

SUSTAINABILITY INITIATIVES BY STUDENT ORGANIZATIONS FUNDING PROPOSAL

Part I - General Information

Name of Student Organization	CIB - International Council in Building Construction
Contact/Responsible Person	Armin Jeddi Yeganeh
Contact Office Held/Title	Secretary
Contact Email Address	yeganeh@vt.edu
Contact Telephone Number	202-909-3951

Part II – Project Cost Information

Estimated Cost of the Proposal	\$7,160
Estimated Annual Savings	\$1,141 Annual Savings, Simple Payback: 6.2 years
Net Cost of this Proposal	\$6,019

Part III – Supporting Information

A. Please describe your sustainability initiative and attach supporting documentation.

Metal Halide to LED Luminaire Upgrades

The purpose of this RFP is to propose an upgrade to the existing lamps at Virginia Tech scene construction shop. There are 26 metal halide lamps (MH) in the scene shop, each 175 watts, which convert %75 of electricity to heat and create more heat, greenhouse gases and light pollution than contemporary fixtures. In addition, MH lamps maintain less than %50 of their lumen before 10,000 hours of operation. An upgrade would reduce energy costs, cooling load, light pollution, and external costs (such as CO₂ production). If Virginia Tech were to upgrade their lighting infrastructure, an LED would produce 80% more light (11800 lumen/100 watts=118 lum/watt) than a traditional MH lamp (13300 lumen/205 watts=65 lum/watt) using less than half the wattage. In terms of light quality, LEDs maintain more than 90% of their lumen until 40000 hours of operation. MH lamps maintain less than %50 of their lumen before 10,000 hours, meaning that the MH lamps should be replaced almost every year to give %75-%100 of their total brightness (about \$600 added annual cost of maintenance). There are 26 MH high-bay luminaires in the scene shop, each 205 watts, which are operated from 9 am to 6 pm during working days and some weekends in every academic year (more than 1800 hours annually). We propose to change these for LED luminaires, such as the Altech model AE-L-HBIS-100, which is DLC, UL, and IP44 certified, and dimmable. This model includes 5-year warranty services and 100,000-hour life time (expected to operate more than 30 years without replacement).

B. How does this initiative help to achieve the goals of the Virginia Tech Climate Action Committee Resolution and Sustainability Plan?

Policy Point # 1 - Virginia Tech will be a leader in Campus Sustainability.

Adopting the use of LEDs on campus will solidify Virginia Tech's reputation as a campus dedicated to sustainable technology and infrastructure.

Policy Point # 3 - Virginia Tech will establish a target for reduction of campus GHG emissions to 80% below 1990 emissions level by 2050.

Assuming 1.222lbs CO₂ per kWh electricity, changing 26 MH fixtures to LED luminaires will reduce current carbon footprint by more than 50% (11723.868 vs. 5718.96 lb).

Policy Point # 4 - Virginia Tech will work toward these emission reduction targets through improved energy efficiency.

LEDs will reduce electricity consumption by half per year and can emit a higher quality of light than an MH lamp using half the wattage.

Policy Point # 7 - Virginia Tech will improve electricity and heating efficiency of campus facilities and their operations, including lighting efficiency.

The existing MH lamps convert %75 of electricity to heat and create more greenhouse gases and light pollution than contemporary fixtures. In addition, they maintain less than %50 of their lumen before 10,000 hours. LEDs would produce 80% more light using less than half amount of electricity.

Policy Point # 9 - Virginia Tech will require purchase of Energy Star rated equipment.

Energy Star was mainly created to rate residential products. Commercial lighting products such as high-bay luminaires are rated by DLC (Design Lights Consortium) which is commonly considered a commercial equivalent for Energy Star. Companies like Philips, which produce both residential and commercial products, obtain Energy Star for their residential lights and DLC for their commercial lights.

Policy Point # 14 - Virginia Tech will provide funding to support sustainability programs through a variety of sources, which might include savings from reduced electricity use.

The \$1,140 annual cost savings from reduced electricity use of LEDs could be re-invested in sustainability programs, increasing our ability to fund future sustainability initiatives.

C. What is the cost of your proposal? Please describe in adequate detail the basis for your cost estimate.

Cost of 26 new LED fixtures: \$ 4160

Cost of installation: \$3000

Total cost of replacement: \$ 7,160

The simple payback takes 6.2 years. After that, the proposal has \$ 1,141 annual savings for the university. Please see the attachment for more information.

D. Will your proposal produce cost savings for the University? If so, how much? Please describe in adequate detail the basis for your savings estimate.

The simple payback takes 6.2 years. After that, the proposal has \$ 1,141 annual savings for the university for more than 30 years. Please see the attachment.

E. Is this funding request an Ongoing or One-Time change (please check one)?

One time.

F. Is funding available for this request from another source? If yes, describe the funding (source, amount, etc.)

No. Besides the energy use problems, the existing fixtures' light is so bright that it produces much more light pollution than HPS or LPS street lamps. The whites from an MH lamp are closer to daylight in frequency. This lighting pollution affects hundreds of students and staff who work here during an academic year. Despite the existing problems, replacing the existing fixtures is not in departments' priorities due to the limited availability of upgrade budget.

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Part IV – Requestors/Reviewers

Armin Jeddi Yeganeh (Secretary at CIB Student Organization)

Prepared By (Name of Contact for Student Organization)

Date 05/15/16

Chris Russo (Scene Shop Supervisor)

Reviewed By (Name of Appropriate University Official)

Date 05/15/16

Denny Cochrane

Reviewed By (Name of Office of Energy and Sustainability Representative)

Date 12/1/16



Virginia Tech Scene Construction Shop