

Asheville Friends Meeting

227 Edgewood Road
Asheville, NC 28804



Gross Square Footage (GSF):	3,200 sq. ft.
Year Constructed:	1911
Audit Date:	June 26, 2016
Annual Energy Cost:	\$1,234
Annual Water Cost	\$936
Total Annual Utility Cost	\$2,170
Energy Cost Index (\$/GSF)	\$0.39
Energy Use Index (kBtu/GSF)	34.8

Eric Soderberg
North Carolina Interfaith Power & Light
27 Horne Street
Raleigh, NC 27607
(919) 828-6501
info@ncipl.org

Site Contact

Patricia Johnson, Green Team Chair
Asheville Friends Meeting
Phone: (828) 400-4844
Email: pjohnsonpa@yahoo.com

Table of Contents

Executive Summary 2

Building and Systems 2

 Building Description 2

 HVAC Systems..... 2

 Lighting 2

Energy Analysis 2

 Recent Energy Cost 3

 Water Use and Cost..... 4

 Summary of Annual Energy and Water Use..... 5

Energy Conservation Measures (ECM) 6

 ECM Descriptions 6

List of Figures

Figure 1. Total Electricity Use 3

Figure 2. Total Electricity Cost 3

Figure 3. Natural Gas Use..... 4

Figure 4. Natural Gas Cost..... 4

Figure 5. Water Use 4

Figure 6. Water Cost 4

List of Tables

Table 1. Monthly Energy and Water Use and Cost 3

Table 2. Summary of Energy and Water Use 5

Table 3. ECM Outline..... 6

Executive Summary

North Carolina Interfaith Power & Light (NCIPL) performed an energy audit on June 26, 2016 at the Asheville Friends Meeting (AFM) to determine potential energy conservation measures (ECMs). Nine (9) ECMs were identified. Some would require low or no cost to implement, and some would require a capital investment of a few hundred to several thousand dollars. The current energy use at the church does not appear to be excessive. The staff consistently turns off lights and equipment and resets thermostats when not in use. The recommended ECMs generally address the physical rather than operations limitations of energy efficiency, such as weatherstripping and HVAC equipment.

Building and Systems

Building Description

AFM consists of one two-story building built in 1911. It is built on a full basement. Total area is 3,200 sq. ft.

HVAC Systems

The church is served by two (2) natural gas condensing furnaces. Air is circulated by the fans in the furnaces. The gas burners heat the air during heating mode. The church is not cooled with mechanical air conditioning in the summer. The HVAC systems are controlled by wall-mounted programmable thermostats. The staff reports the thermostat setpoints are lowered or raised when the spaces are in use, and returned to an energy-saving setting when not in use.

Lighting

Interior lighting consist primarily of T12 fluorescent fixtures and compact fluorescent lamps. All interior lighting is controlled by manual switches. The staff reports interior lights are consistently turned off when not in use.

Exterior lighting consists of compact fluorescent lamps.

Energy Analysis

The team referred to the Commercial Building Energy Conservation Survey (CBECS) to determine how the church's energy use compares to similar buildings. CBECS collects energy use and data from non-residential buildings across the country. The average energy cost index (ECI) for these churches was \$0.65/square foot. The ECI compares total energy cost (electric and gas) per year with the total square footage of the building. The ECI of the AFM was calculated from provided energy cost data and square footage of 3,200 SF to be approximately \$0.39/square foot. The church's ECI is well below average, indicating the church is doing a good job of energy conservation.

Recent Energy Cost

Electricity

Table 1 shows monthly energy and water use and cost for the one year period from Apr. 2015 to Mar. 2016. Electricity cost ranges from about \$38 to \$58 per month, with higher use during the winter months. For the recent 12-month period, electricity use was 3,698 kWh/yr and electricity cost was \$540/yr.

Month / Yr	Electric-All	Electric	Nat Gas	Nat Gas	Water	Water and Sewer Cost
	Usage (KWH)	Cost (\$)	Usage (Therms)	Cost (\$)	Usage (Gallons)	Cost (\$)
Apr-15	337	\$48	38	\$48		
May-15	273	\$41	10	\$26	2,244	\$113
Jun-15	250	\$39	0	\$19		
Jul-15	239	\$40	0	\$19	5,236	\$154
Aug-15	218	\$38	0	\$19		
Sep-15	218	\$38	0	\$19	10,472	\$207
Oct-15	349	\$52	18	\$32		
Nov-15	286	\$42	43	\$50	11,220	\$215
Dec-15	402	\$54	119	\$116		
Jan-16	492	\$58	128	\$103	1,496	\$116
Feb-16	314	\$45	184	\$139		
Mar-16	320	\$45	128	\$105	2,992	\$131
12-month Total	3,698	\$540	668	\$694	33,660	\$936

Table 1. Monthly Energy and Water Use and Cost

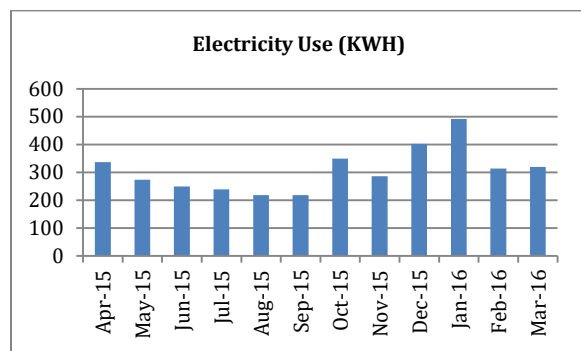


Figure 1. Total Electricity Use

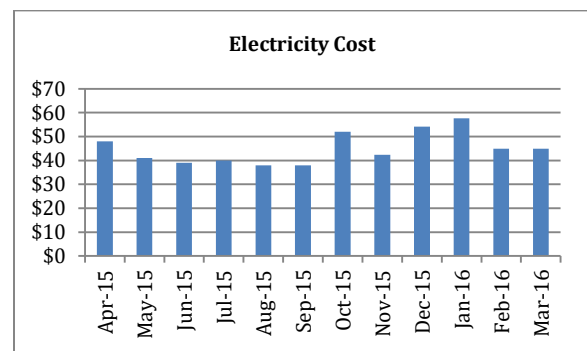


Figure 2. Total Electricity Cost

Natural Gas Use and Cost

Natural gas is used for space heating, water heating, and cooking. Table 1 and Figure 3. Natural Gas Use and Figure 4 present natural gas use and cost for a recent 12-month period. Natural gas costs range from about \$19 to \$139 per month. Higher use and cost are during the winter months, due to space heating. For the recent 12-month period, nat. gas use was 668 therms/yr and nat. gas cost was \$694/yr.

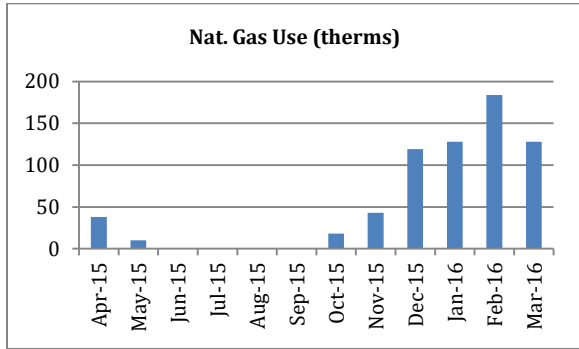


Figure 3. Natural Gas Use

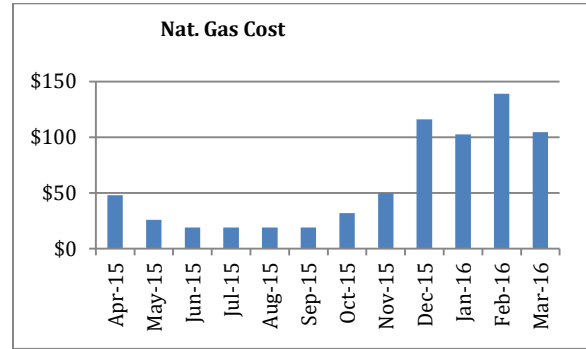


Figure 4. Natural Gas Cost

Water Use and Cost

Water use and cost is shown in Table 1 and Figure 5 and Figure 6 below. For the period from Apr. 2015 to Mar. 2016, water use was 33,660 gal/yr and cost for the water was \$936/yr.

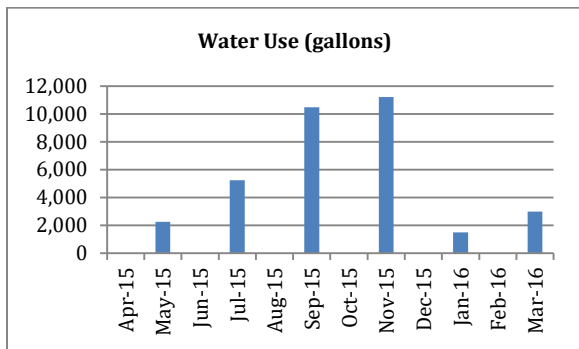


Figure 5. Water Use

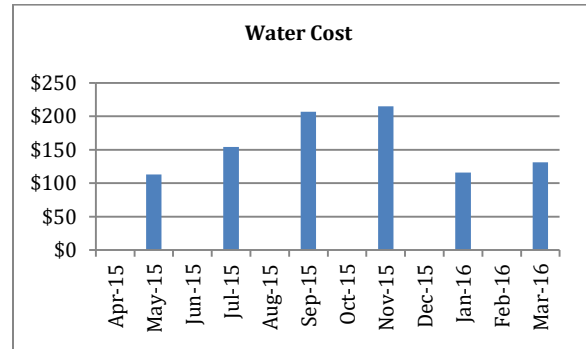


Figure 6. Water Cost

Summary of Annual Energy and Water Use

Table 10 summarizes the annual energy and water use for the recent 12-month period. Total cost for all utilities was \$2,170/yr.

Table 2. Summary of Energy and Water Use

Utility	Annual Use	Annual Cost
Electricity	3,698 kWh/yr	\$540
Natural Gas	668 therms/yr	\$694
Water	33,660 gal/yr	\$936
	Total	\$2,170

Energy Conservation Measures (ECM)

The proposed ECMs are listed in Table 3 below.

Table 3. ECM Outline

Low/No-Cost ECMs	
1	Recommended programmable thermostat settings.
2	Thermostat Labels.
3	Place Signs on Light Switches or Install Occupancy Sensors.
4	Upgrade T12 Linear Fluorescent Lamps To T8s.
5	Upgrade CFL Lamps To Leds
6	Check Door and Window Weather Stripping.
7	Check Thermostat Setting on Refrigerator in Kitchen
8	ENERGY STAR
9	Check DWH Setpoint.

ECM Descriptions

Low/No-Cost

These ECMs can probably be implemented by skilled members of the congregation for low- or no-cost.

HVAC

1. Recommended programmable thermostat settings.

Programmable thermostats automatically set the temperature back during unoccupied hours. For every 1 degree reduction of the temperature setting, there is a 3% energy savings. Recommended temperature setpoints are shown in the table below.

	Occupied Temp. (°F)	Unoccupied Temp. (°F)
Summer (cooling)	76	85
Winter (heating)	70	55

2. Thermostat Labels.

As noted, the thermostat setpoints are reset when the spaces are to be used or unoccupied. It is recommended the staff add labels to each thermostat indicating the proper setting. Four settings are suggested with possible setpoints: Occupied Summer: 76 F, Unoccupied Summer: 85 F, Occupied Winter: 70 F, Unoccupied Winter: 55 F.

Lighting

3. Place Signs on Light Switches or Install Occupancy Sensors

Place signs on light switches to remind people to turn off the lights when not in use. Alternatively, install occupancy sensors that automatically turn lights on and off.

4. Upgrade T12 Linear Fluorescent Lamps To T8s.

T8 fluorescent lights are 30 to 40% more efficient than T12 fluorescent lights. The upgrade can be made to the existing fixture by replacing the electromagnetic ballast with an electronic ballast and replacing the T12 lamps with T8 lamps. T8s come in 32-, 20-, 28, and 25-watt options. The lower the wattage, the higher the energy savings will be. The implementation may be eligible for an incentive from Duke Energy under the Smart Saver Incentive program. The T-12 incentives are being phased out as production of the T12 lamps ends, so the congregation should contact Duke as soon as possible.

5. Change CFL lights to LEDs.

LED lamps are up to 50% more efficient than CFL lamps. The CFLs should be replaced with LEDs as lamps fail. Any incandescent exterior lighting should be upgraded to LEDs. The implementation may be eligible for an incentive from Duke Energy under the Smart Saver Incentive program.

Building Envelope

6. Check Door and Window Weather Stripping

The exterior doors should be checked for proper weather stripping in place to prevent airflow. Airflow through unsealed doors and windows can be a large source of energy loss.

Kitchen

7. Check Thermostat Setting on Refrigerator in Kitchen

The thermostat on the refrigerator in the kitchen should be checked. The thermostat should be set to the highest setting that maintains the temperature of the refrigerator at about 35°F to 38°F.

Miscellaneous

8. ENERGY STAR

ENERGY STAR is a free web site created by the Environmental Protection Agency for users to track and compare energy use in buildings. Entering energy use and building data will rank the building in relation to similar buildings. If used correctly, this comparison will be more meaningful than the CBECS comparison discussed in the executive summary of this report. A meaningful comparison with other buildings can help the congregation set energy saving goals.

9. Check DWH Setpoint

The setpoint on the domestic water heater (DWH) should be checked. Recommended setpoint is 120°F and should not be over 140 °F. For every 1 degree reduction of temperature setting, there is a 3% energy savings