Student Housing Lighting Upgrade

The Office of Student Life is planning to change the fluorescent lighting system for Scholar East, West and Worthington Student Housings. Student Life's goal is to reduce the energy consumption while improving students' life experience. The buildings have a total of 500 fixtures and the new lights will require new fixtures to use the LED lights. 20% of the current fixtures burn 24/7, 10% burn about 16 hours a day and the remaining burn for 8 hours in a day. The current fluorescent lighting unit consumes about 108 Watts of energy.

Student Life had gotten an estimate from the contractor for the new system. Student Life has 2 options regarding purchasing the LED fixtures:

a) The contractor recommended that Student Life buy EvoKit LED Retrofit Kit 2x2 that will be able to replace current light fixtures without the need to break the ceiling plenum. The new LED light is expected to consume only 32 Watts of electricity. The retrofit kit of the LED light will cost $79 each and can last up to 10 years.
b) Student Life later found out that there is another newer option of Evokit LED Retrofit Kit 2x2 with similar features but consume only 23W of energy per unit. The price for each unit is higher at $130. The Evokit LED also last up to 10 years.

There is no additional disposal cost for the old fixtures.

To help them make decision, they want to know if replacing the buildings' lighting now is a good decision and gives reasonable rate of return.

Current fixture light bulbs unit can last 2 years but only cost $10 for replacement. However, the current lights use integrated emergency light system that run on battery packs and are installed in half of the fixtures. It costs $300 to replace the battery pack when it fails. Currently, approximately 10% of the batteries die every year. With the new LED system, separate emergency lights will be installed for every 2 units of lighting which cost $60 per unit. The battery of the new emergency light can last for 10 years and costs only $10 to replace. Consider that 10% of the batteries will fail every year.

If Student Life installs the new lighting system, there will be $0.30 rebate per watt reduced sent by AEP as an incentive check for energy reduction program. Student Life has in-house staffs that can install the lighting system. However, if the staffs are busy and unable to perform the installation, the office might have to hire contractor for installation. From the past experiences, the need to hire contractors to replace light fixtures is very rare. If they have to hire contractor, there will be additional installation cost at approximately $40 per fixture.
Currently the university pays $0.09022 per kwh for the buildings.

To complete this case study, analyze various options of lighting replacement and determine which is the most effective and if it would likely meet the hurdle rate of OSU