

Fork Union Fire Station Energy Audit
June 26, 2008
Executive Summary

The Fork Union Fire Station, built in 1967, has an energy usage of \$1.90/sq. ft. per year. This is moderate to high compared to other county buildings. This building has had several additions put on and has no central cooling and a partial central heating unit. The building is operated 24 hours per day and normally has a small staff present on an irregular schedule. Unoccupied times are difficult to schedule. Significant reductions in energy usage are possible by changing some routine operations. Savings in the range of 10-15% could be easily achieved. This would mean a savings of \$700 to \$1,100 per year.

By changing the thermostat settings to 68°F in the heating season and 78°F in the cooling season, considerable savings could be achieved. Tamperproof covers should be put on the thermostats. Adding insulation the floor of the auxiliary room would save energy. The location is prone to flooding fiberglass insulation could not be used. Covering the 4 window A/C units in the winter should reduce heat losses. These and other measures should result in significant energy savings over the next year.

Submitted by: Curtis Putnam

Recommendations from Energy Audit of
Fork Union Fire Station
June 26, 2008

- Replace worn and/or broken weather stripping and caulking
- Repair broken weather strip on Garage doors.
- Cover all window A/C units in the winter.
- Close door to tower
- Cover opening to Auxiliary hall in the summer and turn off A/C
- Insulate the floor of the Auxiliary hall
- Adjust thermostats to 68°F in the heating season and to 78°F in the cooling season.
- Install tamperproof locking covers on thermostats.
- Turn off heating and cooling in side room (with heat pump) when unoccupied.
- Insulate hot water tank and supply lines.
- Turn off lights in unoccupied areas.

2. ANNUAL ELECTRIC USE AND COST
Include Electrical Demand, if applicable

1		2		3		4		5		6		7		8		9		10		
Meter Read Date		Date		KWh* Used		KWh/gross sq.ft.**		Annual (EUI) BTU/sqft		Energy Cost		KW-KVA Demand		Fixed Service Cost		P.F. * and Demand Cost***		Total Cost		
From		To																		
4-27	5-24			3132															24346	
5-24	6-27			4953															39198	
6-27	7-27			2708															23981	
7-27	8-27			3446															38427	
8-27	9-21			1946															17499	
9-21	10-23			1398															12792	
10-23	11-28			2289															20595	
11-28	12-27			2707															24256	
12-27	1-30			3459															30834	
1-30	2-27			2951															26386	
2-27	3-28			2666															23890	
3-28	4-28			1717															15582	
TOTAL				33372		8.5635		29227											2897.86	

Comments: \$ 74 / sq. Ft. - yr

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.

Building: **Fire Union Fire Station** Address: **15704 W. River Rd** Year of Record: **From 9-07 To 4-08**
 Account Number: **8866300000** Meter Number: **087875435** Utility: **Dominion**
 Maximum kW Demand W/O charge: _____ Minimum Power Factor W/O charge: _____ Building size (sqft): **3897**

3. ANNUAL NON-ELECTRIC ENERGY USE AND COST

Photo copy this form for additional fuel types

Building	Address	Year of Record	Fuel Type	Conversion Factor	MMBTU	Annual (EUJ) Btu/sq.ft.	Cost \$
Fork Union Fire	15704 W. River Rd	From 4-07 To 4-08	LP Gas				
Account Number 60330452	Meter Number	Utility Blossman	Specify Units Gallons				
Building Size (sq ft) 3897							
Billing Period From To	Fuel consumption	Conversion Factor	MMBTU	Annual (EUJ) Btu/sq.ft.	Cost \$		
4-30	0				0		
5-30	165.1				258.48		
6-30	0				0		
7-30	0				0		
8-30	0				0		
9-30	0				0		
10-30	168.2				323.45		
11-30	434.3				866.75		
12-30	301.2				606.76		
1-30	474.8				988.30		
2-28	556.0				1026.17		
3-30	241.5				468.50		
TOTAL	2341.1	138690	32468	83317	4532.41		

Comments:

Fuel EUJ 83,317
Elect EUJ 29,227

Fuel \$1.16/sqft-yr
Elect. 94

Total EUS 112,544

Total \$1.90 SFF-yr

*Conversion Factors

Natural Gas	100,000 Btu/therm
Natural Gas	1,030 Btu/cubic feet
Liquidified 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

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	<u>10</u>	X	<u>33372</u>	=	<u>3337</u>	<u>10</u>	X	\$ <u>2898</u>	=	\$ <u>289</u>
Upper bound	<u>15</u>	X	<u>33372</u>	=	<u>5005</u>	<u>15</u>	X	\$ <u>2898</u>	=	\$ <u>434</u>

Range of Fuel Savings										
	% Range		Annual fuel consumption Btu (mm)	=	Range of fuel savings Btu (mm)	%	Range	Annual Fuel dollars spent	=	Range of Fuel Dollar savings
Lower Bound	<u>10</u>	X	<u>3247</u>	=	<u>3247</u>	<u>10</u>	X	\$ <u>4532</u>	=	\$ <u>453</u>
Upper bound	<u>15</u>	X	<u>3247</u>	=	<u>4870</u>	<u>15</u>	X	\$ <u>4532</u>	=	\$ <u>679</u>

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 43.8 mm Btu to 65.8 mm Btu.
 (lower bound) (upper bound)

Comments: