

Energy Check Up and Prescription



Lands Lutheran Church

16640 Hwy 60 Blvd, Zumbrota, 55992

April 8, 2016

Date of Energy Analysis: April 8th, 2016

Facility Manager: Kim Jensen & Green Team

This energy efficiency program is to help you save money with lower CenterPoint Energy and/or Xcel Energy utility bills. Our next step is to help you implement the most practical upgrades that will lower utility demand of electricity AND



natural gas. We are a MN Department of Commerce funded program for nonprofit organizations to find specific recommendations to reduce energy waste.

After you make some of these recommendations, please send us a short email telling us which numbered items you were able to do. Your data is critical to prove Minnesota is making a difference! Our goal is

to provide energy efficiency improvements that are free to implement because they save you money in just a few years.

Building Overview

Construction of Lands Lutheran Church began in 1912 with the sanctuary and Fellowship Hall. Additions were made in 1951 with offices and classrooms, in 1970 with the narthex, and in 2002 with the Welcome Center. Current size of the facility is 12,540 square feet. The church is used primarily on Sundays and Wednesdays, but services, meetings, and events occurring anytime but typically Tuesday through Thursday. In the summer, Sunday services are held outdoors.

Electricity is provided by Xcel Energy on the General Service rate at 240/120 volts, single phase. Usage over the last 12 months was 45,200 kWh at a cost of \$7,687. High summertime electrical demand costs are typically limited by low energy use where “Billed Demand” cannot exceed 1% of kWh. This resulted in 411 kW being billed over the last 12 months with an actual demand of 478 kW. Propane provided by Matthees Oil and usage over the last 12 months was 4,870 gallons at a cost of \$6,946. **Electric and propane usage is about average compared with other churches in this climate.**

- The building is heated and cooled with six residential style forced air furnaces with all but one being 90+% efficient.
- The joints in the furnace plenums are not well sealed.
- The condensing units associated with the furnaces are older, but all have Saver Switches installed.
- A portion of the building is heated by an 80% efficient hot water boiler that does not have temperature reset controls but does have a stack damper.
- There appears to be three zone controls valves on the hot water lines in the boiler room.
- The sanctuary is kept cool in the summer for humidity control.
- Most thermostats are programmable.

Interior Lighting is primarily with CFLs and T8 fluorescent – some with magnetic ballasts. Some incandescent bulbs remain. Exterior lighting is with HID wall pack which may be controlled by a timer. One CFL flood lamp fixture is controlled by a photocell.

The all electric kitchen is used primarily for serving. Exhaust hoods are in place for the range and dishwasher. The dishwasher is used monthly, has a 180 degree rinse, total power is 11.7 kW. Two coffee makers were in standby mode. The larger one is rated at 7 kW, is used only on Sunday, and the exterior was hot to the touch. The smaller coffeemaker uses glass carafes with warming plates.

Other items noted:
 Some exterior doors do not seal tightly.
 Attic insulation levels were not checked.
 Ground has settled in some areas around the building.

Prescription

The following cost and energy saving measures were identified for your facility.
 To maximize rebates as well as allowing us to fulfill our requirement to report energy savings –
 * **Please contact EnerChange before implementing or contracting to implement these measures.** *

Highest Priority

1. Upgrade Lighting to LED

ECO #	Energy Conservation Opportunity Description	Estimated Demand Savings kW/Mo.	Estimated Energy Savings kWh/Yr	Estimated Propane Savings Therm/Yr	Estimated Annual Electric Cost Savings	Estimated Annual Propane Savings	Estimated Annual Other Savings	Estimated Annual Total Savings	Estimated L&M Install Cost	Estimated Electric Energy Incentive	Estimated Propane Energy Incentive	Simple Payback Period Years
1	REPLACE EXTERIOR FIXTURES WITH LED	0.7	3,189	0	\$325	\$0	\$0	\$325	\$600	\$218	\$0	1.2

2. Exterior fixtures that are on during all hours of darkness.
3. Use LED lamps to replace Any remaining incandescent bulbs.
4. Turn off the larger coffee maker between uses.
5. Seal furnace plenums and exposed ducting to reduce air leakage. Adjust air flows so that rooms heat and cool more evenly.

Measures with Payback Periods of less than 2 Years

6. Form a Green Team - An energy assessment does not replace the need for ongoing energy management
 - Identify an energy champion in the congregation who will lead the effort and build the team.
 - Team things to do to get started:
 - Ask EnerChange for Help!
 - Visit www.enerchange.org and log in to see your latest utility bills.
 - Search “energy star congregations” for organizational tool and resources.
 - Assemble a binder containing building operation notes and equipment records.
 - Ensure that air cannot migrate from conditioned spaces to unconditioned spaces. Check wall and ceiling penetrations to ensure they are sealed.
 - Check the insulation levels in the attic. A 49 R value would be ideal – approximately 18” of fiberglass insulation.
 - Label light switches as to what lights are being controlled.

7. Program the sanctuary thermostat to cool at night and be off during the day. This will help lower demand charges as well as save energy.
8. Have HVAC equipment tuned up on a regular basis.
9. Program the thermostats for 10 degree setbacks in the heating season.

5	INCREASE TEMPERATURE SETBACK AT NIGHT	0.0	124	242	\$9	\$347	\$0	\$356	\$600	\$0	\$0	1.7
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10. Consider using the sanctuary ceiling fans only when the heating and cooling systems are off. In the heating season the high vaulted ceiling should promote natural convection currents to maintain an even temperature floor to ceiling and using the fans may cause uncomfortable drafts. When using mechanical cooling, the air conditioned air will naturally be at floor level and using the ceiling fans will mix the cooled air at seating level with the warm air aloft, causing the air conditioners to run more often.

Measures with Payback Periods of 2 Years to 5 Years

11. Seal against air infiltration - Ensure doors and windows seal against infiltration by replacing damaged weather stripping and replacing cracked caulking around frames.
12. Replace the coffee maker with the glass carafes with one that uses insulated pots.

Measures with Payback Periods of 5 Years to 10 Years

13. Improve water drainage away from the foundation to reduce the need for basement dehumidification.

Future Planning Measures

14. Replace equipment with high efficiency Energy Star models. Often rebates are available to help offset the higher initial cost.
15. When replacing the roof, consider adding insulation.
16. Install **networked** thermostats that allow for remote temperature and schedule changes as well as data logging, allowing the monitoring of temperature changes in the building.

Cost Benefit Analysis:

EnerChange Energy Conservation Opportunities

5/3/2016

Lands Lutheran Church

Electric Provider: Xcel Energy

Energy Efficiency Manager: Michael T'Kach

Propane Provider: Matthees Oil

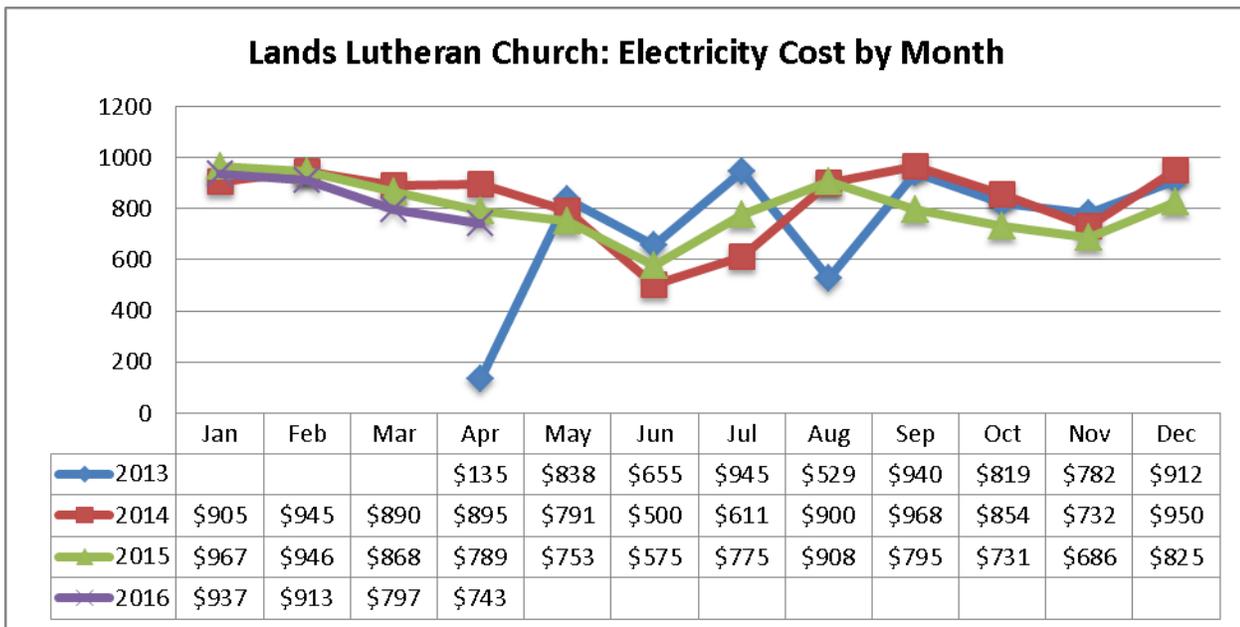
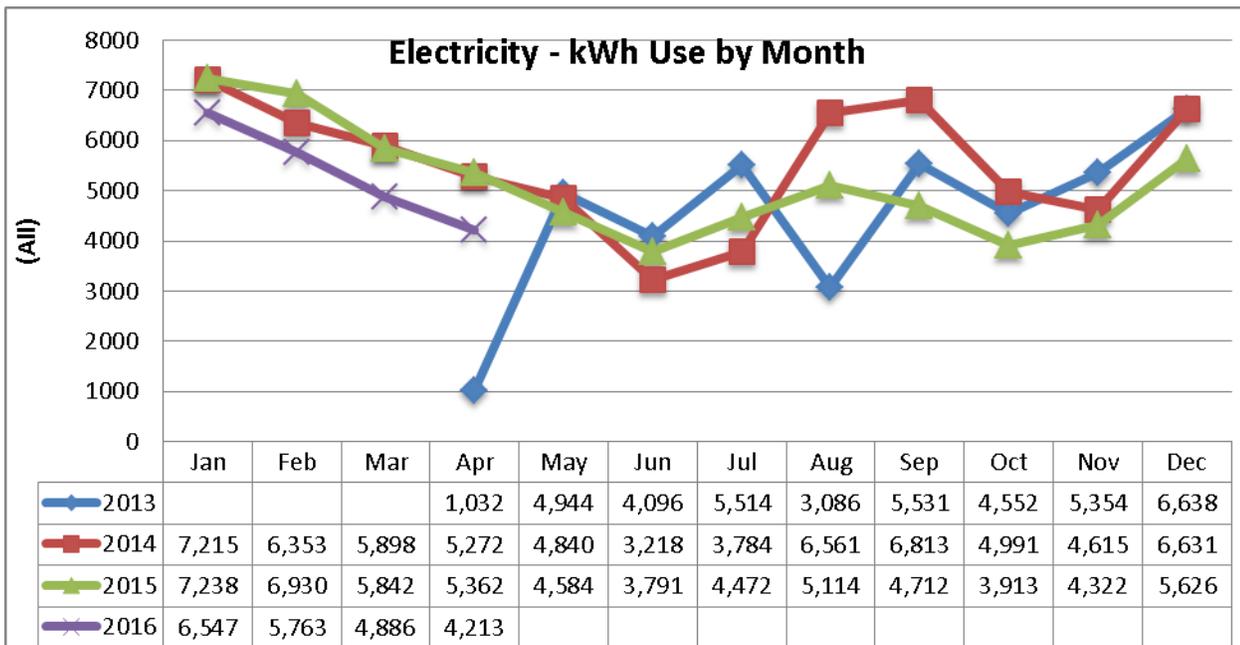
Energy Engineer: Mark Ginsbach

SUMMARY OF RECOMMENDATIONS :

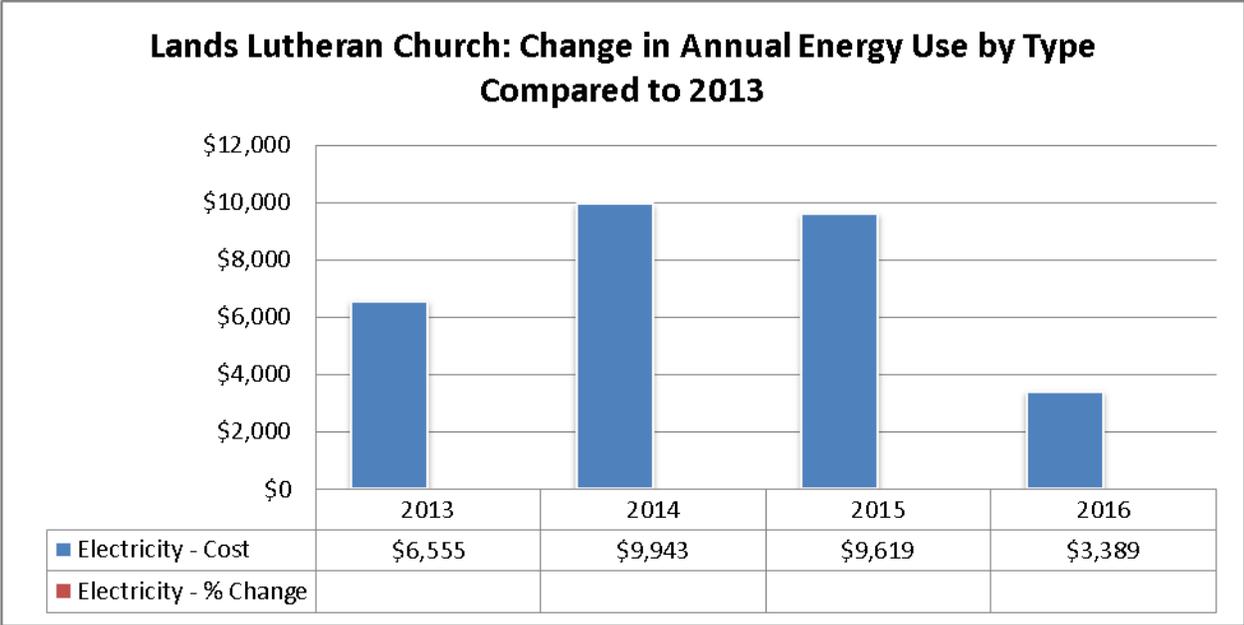
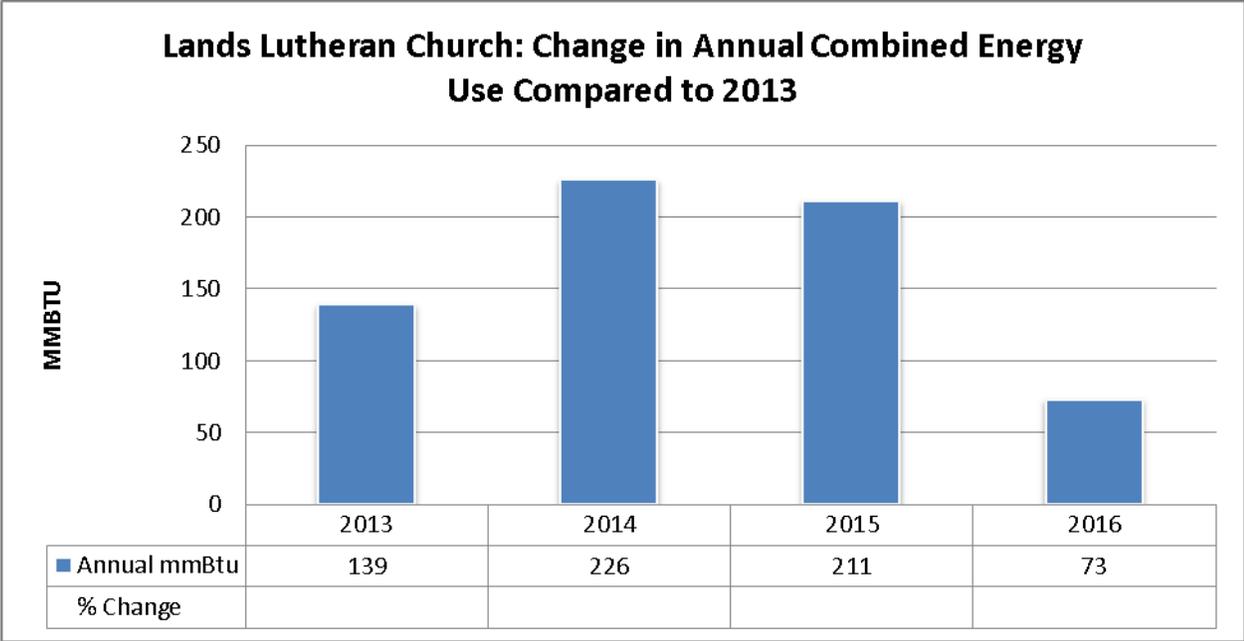
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1	REPLACE EXTERIOR FIXTURES WITH LED	0.7	3,189	0	\$325	\$0	\$0	\$325	\$600	\$218	\$0	1.2
2	TURN OFF LARGE COFFEE MAKER	0.6	1,652	0	\$120	\$0	\$0	\$120	\$0	\$0	\$0	0.0
4	FORM A GREEN TEAM	0.3	2,260	242	\$197	\$347	\$0	\$545	\$500	\$0	\$0	0.9
5	INCREASE TEMPERATURE SETBACK AT NIGHT	0.0	124	242	\$9	\$347	\$0	\$356	\$600	\$0	\$0	1.7
7	WEATHERSTRIP EXTERIOR DOORS	0.0	0	111	\$0	\$160	\$0	\$160	\$280	\$0	\$0	1.8
TOTAL ALL		1.6	7,225	596	\$651	\$854	\$0	\$1,506	\$1,980	\$218	\$0	1.2

Natural Gas - non Xcel Energy LP based

Electric Use/Cost:



Breakdown by Utility Use/Cost: Electric Only...

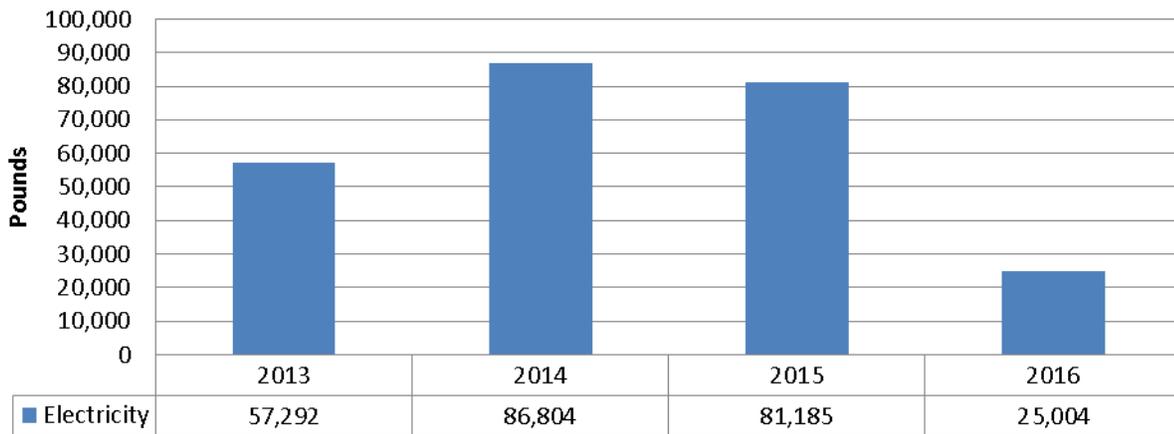




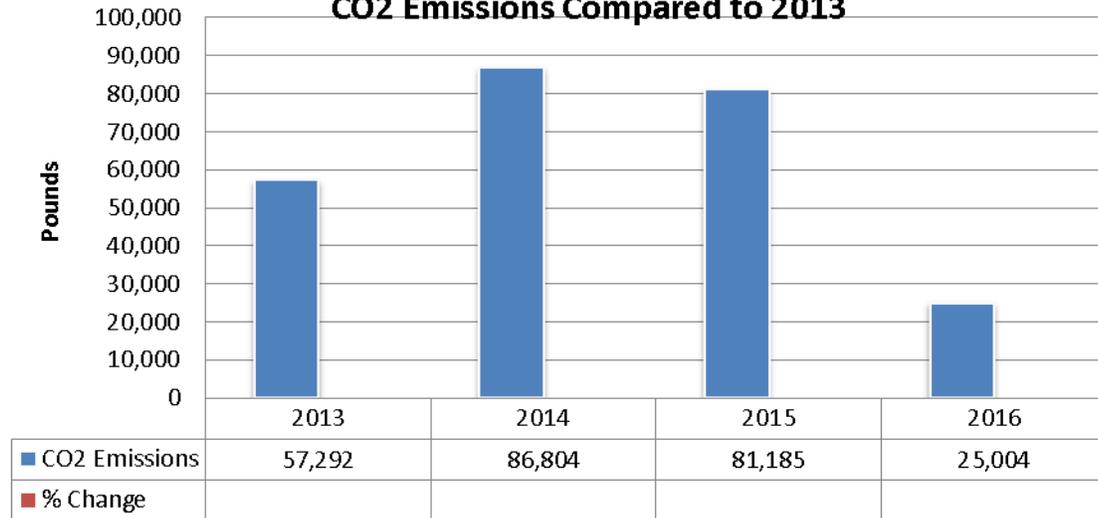
Carbon Footprint:

(= energy total consumption converted by utility type)

Lands Lutheran Church: Change in Annual CO2 Emissions By Energy Type



Lands Lutheran Church: Change in Annual Combined Energy CO2 Emissions Compared to 2013



EnerChange helps with:

- **Rebates:**

- such as steam trap repair, boiler tune up 25% back, new energy efficient equipment and LED lighting plus the Saver Switch program.

- **Finance Programs:**

- **0% with CEE Lighting Program (Center for Energy & Environment)**
- **< 5% with St. Paul Port Authority public funds**
- **Cash neutral programs where the upgrades are paid from the savings**

Buy Energy Star rated appliances!

- **“Operating costs” are an invisible price tag that add up over the lifetime of the device, Don’t just see the “sticker price tag” think also about the years of service-life. (rebates apply)**

The ENERGY STAR® Logo

The ENERGY STAR logo is on all qualified products that meet specific standards for energy efficiency. ENERGY STAR-qualified products exceed the federal minimum standards for efficiency and quality—sometimes significantly. Look for the label on appliances, electronics, water heaters, windows, and other products that consume energy in your home.



Summary

EnerChange exists to help you achieve greater energy efficiency and save money for your mission. These energy efficiency measures will reduce your operating costs. We’re here to serve as your guide; eliminating the confusion and has hassle that often prevents organizations from reaching important energy efficiency goals and aspirations. We appreciate this opportunity to be your partner in this important and highly relevant initiative, thank you for your time and **congratulations on your energy efficiency efforts!**

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