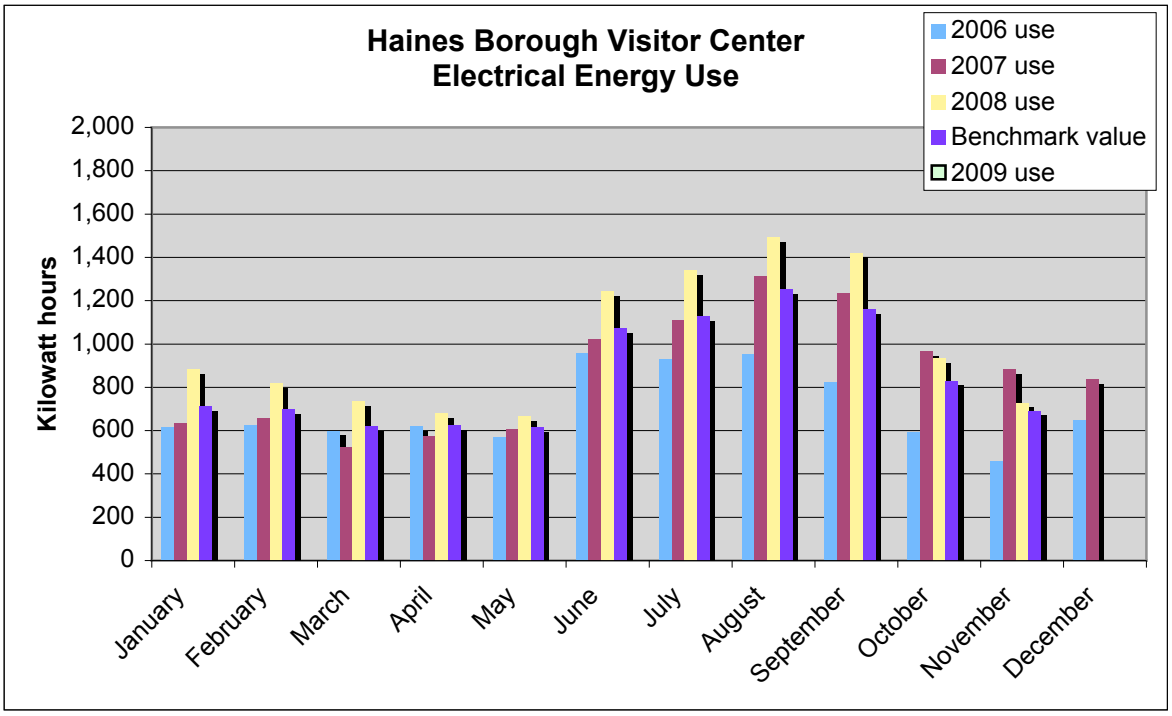


Appendix M: Visitor Center

HISTORIC ELECTRICAL USE

HAINES BOROUGH VISITOR CENTER

	2006 Usage (kWh)	2007 Usage (kWh)	2008 Usage (kWh)	Usage trend (2006-2008) (%)	Benchmark (3-year average) (kWh)
January	618	635	886	43.4%	713
February	625	656	819	31.0%	700
March	600	523	737	22.8%	620
April	621	576	680	9.5%	626
May	572	607	668	16.8%	616
June	956	1,024	1,243	30.0%	1,074
July	932	1,112	1,340	43.8%	1,128
August	955	1,312	1,491	56.1%	1,253
September	827	1,235	1,422	71.9%	1,161
October	594	966	934	57.2%	831
November	459	886	729	58.8%	691
December	650	837			
Totals	8,409	10,369			

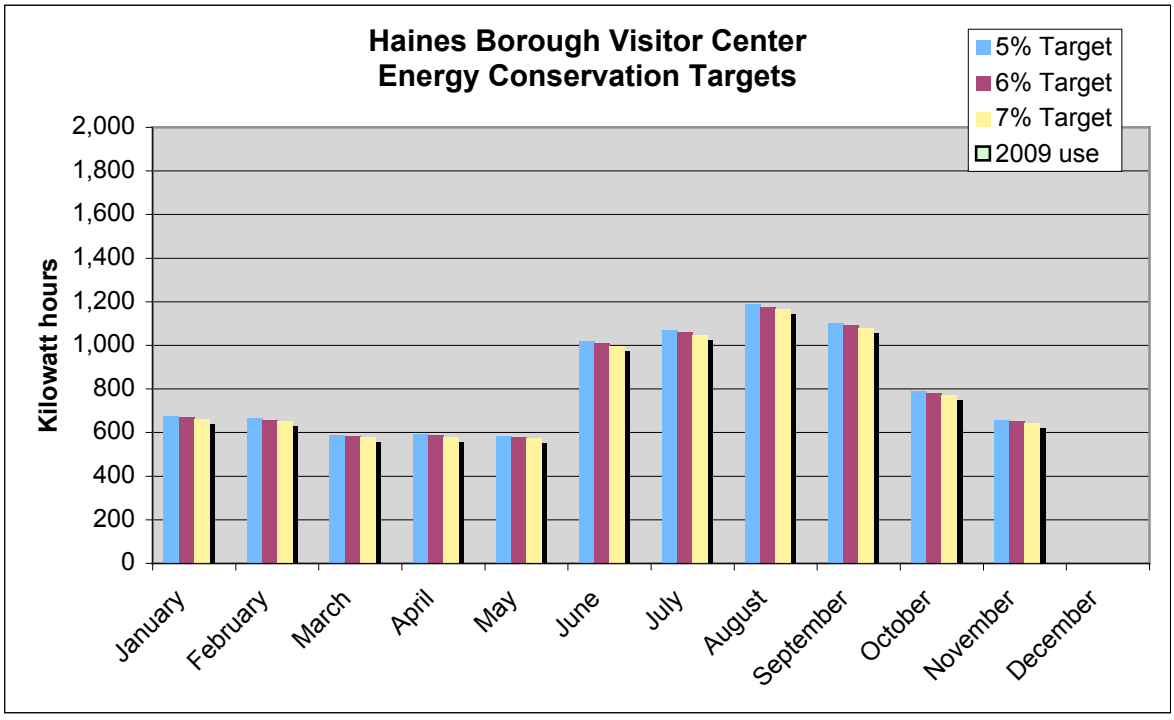


Jan-Nov	7,759	9,532	10,949	41.1%

ELECTRICAL CONSERVATION TARGETS

HAINES BOROUGH VISITOR CENTER

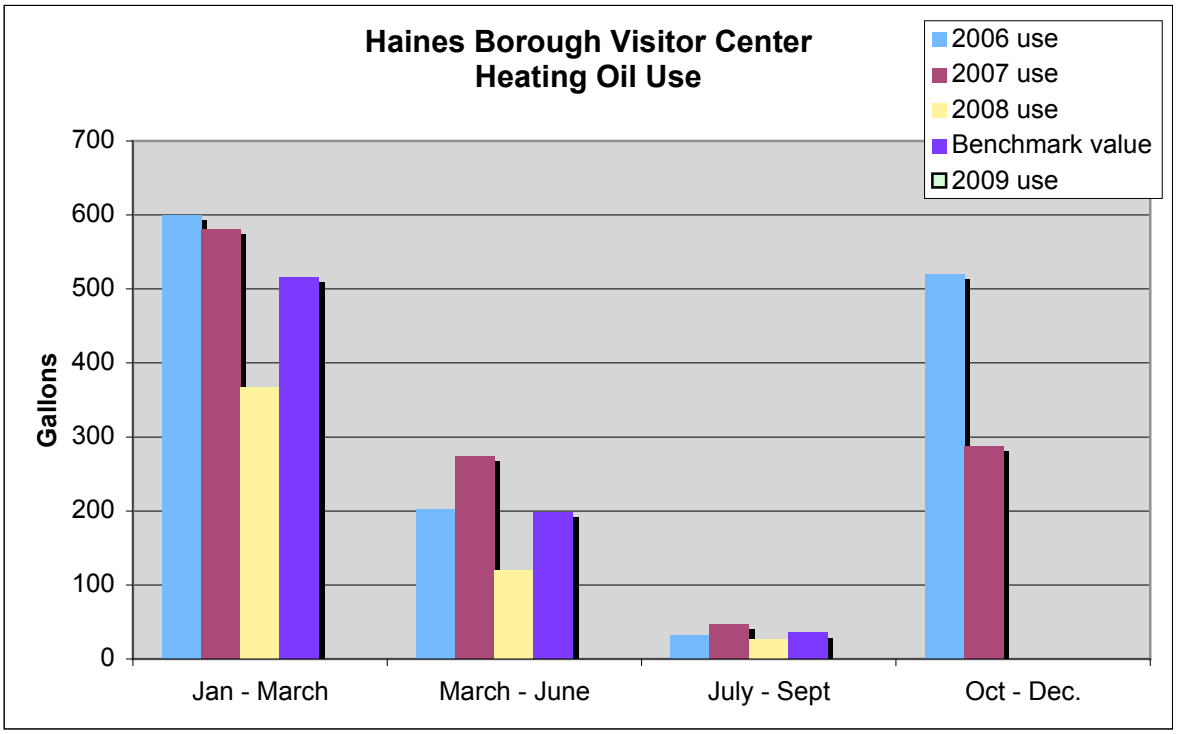
	2009 Usage (kWh)	5% Target (kWh)	6% Target (kWh)	7% Target (kWh)	% Change from Benchmark (%)
January		677	670	663	
February		665	658	651	
March		589	583	577	
April		594	588	582	
May		585	579	573	
June		1,021	1,010	999	
July		1,072	1,060	1,049	
August		1,190	1,178	1,165	
September		1,103	1,092	1,080	
October		790	781	773	
November		657	650	643	
December					
Totals					



HISTORIC HEATING OIL USE

HAINES BOROUGH VISITOR CENTER

	2006 Usage (gallons)	2007 Usage (gallons)	2008 Usage (gallons)	Usage trend (2006-2008) (%)	Benchmark (3-year average) (gallons)
Jan - March	600	581	367	-38.8%	516
March - June	202	275	119	-41.2%	198
July - Sept	32	47	27	-15.9%	35
Oct - Dec.	520	287			
Totals	1,354	1,189			

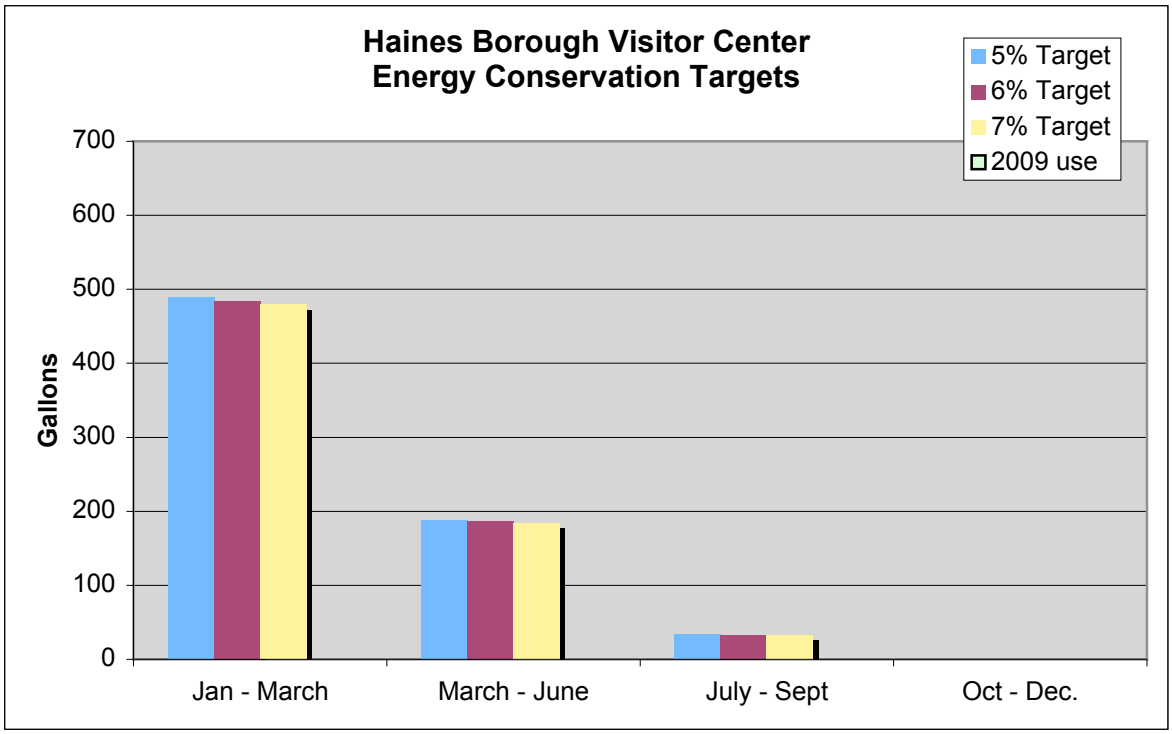


Jan-Nov	833	902	512	-38.5%

HEATING OIL CONSERVATION TARGETS

HAINES BOROUGH VISITOR CENTER

	2009 Usage (gallons)	5% Target (gallons)	6% Target (gallons)	7% Target (gallons)	% Change from Benchmark (%)
Jan - March		490	485	480	
March - June		188	186	185	
July - Sept		34	33	33	
Oct - Dec.					
Totals					



Appendix N: Monthly Energy Bill

Municipal Energy Bill: August 2008

	Gallons Heating Fuel	Cost	kWh	Cost	Total Cost Fuel + Kwh
Management & Safety					
Admin. Building	0.00	$0.00	2,643	$620.44	$620.44
Public Safety Building	50.50	$226.74	5,657	$1,309.86	$1,536.60
PW: Old Maintenance Shop	0.00	$0.00	2,237	$337.93	$337.93
PW: New Maintenance Shop	0.00	$0.00	97	$36.08	$36.08
Fire: PC Fire Hall			0	$11.86	$11.86
Fire: Radio Tower			435	$75.27	$75.27
Sector Total	**50.50**	**$226.74**	**11,069**	**$2,391.44**	**$2,618.18**
Ports & Harbors					
Port: PC Dock Lights			615	$101.49	$101.49
Port: NOAA Weather Station			552	$92.32	$92.32
Port: Lutak Barge Facility			403	$104.66	$104.66
Harbor	13.30	$62.98			$62.98
Harbor: Lights -058			236	$46.26	$46.26
Harbor: Lights -059			964	$152.38	$152.38
Fuel Facility			1,115	$174.37	$174.37
B-4			185	$54.47	$54.47
E-18			132	$44.58	$44.58
B-14			0	$11.86	$11.86
C-32			0	$11.86	$11.86
E-16			0	$12.51	$12.51
E-1			325	$86.70	$86.70
Ice House			11,160	$2,581.59	$2,581.59
Sector Total	**13.30**	**$62.98**	**15,687**	**$3,475.05**	**$3,538.03**
Outdoor Lighting					
Streetlights: 100 W.			5,670	$838.32	$838.32
Streetlights: 250 W.			7,524	$1,744.34	$1,744.34
Parks: Oslund			412	$71.92	$71.92
Parks: Tlingit			3	$12.30	$12.30
Sector Total			**13,609**	**$2,666.88**	**$2,666.88**
Community Buildings					
Chilkat Center	1,276.70	$5,691.96	3,920	$914.49	$6,606.45
Library	2.30	$10.33	4,520	$1,849.16	$1,859.49
Sheldon Museum	42.60	$191.27	2,170	$511.53	$702.80
Visitor Center	13.50	$60.61	1,491	$229.19	$289.80
Sector Total	**1,335.10**	**$5,954.17**	**12,101**	**$3,504.37**	**$9,458.54**
Water & Sewer					
Water: Plant	0.00	$0.00	1,040	$163.45	$163.45
Water Pump: Barnett			3,106	$464.59	$464.59
Water Tank: Piedad			1	$12.01	$12.01
Water Lift Bldg: Skyline			250	$48.31	$48.31
Water Tank: FAA			158	$34.89	$34.89
Sewer: Plant	53.00	$237.97	13,640	$3,002.00	$3,239.97
Sewer: Beach Road			536	$89.98	$89.98
Sewage Pump			398	$69.87	$69.87
Sewer Lift Pump Skyline			70	$22.06	$22.06
Sector Total	**53.00**	**$237.97**	**19,199**	**$3,907.16**	**$4,145.13**
School Buildings & Pool					
Primary School			1	$12.09	$12.09
Elementary School			0	$0.00	$0.00
K-12, Pool, Voc. Ed.	2,151.40	$9,664.27	34,880	$7,265.32	$16,929.59
Voc. Ed.	0.00	$0.00			$0.00
Mosquito Lake School	0.00	$0.00	1,280	$898.66	$898.66
Sector Total	**2,151.40**	**$9,664.27**	**36,161**	**$8,176.07**	**$17,840.34**
Vehicle Fuel & Petroleum Products					
Gasoline	212.20	$827.79			$827.79
Diesel #2	402.30	$1,806.32			$1,806.32
PW: Kwik Dry		$363.85			$363.85
Sector Total	**614.50**	**$2,997.96**			**$2,997.96**

TOTAL ENERGY BILL **$43,265.06**

Municipal Energy Bill: September 2008

	Gallons Heating Fuel	Cost	kWh	Cost	Total Cost Fuel + Kwh
Management & Safety					
Admin. Building	0.00	$0.00	2,684	$629.88	$629.88
Public Safety Building	0.00	$0.00	5,907	$1,352.28	$1,352.28
PW: Old Maintenance Shop	128.20	$602.54	2,432	$366.36	$968.90
PW: New Maintenance Shop	0.00	$0.00	121	$41.90	$41.90
Fire: PC Fire Hall			0	$11.86	$11.86
Fire: Radio Tower			492	$83.59	$83.59
Sector Total	**128.20**	**$602.54**	**11,636**	**$2,485.87**	**$3,088.41**
Ports & Harbors					
Port: PC Dock Lights			381	$67.40	$67.40
Port: NOAA Weather Station			609	$100.63	$100.63
Port: Lutak Barge Facility			876	$213.58	$213.58
Harbor	0.00	$0.00			$0.00
Harbor: Lights -058			427	$74.10	$74.10
Harbor: Lights -059			1,123	$175.56	$175.56
Fuel Facility			1,229	$190.99	$190.99
B-4			226	$63.90	$63.90
E-18			76	$30.99	$30.99
B-14			0	$11.86	$11.86
C-32			0	$12.32	$12.32
E-16			0	$12.51	$12.51
E-1			601	$150.25	$150.25
Ice House			9,280	$2,148.69	$2,148.69
Sector Total			**14,828**	**$3,252.78**	**$3,252.78**
Outdoor Lighting					
Streetlights: 100 W.			7,980	$1,175.04	$1,175.04
Streetlights: 250 W.			10,602	$2,453.10	$2,453.10
Parks: Oslund			496	$84.16	$84.16
Parks: Tlingit			3	$12.30	$12.30
Sector Total			**19,081**	**$3,724.60**	**$3,724.60**
Community Buildings					
Chilkat Center	411.60	$1,926.29	3,280	$767.12	$2,693.41
Library	0.00	$0.00	4,520	$1,849.16	$1,849.16
Sheldon Museum	64.90	$303.73	2,294	$540.08	$843.81
Visitor Center	0.00	$0.00	1,422	$219.12	$219.12
Sector Total	476.50	$2,230.02	11,516	$3,375.48	$5,605.50
Water & Sewer					
Water: Plant	81.90	$384.93	1,000	$157.62	$542.55
Water Pump: Barnett			5,322	$787.60	$787.60
Water Tank: Piedad			0	$11.86	$11.86
Water Lift Bldg: Skyline			320	$58.51	$58.51
Water Tank: FAA			189	$39.41	$39.41
Sewer: Plant	278.80	$1,304.79	14,200	$3,096.77	$4,401.56
Sewer: Beach Road			816	$130.81	$130.81
Sewage Pump			522	$87.94	$87.94
Sewer Lift Pump Skyline			69	$21.92	$21.92
Sector Total	**360.70**	**$1,689.72**	**22,438**	**$4,392.44**	**$6,082.16**
School Buildings & Pool					
Primary School			0	$11.86	$11.86
Elementary School			0	$0.00	$0.00
K-12, Pool, Voc. Ed.	1,000.20	$4,680.94	66,240	$14,020.01	$18,700.95
Voc. Ed.	0.00	$0.00			$0.00
Mosquito Lake School	0.00	$0.00	2,680	$1,734.14	$1,734.14
Sector Total	**1,000.20**	**$4,680.94**	**68,920**	**$15,766.01**	**$20,446.95**
Vehicle Fuel & Petroleum Products					
Gasoline	1,058.60	$4,351.91			$4,351.91
Diesel #2	713.30	$3,338.24			$3,338.24
PW: Lubes	0.00	$2,064.42			$2,064.42
Sector Total	**1,771.90**	**$9,754.57**			**$9,754.57**
				TOTAL ENERGY BILL	**$51,954.97**

Municipal Energy Bill: October, 2008

	Gallons Heating Fuel	Cost	kWh	Cost	Total Cost Fuel + Kwh
Management & Safety					
Admin. Building	107.70	$484.65	2,579	-$275.91	$208.74
Public Safety Building	149.70	$670.66	5,977	-$537.63	$133.03
PW: Old Maintenance Shop	415.10	$1,867.95	2,425	$361.94	$2,229.89
PW: New Maintenance Shop	0.00	$0.00	183	$12.69	$12.69
Fire: PC Fire Hall			0	$11.86	$11.86
Fire: Radio Tower			548	$90.97	$90.97
Sector Total	**672.50**	**$3,023.26**	**11,712**	**-$336.08**	**$2,687.18**
Ports & Harbors					
Port: PC Dock Lights			12	$13.59	$13.59
Port: NOAA Weather Station			546	$90.69	$90.69
Port: Lutak Barge Facility			669	$146.84	$146.84
Harbor	0.00	$0.00			$0.00
Harbor: Lights -058			405	$70.33	$70.33
Harbor: Lights -059			1,224	$188.55	$188.55
Fuel Facility			1,372	$209.93	$209.93
B-4			1	$12.06	$12.06
E-18			12	$15.07	$15.07
B-14			0	$11.86	$11.86
C-32			0	$11.86	$11.86
E-16			14	$15.50	$15.50
E-1			520	$116.78	$116.78
Ice House			10,280	$2,085.97	$2,085.97
Sector Total	**0.00**	**$0.00**	**15,055**	**$2,989.03**	**$2,989.03**
Outdoor Lighting					
Streetlights: 100 W.			9,240	$1,345.75	$1,345.75
Streetlights: 250 W.			12,312	-$197.83	-$197.83
Parks: Oslund			122	$29.47	$29.47
Parks: Tlingit			6	$12.73	$12.73
Sector Total			**21,680**	**$1,190.12**	**$1,190.12**
Community Buildings					
Chilkat Center	1,442.20	$6,461.04	2,960	-$386.82	$6,074.22
Library	0.00	$0.00	5,000	$756.27	$756.27
Sheldon Museum	259.80	$1,168.97	1,522	$231.58	$1,400.55
Visitor Center	18.40	$82.43	934	$146.70	$229.13
Sector Total	**1,720.40**	**$7,712.44**	**10,416**	**$747.73**	**$8,460.17**
Water & Sewer					
Water: Plant	302.20	$1,359.90	1,000	$156.22	$1,516.12
Water Pump: Barnett			2,455	$366.27	$366.27
Water Tank: Piedad			41	$17.78	$17.78
Water Lift Bldg: Skyline			325	$58.78	$58.78
Water Tank: FAA			267	$50.41	$50.41
Sewer: Plant	352.30	$1,585.35	15,640	-$1,334.17	$251.18
Sewer: Beach Road	70.50	$317.25	1,065	$165.61	$482.86
Sewage Pump			772	$123.31	$123.31
Sewer Lift Pump Skyline			53	$19.52	$19.52
Sector Total	**725.00**	**$3,262.50**	**21,618**	**-$376.27**	**$2,886.23**
School Buildings & Pool					
Primary School			0	$11.86	$11.86
Elementary School			1,840	$383.10	$383.10
K-12, Pool, Voc. Ed.	3,350.20	$15,008.90	84,960	$15,132.29	$30,141.19
Voc. Ed.	221.40	$991.87			$991.87
Mosquito Lake School	0.00	$0.00	3,160	$2,116.22	$2,116.22
Sector Total	**3,571.60**	**$16,000.77**	**89,960**	**$17,643.47**	**$33,644.24**
Vehicle Fuel & Petroleum Products					
Gasoline	595.30	$2,346.08			$2,346.08
Diesel #2	173.10	$775.48			$775.48
Diesel Blend	672.30	$3,018.62			$3,018.62
PW: Lubes	0.00	$0.00			$0.00
Sector Total	**1,440.70**	**$6,140.18**			**$6,140.18**
			TOTAL ENERGY BILL		**$57,997.15**

Municipal Energy Bill: November 2008

	Gallons Heating Fuel	Cost	kWh	Cost	Total Cost Fuel + Kwh
Management & Safety					
Admin. Building	100.90	$421.76	2,564	$382.01	$803.77
Public Safety Building	283.80	$1,186.28	6,000	$846.87	$2,033.15
PW: Old Maintenance Shop	398.80	$1,674.96	2,542	$378.83	$2,053.79
PW: New Maintenance Shop	351.00	$1,474.20	449	$82.31	$1,556.51
Fire: PC Fire Hall			3	$12.29	$12.29
Fire: Radio Tower			749	$119.99	$119.99
Sector Total	**1,134.50**	**$4,757.20**	**12,307**	**$1,822.30**	**$6,579.50**
Ports & Harbors					
Port: PC Dock Lights			0	$11.86	$11.86
Port: NOAA Weather Station			536	$89.23	$89.23
Port: Lutak Barge Facility			965	$206.56	$206.56
Harbor	0.00	$0.00			$0.00
Harbor: Lights -058			914	$143.81	$143.81
Harbor: Lights -059			1,466	$223.49	$223.49
Fuel Facility			1,371	$209.78	$209.78
B-4			0	$0.00	$0.00
E-18			0	$0.00	$0.00
B-14			0	$11.86	$11.86
C-32			19	$15.69	$15.69
E-16			0	$0.00	$0.00
E-1			838	$180.93	$180.93
Ice House			3,320	$681.71	$681.71
Sector Total	**0.00**	**$0.00**	**9,429**	**$1,774.92**	**$1,774.92**
Outdoor Lighting					
Streetlights: 100 W.			11,340	$1,648.92	$1,648.92
Streetlights: 250 W.			14,934	$2,167.77	$2,167.77
Parks: Oslund			0	$11.86	$11.86
Parks: Tlingit			0	$11.86	$11.86
Sector Total			**26,274**	**$3,840.41**	**$3,840.41**
Community Buildings					
Chilkat Center	1,330.90	$5,570.56	5,120	$750.99	$6,321.55
Library	299.00	$1,249.82	5,680	$831.84	$2,081.66
Sheldon Museum	382.30	$1,601.47	2,244	$13.79	$1,615.26
Visitor Center	165.40	$691.38	729	$117.10	$808.48
Human Resources Bldg.	253.70	$1,063.26			$1,063.26
Sector Total	**2,177.60**	**$10,176.49**	**13,773**	**$1,713.72**	**$11,890.21**
Water & Sewer					
Water: Plant	430.30	$1,807.26	1,160	$179.33	$1,986.59
Water Pump: Barnett			4,013	$591.18	$591.18
Water Tank: Piedad			336	$60.36	$60.36
Water Lift Bldg: Skyline			484	$81.74	$81.74
Water Tank: FAA			425	$73.21	$73.21
Sewer: Plant	569.90	$2,389.08	14,320	$1,974.29	$4,363.37
Sewer: Beach Road			2,176	$326.00	$326.00
Sewage Pump			1,515	$230.57	$230.57
Sewer Lift Pump Skyline			61	$20.66	$20.66
Sector Total	**1,000.20**	**$4,196.34**	**24,490**	**$3,537.34**	**$7,733.68**
School Buildings & Pool					
Primary School			0	$11.86	$11.86
Elementary School			400	$92.56	$92.56
K-12, Pool, Voc. Ed.(Voc. Ed.KWH only)	3,500.10	$14,630.42	89,760	$15,901.54	$30,531.96
Voc. Ed.	261.40	$1,096.83			$1,096.83
Mosquito Lake School	1,332.60	$5,596.92	2,760	$1,862.61	$7,459.53
Sector Total	**5,094.10**	**$21,324.17**	**92,920**	**$17,868.57**	**$39,192.74**
Vehicle Fuel & Petroleum Products					
Gasoline	547.50	$1,993.44			$1,993.44
Diesel #2	0.00	$0.00			$0.00
Diesel #1	401.60	$1,686.72			$1,686.72
PW: Lubes		$930.90			$930.90
Sector Total	**949.10**	**$4,611.06**			**$4,611.06**

TOTAL ENERGY BILL **$75,622.52**

End Notes

[i] Melissa Aronson, Chair; Dan Wackerman, Vice Chair; Scott Hansen, Recorder & representative from the Chilkoot Indian Association; Danny Gonce, representing AP&T; Leonard Dubber, Andy Hedden, representing the Haines Borough Planning Commission; Frank Holmes; Gary Lidholm; Tom Moody; and Steve Vick, liaison, Haines Borough Assembly

[ii] Leonard Dubber, Andy Hedden, Dan Wackerman

[iii] Some may question the use of quarterly averages versus monthly averages for heating fuel. Why not, after all, be consistent with the analysis? If using monthly data for kilowatt consumption, use monthly gallons for fuel oil consumption. As soon as a monthly analysis for fuel oil is attempted, the limitations of doing so e become obvious. Here is monthly fuel delivery data for the Haines Borough Administration Building.

GALLONS DELIVERED

	2006	2007	2008
JANUARY	81.1	0	0
FEBRUARY	224.9	223.7	321.5
MARCH	159.3	247.3	192.6
APRIL	0	63.5	130.8
MAY	59.7	0	103
JUNE	0	37	8.9
JULY	0	0	0
AUGUST	88.2	0	0
SEPTEMBER	0	56.9	0
OCTOBER	32.5	0	107.7
NOVEMBER	216.1	218.4	
DECEMBER	88.1	188.3	
Annual Total	949.9	1035.1	864.5
			(YTD)

[iv] Building Operating Management, 2008, April, "Finding Real Energy Savings," http://www.facilitiesnet.com/BOM/article.asp?id=8573

[v] About Energy Star: *ENERGY STAR is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy helping us all save money and protect the environment through energy efficient products and practices*. See http://www.energystar.gov/index.cfm?c=about.ab_index.

There are 50 categories of Energy Star Qualified products. Go to http://www.energystar.gov/index.cfm?fuseaction=find_a_product.

[vi] Writing the Green RFP, The American Institute of Architects, http://www.aia.org/cote_rfps

[vii] Lighting Control Types, Federal Energy Management, US Department of Energy, Energy Efficiency and Renewable Energy, http://www1.eere.energy.gov/femp/procurement/eep_light_controls.html

[viii] Lighting: Occupancy Sensors, Reliant Energy, http://www.reliant.com/en_US/Page/Generic/Public/esc_purchasing_advisor_occupancy_sensors_bus_gen.jsp

[ix] Danny Gonce, AP&T, Haines Power Supervisor, email communication December 5, 2008.

[x] Lower Water Heating Temperature for Energy Savings, US Department of Energy – ERRE, http://apps1.eere.energy.gov/consumer/your_home/water_heating/index.cfm/mytopic=13090

[xi] Energy Savers – Tips on Saving Money & Energy, US Department of Energy, ERRE, http://www1.eere.energy.gov/consumer/tips/water_heating.html

[xii] Table E5A. Electricity Consumption (kWh) by End Use for All Buildings, 2003. (http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/detailed_tables_2003.html - enduse03)

[xiii] Energy Star Guide for Small Business, download from http://www.energystar.gov/ia/business/small_business/sb_guidebook/smallbizguide.pdf -

[xiv] The basic formula for calculating kilowatt hour consumption is:
Watts x Hours Used/1000 x cost per kilowatt-hour = Total Cost

[xv] Life Cycle Cost Estimator for Energy Star Qualified Exit Signs, http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/Calc_Exit_Signs.xls

[xvi] Alaska Power & Telephone rate for the Administration Building 10/14/08 is $.2018/KWH reduced to $.1444 due to a PCE (Power Cost Equalization Rate) of $.0574. The PCE rate can vary month to month.

[xvii] Energy Star, Frequently Asked Questions Information on Proper Disposal of Compact Fluorescent Light Bulbs (CFLs), www.energystar.gov/ia/partners/promotions/change_light/downloads/Fact_Sheet_Mercury.pdf

[xviii] Environmental Protection Agency, Fact Sheet: Mercury in Compact Fluorescent Lamps (CFLs), www.gelighting.com/na/home_lighting/ask_us/downloads/MercuryInCFLs.pdf

[xix] CFL Calculator, http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/CalculatorCFLs.xls

[xx] Water Heating, http://www1.eere.energy.gov/consumer/tips/water_heating.html

[xxi] The U.S. Department of Energy – Energy Efficiency and Renewable Energy, Consumer's Guide to Energy Efficiency and Renewable Energy http://apps1.eere.energy.gov/consumer/your_home/water_heating/index.cfm/mytopic=12760

[xxii] http://www.prlog.org/10088665-80-savings-on-electricity-with-led-street-lighting.html

[xxiii] Demand (Tankless) or Instanteous Hot Water Heaters, US DOE, ERRE, http://apps1.eere.energy.gov/consumer/your_home/water_heating/index.cfm/mytopic=12820

[xxiv] Managing Swimming Pool Water Temperature for Energy Efficiency, US Department of Energy – Energy Efficiency and Renewable Energy, http://apps1.eere.energy.gov/consumer/your_home/water_heating/index.cfm/mytopic=13300

[xxv] Measure 1.2.1: Test Boiler Efficiency on a Continuing Basis, Oikos, Green Building Source, http://www.oikos.com/library/eem/boiler/index.html

[xxvi] Zip Code Insulation Program, US Department of Energy, http://www.ornl.gov/~roofs/Zip/ZipHome.html