Magnolia Field Lights Proposal USF Student Green Energy Fund

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By

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Idea/Initiative

The idea is to replace the current metal halide lights in the Magnolia Fields (Tampa campus) by LED lights with the purpose of drastically reducing the energy consumption and contributing towards a more sustainable campus.

Current status

Ourrently there are 6 light poles (3 on each side of the field, as shown in Figures 1 and 2). Each one of the 6 poles holds 13 metal halide lamps. That makes a total of 78 lamps. Each lamp

New plan proposition

Replace the current 78 metal halide lamps with 54 TLC-LED lamps (10 of the TLC-LED-1200, and 44 of the TLC-LED-1500). The average power consumption of one of the new LED lamps is 1.3656 kilowatts. The total power consumption for the 54 lamps is 73.74 kilowatts, as opposed to the current 123 kilowatts.

The annual energy consumption with the new LED lamps would total 35,040 kWh, which is a 41% reduction with respect to the 60,722 kWh consumed in 2022. Given the cost of the kWh in Tampa (\$0.17/kWh), the new plan would imply \$4,080 in savings per year.

Benefits for a more sustainable campus

The new LED lights will require 73 kW of power as opposed to the 123 kW required by the current lights. This translates into a reduction of more than 40% in energy consumption with the new LED lights. In terms of energy, the total amount saved each year will be 24,000 kWh. This is equivalent to 17 metric tons of CO_2 emissions avoided or 1,887 gallons of gasoline saved each year.

The lamp life for the current metal halide lamps is 5,000 hours. Given the current usage of the fields (480 hours/year), these lamps will last 10.4 years. That is, the current metal halide lights must be replaced every 10.4 years. On the contrary, the

Partners

Our partners for this project will be the Recreation and Wellness department at USF.

Continued maintenance

The company in question offers a 25-year warranty covering all materials and labor for any repair when necessary. After 25 years, the Recreation and Wellness department at USF will be in charge of maintaining the lights.

Project implementation

We have already reached out to the company that installed the current halide lights and they have already calculated the conversion to LED lights, since they have the photometrics measurements for the fields. The company will replace the crossarm assemblies and install the new LED lamps. No other changes in the infrastructure are required. The company can replace one pole per day without interrupting the schedule of intramural activities taking place during the semester.

There are six poles in total. Each pole currently holds 13 lamps, so there is a total of 78 metal halide lamps. Given the greater luminous power of LED lamps and their ability to direct light to specific target areas, it will only be necessary to have a total of 54 lamps, that is, 9 lamps per pole.

Timeline

Once the purchase order is received, the company spends 8 weeks manufacturing the new crossarm assemblies. After that, it will take 1-2 days to replace the lamps for each pole. Since there are 6 poles in the Magnolia Fields, this part of the project would take 8-12 business days. Therefore, from the time the purchase order is placed, it will take approximately 11 weeks to have the new LED lamps fully functioning on the field.

Budget

The total cost of this projects amounts to \$332,375 (see appendix for quote). This includes:

Return of investment

The payback period is estimated to be 30 years. Here is the breakdown: during the next 11 years, USF will save \$4,080 from the electricity bill. No maintenance cost yet since the warranty covers it until 2035. After 2035, the maintenance cost for halide lights is estimated to be \$8,000 per year. Also, between 2037 and 2040 another relamping would be necessary since halide lights last about 11 years. The cost of relamping is around \$60,000. Considering all these costs, which will be avoided with LED lights, the return of investment is at 29.8 years, thus by 2054.

After that, considering the same maintenance and relamping costs as well as electricity savings, the total amount saved until the LED lights need to be replaced in 2190 would be \$2,230,800.

Appendix

Cost of relamping: these numbers were provided by Musco, the same employee that provided us with the budget quote.

Therefore, the total cost of relamping is approximately \$61,500.

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Field Description PerMusco Lighting Design#225825B