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**Energy Assessment**  

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**VILLAGE OF PINEHURST**  
**PINEHURST, NC**

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**CONFIDENTIAL**

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**Waste Reduction Partners**  
**Triangle J Council of Governments**

**Sponsored by:**

**The N.C. State Energy Office, Department of Administration**  
**N.C. Division of Pollution Prevention and Environmental Assistance**  
**And U.S. Department of Energy**

**Site visit:**  
**JAN. 8, 2009**

## **EXECUTIVE SUMMARY:**

**The Administration, Police, and Fire Departments of the Village of Pinehurst operate out of three fairly new buildings. There is already a good degree of energy effort. These complexes use approximately \$50,000 per year in electricity. The recommendations below should be able to reduce this cost by \$8,000 to \$15,000 per year. These three complexes use close to 700,000 kWh per year. Most of the recommendations in this assessment are in lighting usage. The total estimated dollars saving is \$ 11,071.13/yr.**

## **BACKGROUND:**

**The Village of Pinehurst is a municipality in rural North Carolina golf country. Three buildings were surveyed: the Village Hall, the Police Headquarters, and the Fire Station. All three facilities were built within the last 20 years and are well constructed with some attention given to energy usage. There are only two major users of energy in the buildings worthy of evaluation: Lighting and HVAC. The entire complex is on Progress Energy's Small General Service- Time of Use (SGS-TOU) rate schedule. The Village Hall has a yearly average kWh cost of \$0.074/kWh. The Police Station has a yearly average cost of \$0.068/kWh. The Fire Station has a yearly average cost of \$0.081/kWh. This is further indicated by the fact that the Village Hall has an average yearly Load Factor of .19 and the Fire Station has a load factor of 0.47, while the Police Station shows a little higher efficiency of .22.**

**The Village Hall has a yearly dollar cost of \$29,633/yr and 407,300 kWh, Fire Station \$10,637/yr and 131,640 kWh, while the Police Station costs \$10,660/yr and uses 158,280 kWh.**

The yearly usage of dollar, costs, kW peaks, off and on peak kWh's, average kWh costs, etc. are totaled in attachments #1, #2, and #3 at the end of this report.

The main building usage of electricity is building lighting and HVAC. Other incidentals are office equipment and computers, and water heating in the facilities. There is also some minor natural gas usage.

It is apparent that building maintenance is given good priority as the buildings are well kept.

### **RECOMMENDATIONS:**

1. It is recommended that the Village purchase a light meter which measures foot-candle levels (\$350), and obtain a copy the Illuminating Society of America lighting level standards (or OSHA standards). This will allow modifications to the lighted areas to be made to recognized standards, especially in the office and work areas.
2. **Hall Lighting:** Significant energy savings may be obtained by reducing the levels of lighting in the halls of all three buildings to 30-40 foot candles. As the fixtures are 3 lamp, two foot ceiling troffers (with 2 ballasts), this can be accomplished by removing 1 or 2 lamps from each fixture, or by disconnecting every 2<sup>nd</sup> or 3<sup>rd</sup> fixture. This will require some trial and error modification. The yearly operating cost of an individual T5 3 lamp in the office area is estimated at:

(NOTE: the average kWh cost in the Village Hall is \$0.074/kWh, \$0.081 in the Fire Station, and in the Police station it is \$0.068 kWh. Village Hall operates on a normal

office schedule and the Police and Fire stations are continuous. Therefore the lighting will have different yearly costs.)

**Office Building :**

$(.135kW) \times (10hr/dy) \times (5dy/wk) \times (52wk/yr) \times (\$0.074/kWh) = \$24.97/yr$

**Fire Station:**

$(.135kW) \times (24hr/dy) \times (365dy/yr) \times (\$0.081/kWh) = \$ 95.79/yr.$

**Police Station:**

$(.135kW) \times (24hr/dy) \times (365dy/wk) \times (\$0.068/kWh) = \$ 80.42/yr$

In the three buildings of the of the Village complex it is estimated that the equivalent of 50 fixtures could be eliminated. In the Police station another 50 are estimated, and in the Fire station some 25 are estimated. The total estimated hallway savings in the three buildings are:

Village Hall .....	(50 fix.)x(\$ 24.97/yr)	=	\$ 1,248.50/yr
Fire Station.....	(25 fix)x(\$ 95.79/yr)	=	2,394.75/yr
Police Station.....	(50 fix)x(\$ 80.48/yr)	=	<u>4,024/yr</u>
	<b>Total</b>		<b>\$ 7,667.25/yr</b>

3. In the Village Hall it is estimated that at least two lamps could be removed from at least one fixture in each office, and possibly more. The removal of 1½ lamps from a fixture will produce an average savings of \$12.53/yr/fixture. Estimating that the building contains the equivalent of 100 areas (or fixtures) which could be modified, the estimated savings would be:  $(100) \times (\$12.53/yr) = \$ 1,253/yr.$

4. Council Room Lighting: There are some 35 250-watt incandescent recessed lamps in the ceiling in addition to very large pendant lights hung from the ceiling, and wall mounted sconce lights. There are

also recessed lights over the council desks. It is recommended that the 12 250-watt recessed fixtures be eliminated. Demonstration showed that the pendant lighting gives more than sufficient lighting levels for the spectators and visitors. The recessed lighting is redundant. This is estimated to save:

$$(12\text{lights}) \times (.250\text{kW}) \times (20\text{hrs/wk}) \times (52\text{wk/yr}) \times (\$0.074/\text{kWh}) = \$ 230.88/\text{yr}$$

5. **Outside Soffit Lighting:** The outside soffit lighting is very inefficient and consideration should be given to changing them. There are over 50 lamps of +150 watts that light the outside of the building at night. These fixtures are now costing:

$$(.200)(50\text{FIX}) \times (12\text{hr/dy}) \times (365\text{dy/yr}) \times (\$0.074) = \$3,241.20/\text{YR}$$

It is recommended that 1/2 of these lamps be eliminated, or reduced to 100watt each. Estimated savings \$ 1,620/YR

6. It is recommended that the Village provide some of its staff with courses in modern techniques and methods of Building Energy Conservation, both at the Administrative and Maintenance levels. This type of education would create a continuing reduction of Energy costs. Such programs are offered at NCSU McKimmon Center in the 3-week Energy Management Diploma Course and in one day seminars from the Mechanical and Aerospace Department of NCSU. Such relevant topics are available as HVAC, Lighting, Electric Motors, Electric Rate Schedules and Costs, Compressed Air, Preventative Maintenance, etc.
7. It is recommended that the Village experiment and determine the minimum set-back temperatures that can be programmed into the

thermostats in order to reduce night time and weekend temperatures to the absolute minimums. A temperature of 70 degrees is recommended in the heating season and 76 in the cooling season months for hours of operation. In the Village Hall, set-back temperatures of 55 in the heating season and 85 in the cooling season is recommended.

8. It is recommended that all the hot water heaters, in the office building, be place on timers, so as not to operate during shut down periods. Estimated savings \$ 300.00/yr.

### **RECOMMENDATIONS FOR FUTURE CONSTRUCTION:**

The Village of Pinehurst is involved in a continuing program of expansion, and consideration should be given to the following for future Energy conservation efforts:

- a. The use of Ground Source Water Heat Pumps for heating and cooling which will decrease operating costs. Each site should be calculated separately and the payback should be based on the additional incremental cost of construction over the cost of a conventional HVAC system. For relevant information contact the:

**Geothermal Heat Pump Consortium. Inc.  
1050 Connecticut Ave. Suite 1000  
Washington, DC 20036  
1-800-ALL.4GEO  
Fax 202-558-6759  
www.GeoExchange.org**

- b. Future internal lighting should be T5 ceiling troffers, on dual switching for conservation control.
- c. Hall lighting should be installed at 39 to 40 foot-candle level.
- d. Office lighting should be installed at 50 to 60 foot-candle background level, with additional low wattage desk lighting to provide 80 to 90 foot-candles.
- e. Outside lighting should be minimized in both wattage and foot-candles.
- f. All hot water heaters should be of the instantaneous type.

**TOTAL SAVINGS RECOMMENDED:**

Hallway Lighting.....	\$ 7,667.25/yr
Office lighting .....	1,253/yr
Council Room Lighting .....	230.88/yr
Outside Soffit Lighting.....	1,620/yr
Timers on Hot Water Htrs.....	<u>300/yr</u>
<b>Total</b>	<b>\$ 11,071.13/yr</b>

## **Disclaimer**

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**This Energy Assessment is sponsored by the State Energy Office, N.C. Department of Administration, and the U.S. Department of Energy, with State Energy Program Funds, in cooperation with the Triangle J Council of Governments. However, any opinions, findings, conclusions, or recommendations expressed herein are those of the author(s) and do not necessarily reflect the views of the State Energy Office, NC Department of Administration, or the U.S. Department of Energy.**

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**In partnership with the North Carolina Division of Pollution Prevention  
And Environmental Assistance**

Police Station Energy Usage

(ATTACHMENT # 1)

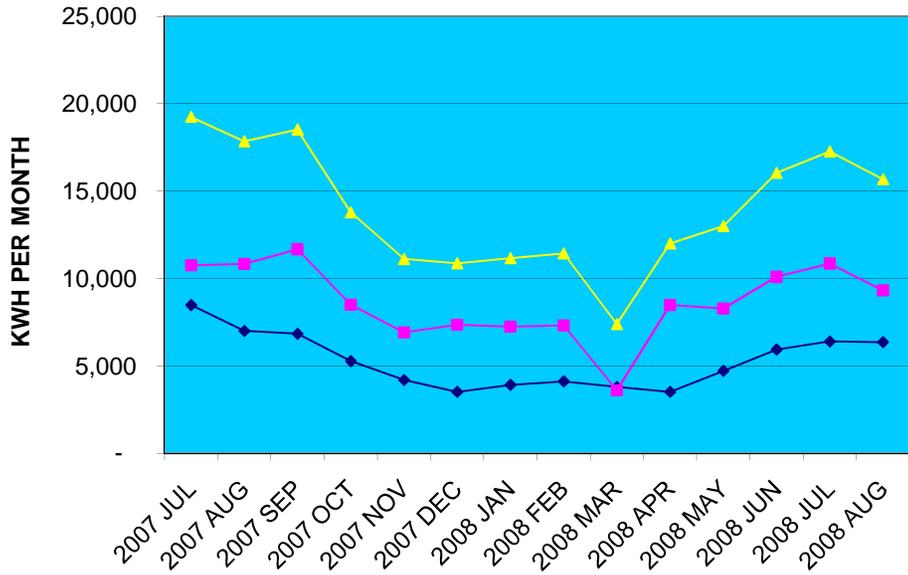
**POLICE STATION VILLAGE OF PINEHURST**

ELEC SUPPLIER PROGRESS ENERGY JAN 2009 WEJ

SGS-TOU RATE SCHEDULE

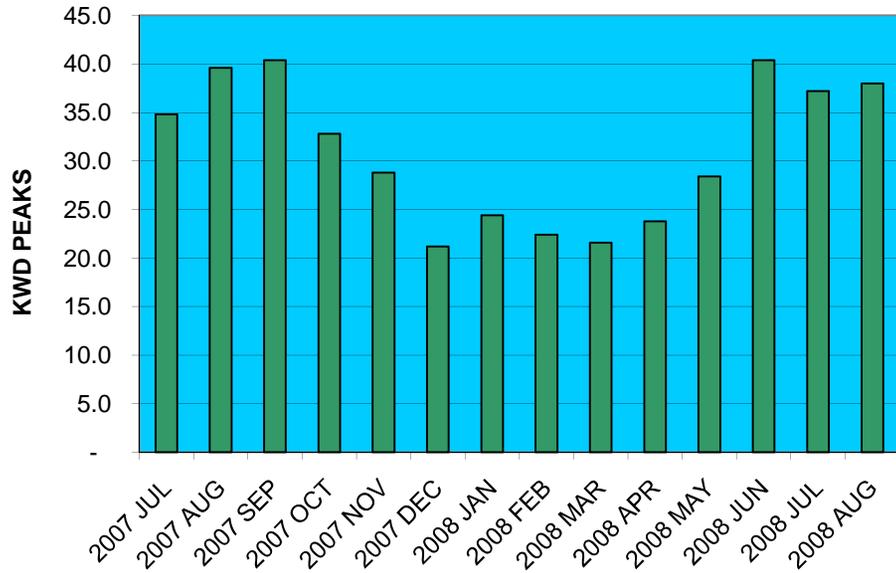
DATES	DAYS	ON PEAK	OFF PEAK	TOTAL				LOAD	KWH's				
(ENDS ON	IN	KWH	KWH	KWH	KWD	DOLLARS	\$/KWH	FACTOR	PER DAY				
20TH	PERD								AVG				
2007 JUL	31	8,480	10,760	19,240	34.8	\$ 1,172	\$ 0.061	0.33	274	2007 JUL	8,480	10,760	19,240
2007 AUG	28	7,000	10,840	17,840	39.6	\$ 1,284	\$ 0.072	0.26	250	2007 AUG	7,000	10,840	17,840
2007 SEP	32	6,840	11,680	18,520	40.4	\$ 1,288	\$ 0.070	0.22	214	2007 SEP	6,840	11,680	18,520
2007 OCT	28	5,280	8,500	13,780	32.8	\$ 922	\$ 0.067	0.24	189	2007 OCT	5,280	8,500	13,780
2007 NOV	29	4,200	6,920	11,120	28.8	\$ 763	\$ 0.069	0.21	145	2007 NOV	4,200	6,920	11,120
2007 DEC	32	3,520	7,360	10,880	21.2	\$ 690	\$ 0.063	0.22	110	2007 DEC	3,520	7,360	10,880
2008 JAN	31	3,920	7,240	11,160	24.4	\$ 734	\$ 0.066	0.22	126	2008 JAN	3,920	7,240	11,160
2008 FEB	33	4,120	7,320	11,440	22.4	\$ 732	\$ 0.064	0.23	125	2008 FEB	4,120	7,320	11,440
2008 MAR	29	3,800	3,600	7,400	21.6	\$ 645	\$ 0.087	0.25	131	2008 MAR	3,800	3,600	7,400
2008 APR	28	3,520	8,480	12,000	23.8	\$ 572	\$ 0.048	0.22	126	2008 APR	3,520	8,480	12,000
2008 MAY	32	4,720	8,280	13,000	28.4	\$ 851	\$ 0.065	0.22	148	2008 MAY	4,720	8,280	13,000
2008 JUN	30	5,940	10,100	16,040	40.4	\$ 1,099	\$ 0.069	0.20	198	2008 JUN	5,940	10,100	16,040
2008 JUL	33	6,400	10,860	17,260	37.2	\$ 1,223	\$ 0.071	0.22	194	2008 JUL	6,400	10,860	17,260
2008 AUG	28	6,360	9,320	15,680	38.0	\$ 1,141	\$ 0.073	0.25	227	2008 AUG	6,360	9,320	15,680
12 MONTH		58,620	99,660	158,280	30.0	\$10,660	\$ 0.068	0.22					
TOTALS		TOTAL	TOTAL	TOTAL	AVG	TOTAL	AVG	AVG					

**KWH's POLICE DEPT. PINEHURST**

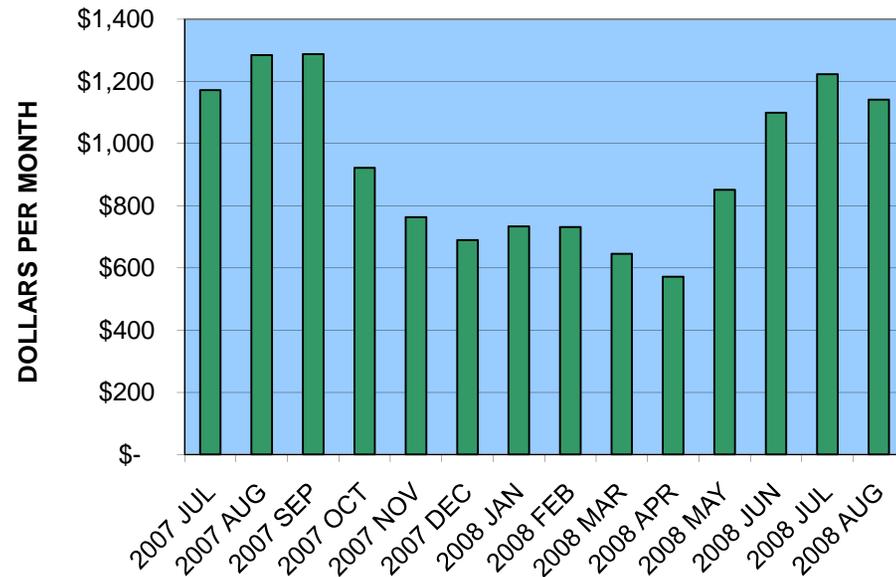


2007 JUL	\$ 1,172	34.8
2007 AUG	\$ 1,284	39.6
2007 SEP	\$ 1,288	40.4
2007 OCT	\$ 922	32.8
2007 NOV	\$ 763	28.8
2007 DEC	\$ 690	21.2
2008 JAN	\$ 734	24.4
2008 FEB	\$ 732	22.4
2008 MAR	\$ 645	21.6
2008 APR	\$ 572	23.8
2008 MAY	\$ 851	28.4
2008 JUN	\$ 1,099	40.4
2008 JUL	\$ 1,223	37.2
2008 AUG	\$ 1,141	38.0

**KWD PEAKS POLICE DEPT. PINEHURST**



**DOLLARS, POLICE STATION PINEHURST**



Village Hall Energy Usage

(ATTACHMENT # 2)

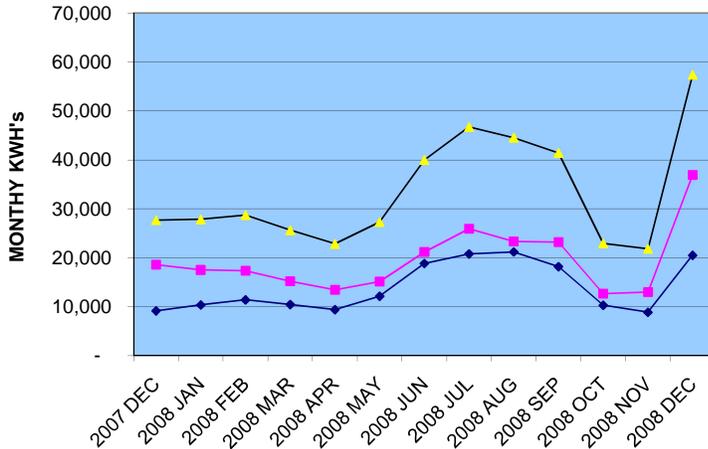
VILLAGE HALL VILLAGE OF PINEHURST

ELEC SUPPLIER PROGRESS ENERGY JAN 2009 WEJ

SGS-TOU RATE SCHEDULE

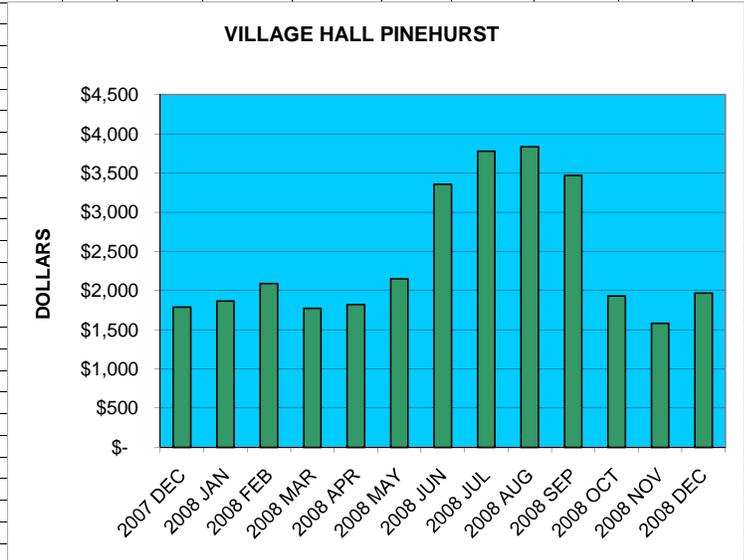
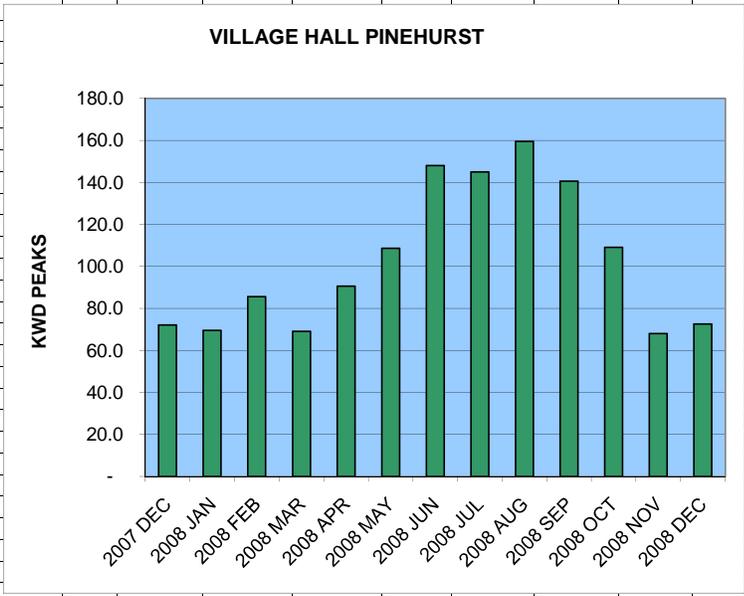
DATES	DAYS	ON PEAK	OFF PEAK	TOTAL				LOAD	KWH's				
ENDS ON	IN	KWH	KWH	KWH	KWD	DOLLARS	\$/KWH	FACTOR	PER DAY				
17TH	PERD								AVG				
2007 DEC	32	9,150	18,550	27,700	72.0	\$ 1,789	\$ 0.065	0.17	286	2007 DEC	9,150	18,550	27,700
2008 JAN	31	10,350	17,500	27,850	69.5	\$ 1,868	\$ 0.067	0.20	334	2008 JAN	10,350	17,500	27,850
2008 FEB	33	11,400	17,350	28,750	85.5	\$ 2,090	\$ 0.073	0.17	345	2008 FEB	11,400	17,350	28,750
2008 MAR	29	10,450	15,200	25,650	69.0	\$ 1,772	\$ 0.069	0.22	360	2008 MAR	10,450	15,200	25,650
2008 APR	29	9,400	13,450	22,850	90.5	\$ 1,823	\$ 0.080	0.15	324	2008 APR	9,400	13,450	22,850
2008 MAY	32	12,150	15,150	27,300	108.5	\$ 2,152	\$ 0.079	0.15	380	2008 MAY	12,150	15,150	27,300
2008 JUN	30	18,850	21,150	40,000	148.0	\$ 3,357	\$ 0.084	0.18	628	2008 JUN	18,850	21,150	40,000
2008 JUL	32	20,800	25,950	46,750	145.0	\$ 3,780	\$ 0.081	0.19	650	2008 JUL	20,800	25,950	46,750
2008 AUG	29	21,200	23,350	44,550	159.5	\$ 3,836	\$ 0.086	0.19	731	2008 AUG	21,200	23,350	44,550
2008 SEP	30	18,200	23,200	41,400	140.5	\$ 3,472	\$ 0.084	0.18	607	2008 SEP	18,200	23,200	41,400
2008 OCT	29	10,300	12,650	22,950	109.0	\$ 1,932	\$ 0.084	0.14	355	2008 OCT	10,300	12,650	22,950
2008 NOV	28	8,850	13,000	21,850	68.0	\$ 1,583	\$ 0.072	0.19	316	2008 NOV	8,850	13,000	21,850
2008 DEC	32	20,500	36,900	57,400	72.5	\$ 1,968	\$ 0.034	0.37	641	2008 DEC	20,500	36,900	57,400
12 MONTH		172,450	234,850	407,300	105.5	\$29,633	\$ 0.074	0.19					
TOTALS		TOTAL	TOTAL	TOTAL	AVG	TOTAL	AVG	AVG					

VILLAGE HALL PINEHURST



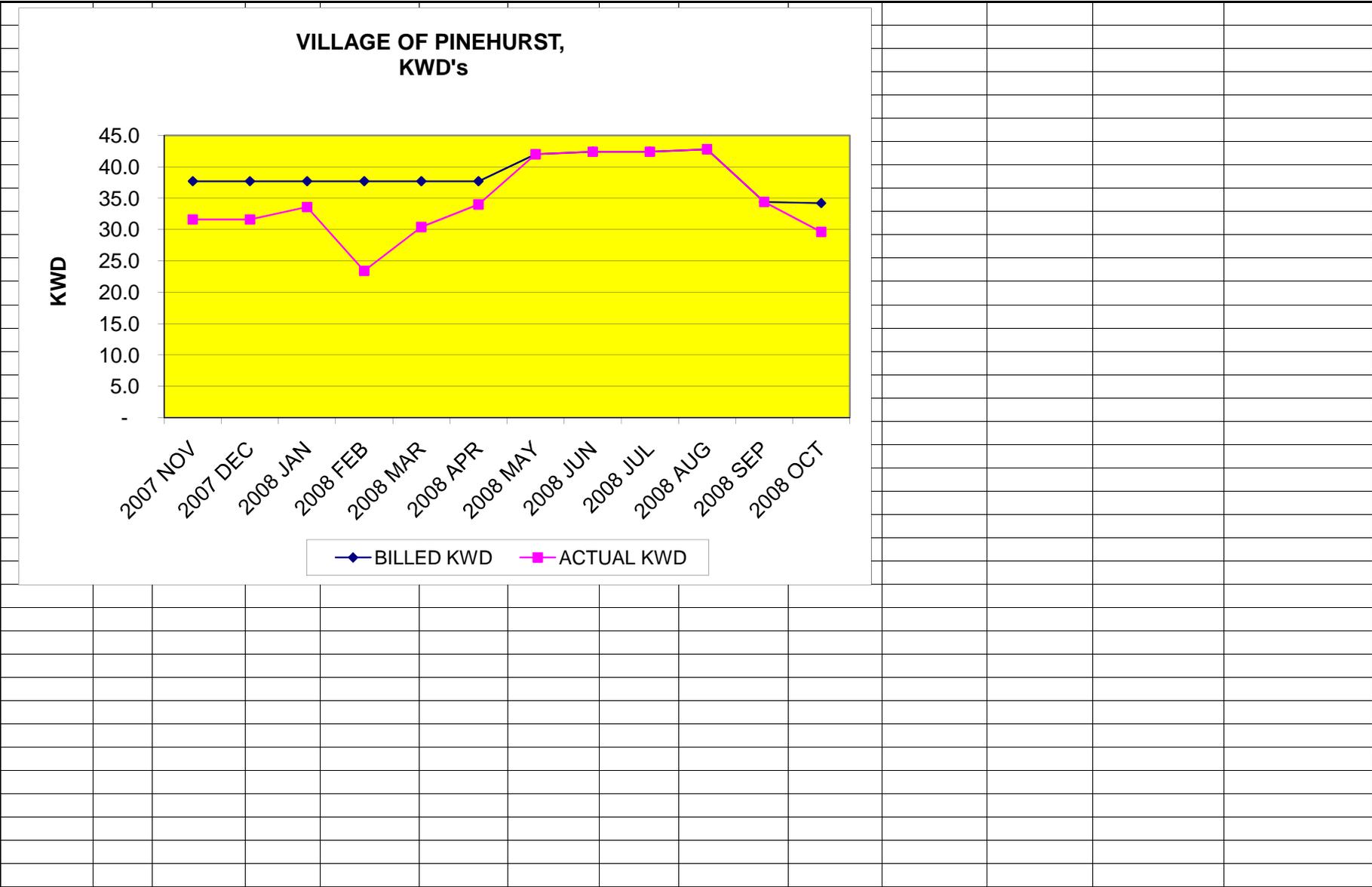
2007 DEC	\$ 1,789	72.0
2008 JAN	\$ 1,868	69.5
2008 FEB	\$ 2,090	85.5
2008 MAR	\$ 1,772	69.0
2008 APR	\$ 1,823	90.5
2008 MAY	\$ 2,152	108.5
2008 JUN	\$ 3,357	148.0
2008 JUL	\$ 3,780	145.0
2008 AUG	\$ 3,836	159.5
2008 SEP	\$ 3,472	140.5
2008 OCT	\$ 1,932	109.0
2008 NOV	\$ 1,583	68.0
2008 DEC	\$ 1,968	72.5

Village Hall Energy Usage

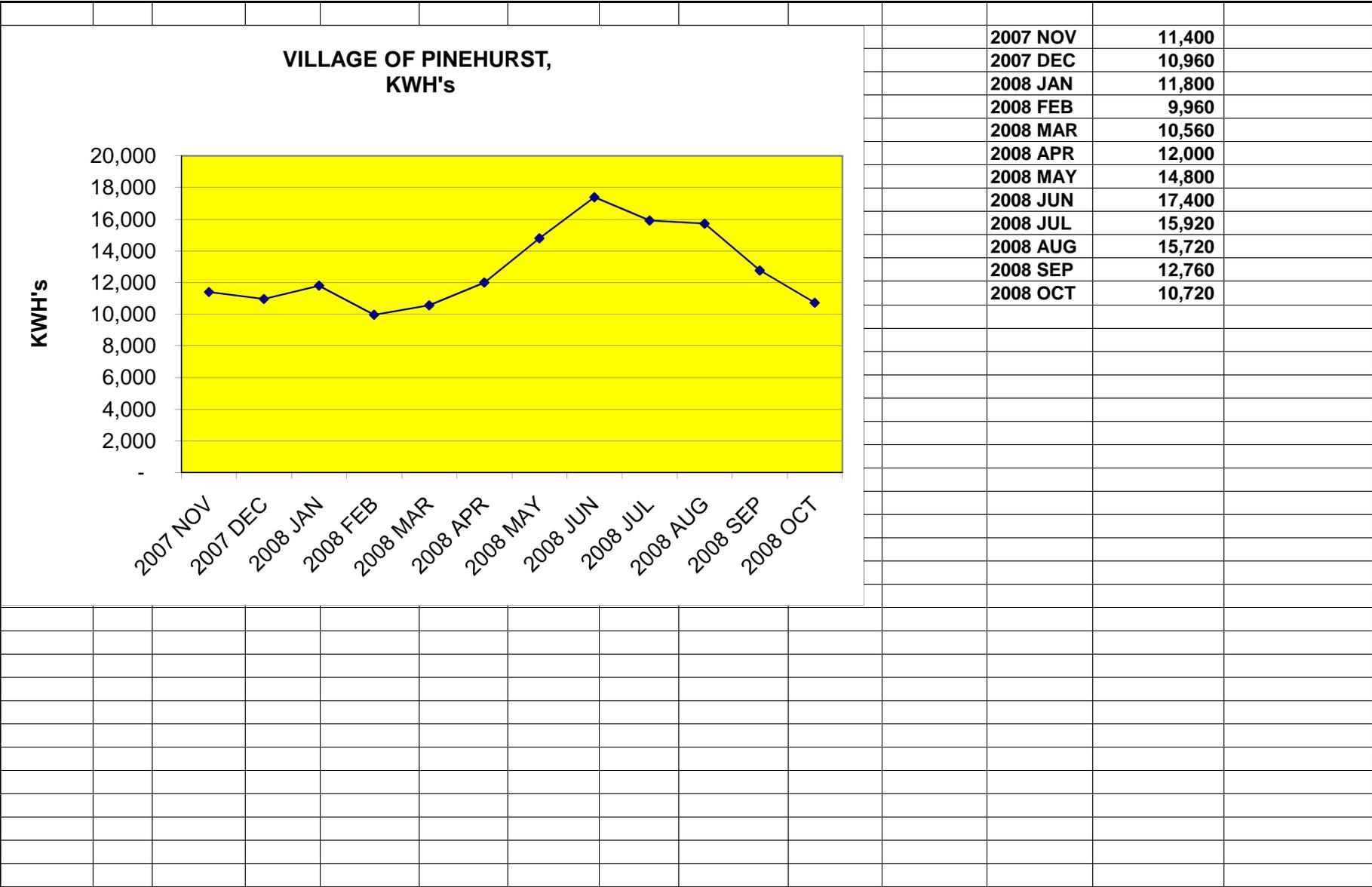




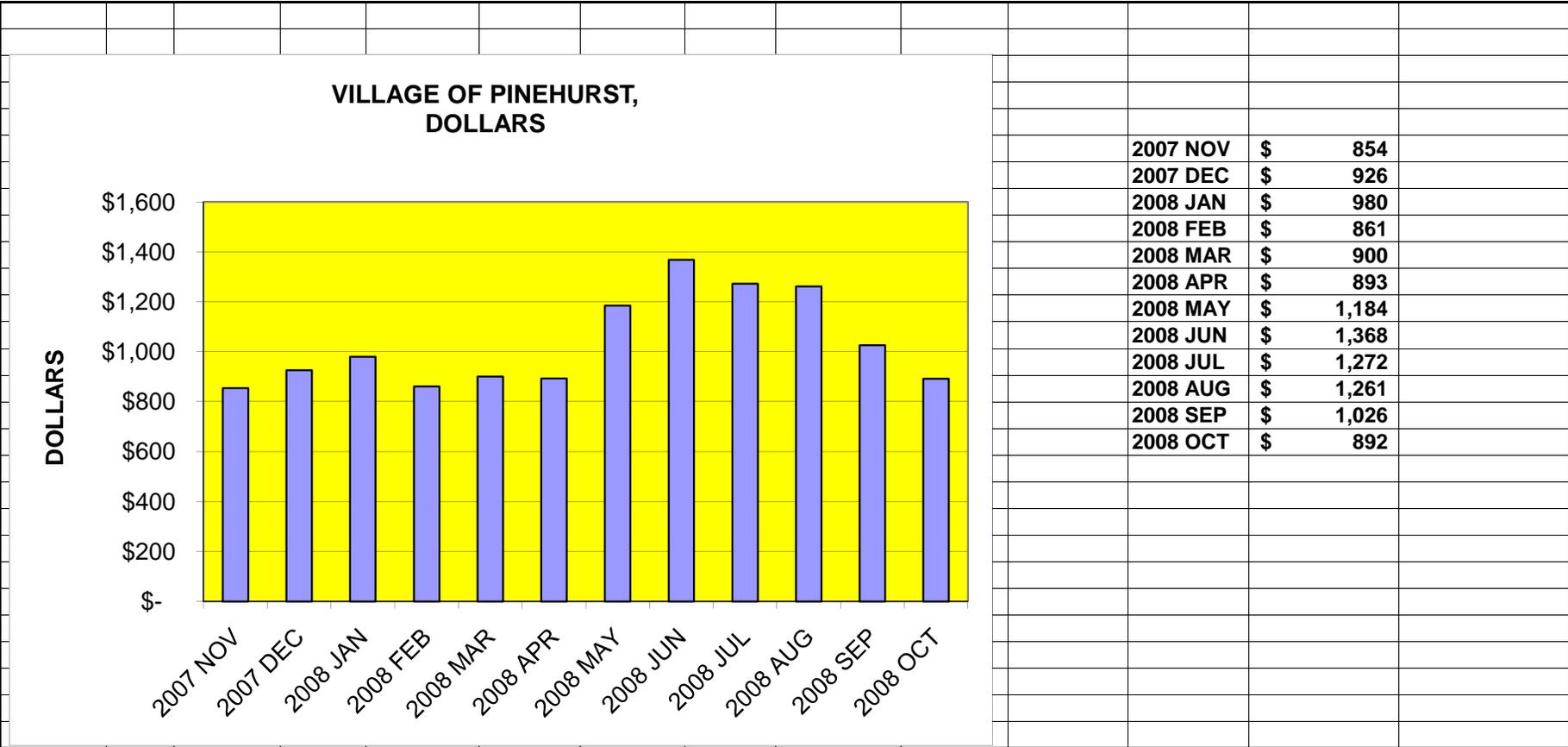
Fire Station 92 energy Usage



Fire Station 92 energy Usage



Fire Station 92 energy Usage



2007 NOV	\$	854
2007 DEC	\$	926
2008 JAN	\$	980
2008 FEB	\$	861
2008 MAR	\$	900
2008 APR	\$	893
2008 MAY	\$	1,184
2008 JUN	\$	1,368
2008 JUL	\$	1,272
2008 AUG	\$	1,261
2008 SEP	\$	1,026
2008 OCT	\$	892