Palmyra Fire Station Energy Audit
June 12, 2008
Executive Summary

The Palmyra Fire Station, built in 2006, has a current energy usage of $1.35 per sq. ft. - year. This is moderate for county buildings and low compared to other fire stations in the county. The construction of the fire station used state of the art technology. Some opportunities for energy savings exist primarily in operating methods. Reductions in the range of 5-10% are possible. This would mean a savings of $800 to $1,600 per year.

The primary savings would come from adjusting thermostat settings and reducing hot water temperatures. Additional saving would come from adding sensors to the exterior lighting and the bay lights. Programmable thermostats would help keep costs down.

Submitted by: Curtis Putnam

Recommendations from Energy Audit of Palmyra Fire Station
June 12, 2008

- Install Vortex units in high bay areas to circulate heat in the winter.
- Keep thermostats between 73°F and 78°F for cooling in occupied areas and between 78°F and 82°F in unoccupied areas.
- Keep thermostats set between 70°F and75°F for heating in occupied areas and between 63°F and 68°F in unoccupied areas.
- Replace thermostats with 4 time zone programmable thermostats.
- Unoccupied or little used areas are heated or cooled unnecessarily. E.g. community room and large room upstairs.
- Reduce water heater temperature to 120°F if possible.
- Security lighting not on sensors, add photocells
- Bay light always on put on dual sensing occupancy sensor.

2. ANNUAL ELECTRIC USE AND COST

Include Electrical Demand, if applicable

Building	Address	Year of Record
Palmyra Fire Station	14567 James Madison Hwy	From 4-09 4-08 To

Account Number	Meter Number	Utility
1005898992	00062142 34	Dominion

Maximum kW Demand W/O charge	Minimum Power Factor W/O charge	Building size (sqft)
10,080 KWh		12,264

1	2	3	4	5	6	7	8	9	10
Meter Read Date From	To	KWh* Used	KWh/gross sq.ft. **	Annual (EUI) BTU/sqft (000)	Energy Cost	KW-KVA Demand	Fixed Service Cost	P.F. * and Demand Cost***	Total Cost
4-23	5-18	3440							254.08
5-18	6-22	5680							449.52
6-22	7-23	5360							463.82
7-23	8-22	4880							435.91
8-22	9-20	4640							414.75
9-20	10-22	4080							344.80
10-21	11-22	4080							344.80
11-21	12-19	4240							358.10
12-19	1-25	5520							464.47
1-25	2-21	3920							331.40
2-21	3-25	4160							351.36
3-25	4-23	3360							284.85
TOTAL		53,360	4.3509	14,849					4497.86

$.367/sq.ft.-yr

Comments:

Conversion: 3413 BTU/kWh
*KW – Kilowatts, KVA – Kilo-Volt-ampere, KWH – Kilowatt hour, P.F. – Power Factor
**Total annual kWh divided by the building's gross sq. ft.
***If demand and/or power factor are metered and billed, energy cost here.

3. ANNUAL NON-ELECTRIC ENERGY USE AND COST

Photo copy this form for additional fuel types

Building	Address	Year of Record
Palmyra fire	14567 James Madison Hwy	From 4-07 To 4-08
Account Number	**Meter Number**	**Utiilty**
60330420		Blossman
Building Size (sq ft)	**Fuel Type**	**Specify Units**
13264	Liquid Propane	Gal

Billing Period From	To	Fuel consumption	Conversion Factor	MMBTU	Annual (EUI) Btu/sq.ft.	Cost $
3-31	4-30	505				773.57
5-01	5-30	551				849.98
5-30	6-31	0				0
6 31	7-31	0				0
7-31	8-30	147				235.36
831	9-30	0				0
10-1	10 31	0				0
10-31	11-30	251				488.71
12-1	12-30	1069				2125.46
12-31	1-30	2171				4280.60
1-31	2-29	1228				2259.33
3-1	3-30	5820				1115.90
TOTAL		6502.2	95475	62079	50619	12129.91

***Conversion Factors**

Natural Gas	100,000 Btu/therm
Natural Gas	1,030 Btu/cubic feet
Liquified Petroleum	(LP bottled gas) 95475 Btu/gallon
Kerosene	134,000 Btu/gallon
Distillate Fuel Oil	138,690 Btu/gallon
Residual Fuel Oil	149,690 Btu/gallon
Coal	24.5 million Btu per Standard short ton
Wood	8,680 Btu/pound
Steam	970 Btu/pound
Other	Consult standard Engineering Reference Manual

Comments: Electric $.367 + Fuel $.9891/sq.Ft-yr = $1.35 sq.ft.-yr

EUI Elec. 14948 + Fuel EUI 50,619 = 65,468 sq.ft.-yr

11. ENERGY SAVINGS

INSTRUCTIONS: This section is to be completed by the auditor after the walk-through portions of the audit. First, check the boxes which state the range of the percent of energy consumption which would be saved by implementing the operation and maintenance items recommended in section 2 of this book. Second, calculate the range of energy and cost savings by multiplying the estimated percentages by the annual electrical and fuel consumption date on this audit report.

Check two boxes in each category:

Range of Electrical Savings [ ]0% [ ]5% [ ]10% [ ]15% [ ]20% [ ]25% [ ]Other____

Range of Fuel Savings [ ]0% [ ]5% [ ]10% [ ]15% [ ]20% [ ]25% [ ]Other____

Calculate ranges of energy and cost savings:

Range of Electrical Savings

	% Range		Annual Electrical consumption kWh	=	Range of Electrical savings kWh	% Range		Annual Electrical dollars spent	=	Range of Electrical Dollar savings
Lower Bound	5	X	53,360	=	2,668	5	X	$ 4498	=	$ $225
Upper bound	10	X	53,360	=	5,336	10	X	$ 4498	=	$ 449

Range of Fuel Savings

	% Range		Annual fuel consumption Btu MM	=	Range of fuel savings Btu	% Range		Annual Fuel dollars spent	=	Range of Fuel Dollar savings
Lower Bound	5	X	620.7	=	31.0	5	X	$ 12130	=	$ 606.
Upper bound	10	X	620.7	=	62.0	10	X	$ 12130	=	$ 1213

The auditor is not responsible if actual savings resulting from the implementation of the energy conservation opportunities listed in this section do not fall between the roughly estimated ranges which are specified.

Total Range of operation and maintenance energy savings (total all fuels):

From _____ Btu to _____Btu.
(lower bound) (upper bound)

Comments: