

LED Retro-Fit at St. Luke's Church Kalamazoo

While the total hours of usage in our worship space was not high (estimated at 430 hours) there was a great need to increase the lighting (lumens) output. A 5 foot 8 inch person standing directly under the existing fixture, with a 300 watt incandescent bulb, experienced 7.5 foot candles falling on an open hymnal or prayer book. This was borderline and moving in any direction resulted in decreased lighting and the overlap in the center aisle was barely adequate for the choir and others in any processional. Increasing to 500 watt was not a good option as electric consumption would increase 67% and the added heat would be significant. Halite option is known for high heat and expensive bulb replacement. While fluorescent would be a good improvement consumption wise and reduced heat; existing screw in replacements did not offer much lumen increase and color tone would still be slightly yellow with no improvement in the contrast on the pages being read. We did try the largest bulb available.

Upon good recommendations and visiting other churches which had up-graded their worship space lighting, we contacted Jefferson Lighting & Brass in Lynchburg Virginia for guidance and options. While we did consider purchasing new fixtures (in antique Gothic style) we did opt to retro-fit our existing 16 Gothic fixtures which were probably purchased around 1920. With the 12 fixtures in the main seating space (nave), increased up-lighting was also desired to light up our decorative but slightly dark ceiling. This was a bit of a problem as the fixtures had a decorative cone forming their tops, blocking up light. Fortunately the LED's project at a 150 degree angle so the projecting side light would criss-cross the room and light-up the ceiling. After testing one fixture with a replacement cluster (see note) of 6 side strips with 48 individual LED's we chose to double this to 12 strips and obtained the desired results. The 150 degree projection of these side lights also helped with the over lap of the down light between the 12 fixtures. The separate down light in the test fixture was initially driven with 52 watts but this resulted in almost 50 foot candles which was a bit harsh; even with a clear diffuser. So we dropped back to 36 watts and with the clear diffuser we obtained 22 foot candles at standing reading level which was almost 3 times the original light. The center aisle measure 10-12 foot candles for those in a processional. The results have been well received by all.

The 4 fixtures in the choir/altar chancel did not need much down light as there are numerous flood lights on the back side of the dividing arch. So we opted for only 18 watts here and it proved to be adequate. The side lights were another matter as the original 6 strips with 24 "super" LED's did not prove adequate after the domed ceiling was painted a medium gold and the walls one half tone darker than the white nave walls; so we also doubled those side light strips to 12 each with the "super" 24 LED's. The results were adequate and appear balanced with the 12 larger fixtures. The total wattage available for these fixture is 135 but the measured draw is only 48 watts!

The 12 nave lights have a total potential for 192 watts but I estimate that the actual draw is probably only 80-90 based on the experience with the chancel fixtures. I forgot to measure them when I was installing each. Thus our total wattage of (16 x 300) 4,800 has probably dropped to 1,272. A reduction of 73% !!! Around 830 kilowatt hours per year savings.

Ben Jamieson, Building and Grounds chair and "resident" of the scaffold.

Note: the original Mogul screw socket was stripped out the fixture and the LED strips and down light "puck" were mounted on a perforated sheet metal hexagon tube, hung inside the decorative fixture.

The 6 fixtures in the adjacent chapel had one 200 watt down light and 3 interior fluorescent 60 watt "pigtales". These were easily replaced with a large LED flood and 3 LED's bulbs of much lower wattage; resulting in a similar consumption drop.

If you wish to talk to me about this project, contact St. Luke's Church at: 269-345-8553 or office3@stlukeskalamazoo.org and give them your contact information.