



FACILITY CASE STUDY

Lutheran Church of The Resurrection—Energy Reduction



Existing Condition

The church had just hired another firm for a full ASHRA audit and come up with a \$300,000.00+ project with a greater than 30 year payback. Tower Energy looked over the project and came up with a average 40% reduction of their energy costs and under a 3 year payback. Tower also did not charge for this audit.

This beautifully designed church was lacking controls based on actual usage.

The existing heating and cooling system was based on pneumatics that had to be controlled manually in order to set back or adapt to actual usage. This left the building being over heated and over cooled when not needed. There was also no way to separate the large cooling system of the church from the lower halls that were not used at the same time. They had to cool the entire church to cool the meeting halls.

VAV's added to separate the two main zones

To separate the two areas, Tower Energy added a VAV (variable air volume) ducting control that separated the church from the lower areas. Then a VFD (variable frequency drive) was added to the blower motor and set to maintain static pressure and modulate with the variable load. Two separated zones were set up with individual controls that set the temperatures and schedules. Now the downstairs can be on while the church is off.

Pneumatics separated from heating and air conditioning system

The heating system was controlled by pneumatics that were operational but lacking in controls. Tower Energy first checked all the thermostats and replaced or repaired the ones that needed repairing. After that a modern control set-back system was added to the boiler to turn on the compressor, dryer and boilers with associated pumps all at the same time based on a variable OA set-point. Previously this system was running 24/7 all year with only the boiler turned off manually when it was deemed warm enough. This improvement will save over 40% of their heating costs throughout the year with more saved during spring and fall.

Initial therms saved per month with new control system

| DATE | 3yr average | 2016 | SAVINGS |
|---------|-------------|------|---------|
| 6/9/16 | 507 | 283 | 44 % |
| 11/8/16 | 977 | 590 | 39 % |
| 12/8/16 | 1760 | 1499 | 14 % |

Note: Savings based year over year after monitoring

**Three Months
Percentage Savings 26%
on Heating**





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Entire Facility Upgraded to LED Lighting

Regular incandescent and florescent lighting was not only inefficient but was stressing the volunteers and paid maintenance staff to keep replacing worn out bulbs and ballasts. The lighting was also poor and the parishioners could not read passages during service. In these situations the maintenance and performance of the lighting is equally as important than the energy savings while they still cut energy costs over 40%.

Electric Savings with Maintenance

| DATE | 2014 | 2015-16 | SAVINGS/MONTH |
|----------|-------|---------|---------------|
| 7/19/16 | 10410 | 6600 | \$ 727.67 |
| 8/19/16 | 13080 | 7920 | \$ 924.77 |
| 9/19/16 | 11775 | 5920 | \$ 1200.91 |
| 10/19/16 | 9931 | 4568 | \$ 1133.45 |
| 11/11/16 | 9309 | 5032 | \$ 984.48 |

5 Months Saving \$ 4,971.28

Note: Projected savings span all seasons and will save more electricity in summer and more gas in winter. The highest savings are spring and fall.

10 YR PROJECTED SAVING \$ 139,593.00

Projected ROI on Combined Project 50% per year



MECHANICAL PROBLEMS SPOTTED DURING THE AUDIT

Leaky valves were wasting compressed air and bypassing heat through the building circulation system into the return lines. This caused the boiler and compressor to keep operating when not needed. The other pneumatic controls that were not operating were not allowing the system to set-back at night. This alone could save 30% of the heating costs.

The main air handler filtration system was badly clogged preventing adequate return and supply off the condensers. This caused excessive load during operation as the four stage system could not get enough air to condition the space.



Led lighting was used to upgrade the entire facility and reduce maintenance costs. These ceiling lights had a new fixture insert was also dimmable for maximum versatility and savings.

TOWER ENERGY MECHANICAL:

Licensed mechanical contractors with 30+ years of experience.

Licensed master electricians specializing on controls.

Practical customized engineering experience to spot opportunities and estimate payback

Real Time Monitoring and Control:



Real time monitoring and controls can spot problems in the BAS and plant operations based on energy usage not just performance. Usage spikes out of the norm indicate equipment or control malfunctions long before they would normally show up on the utility bill. Other issues concerning parts failure are also spotted in advance preventing costly emergency service.