

STUDENT ORGANIZATION SUSTAINABILITY INITIATIVE PROPOSAL FORM

Part I- General Information:

Name of Student Organization	UAP 3354 - Introduction to Environmental Policy and Planning
Contact/Responsible Person	Hannah Sylvester, Joe Girgente, Ryan Moore, Tania Kazi
Contact Office Held/Title	Tania Kazi
Contact Email Address	hns246@vt.edu , joseph92@vt.edu , moorerm@vt.edu , tania99@vt.edu
Contact Telephone Number	(703)-346-9380, (540)-505-6107, (571)-259-7437, (703)-677-4738

Part II- Project Cost Information

Estimated Cost of this Proposal	\$14,300	See III.C. below
Estimated Annual Savings -	\$3,169.96	See III.D. below
Net Cost of this Proposal =	19.0% ROI, simple payback = 5.25 years	

Part III- Supporting Information

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

HPS Lamp to LED Upgrade

Our sustainability initiative proposes to replace high-pressure sodium lights (HPS) with more energy efficient LEDs within the Cassell Coliseum parking lot and sidewalks along Washington Street and Beamer Way. Our proposal has designated thirty cobra head fixtures and twenty-five Hokie lights to be replaced. Cobra head fixtures using 250 watt HPS lamps will be replaced with Leotek fixtures using 105 watt LED lighting. Hokie lights using 100 watt HPS lamps will be replaced with 50 watt LED lighting.

HPS lights require greater energy inputs, have lower energy conversion efficiency, and produce a smaller luminosity radius than LEDs. The Department of Energy suggests a nationwide switch to LEDs may have a large impact on the United States' effort to save energy, and endorses LED lighting for its longevity, durability, and reduced heat emissions.¹ By upgrading to LED lighting, Virginia Tech Electric Service (VTES) can achieve higher light quality at approximately half the wattage.

(1). LED Lighting | Department of Energy. Retrieved October 27, 2018, from <https://www.energy.gov/energysaver/save-electricity-and-fuel/lighting-choices-save-you-money/led-lighting>

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

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

Through conversion to LED lighting, Virginia Tech continues its commitment to sustainable energy and technology.

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

Virginia Tech can reduce its carbon footprint by approximately 248,240 kilograms by changing fifty-five HPS lamp fixtures to LEDs.¹

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

Virginia Tech can reduce its electricity consumption by 32,680 kWh per year; the wattage requirement for fifty-five fixtures will be halved, with an added benefit of providing better light quality.

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

This is a direct lighting improvement with significant and measured efficiency and cost benefits. Virginia Tech will reduce its annual cost and energy consumption by \$3,169.96 and 32,680 kWh, respectively.

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 \$3,169.96 annual cost savings from the reduced electricity use of LEDs is able to be re-invested in sustainability programs, increasing our ability to fund future sustainability initiatives.

- (1) Gresco Carbon Footprint Calculator. Retrieved October 28, 2018, from http://grescopacific.com/grescoiti/carbon_calculator.html

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

After contacting Mr. Dellinger, we were given materials and labor cost estimates for replacing both the cobra head light fixtures and Hokie light replacement bulbs. We calculate the net cost estimate as follows:

Materials Needed	Cumulative Costs	Number Needed	Total Cost
Leotek Cobrahead Fixtures	\$405 per fixture \$50 installation costs	30	(\$455×30 units) = \$13,650
Hokie Light LED Replacement	\$120 installation	25	(\$120×25 units) = \$3,000
			Total Cost: \$16,650.00

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.

Currently, thirty cobra head fixtures require 9 kWh, and twenty-five Hokie lights require 3 kWh. Adding together these requirements and multiplying them by the average hours of operation per year (~4,300 hrs) totals to 51,600 kWh expenditure by these fifty-five lights every year. LED conversions for cobra head and Hokie lights require 3.15 kWh and 1.25 kWh, respectively. Again, adding these totals and multiplying by the average hours of operation per year totals usage of only 18,920 kWh per year--a reduction in energy usage by 32,680 kWh per year. Campus users pay about \$0.097 per kWh; this rate is used to estimate the savings cost for the university. No longer having to purchase 32,680 kWh, Virginia Tech will save \$3169.96 per year. These savings will pay for the cost of conversion in 5.25 years.

A breakdown of the equations used to estimate the energy savings afforded by our initiative are provided below:

Current Energy Use (Ballast Input Levels)

Cobrahead Fixtures		Hokie Light Fixtures	
<i>Cobrahead Fixtures</i>	$= 300 \text{ Watts/Fixture}$ $= (300 \text{ Watts}) \times 30 \text{ Fixtures}$ $= 9,000 \text{ Watts} \times \frac{1KW}{1000W}$ $= \mathbf{9 \text{ Kilowatts Total}}$	<i>Hokie Light Fixtures</i>	$= 120 \text{ Watts/Fixture}$ $= (120 \text{ Watts}) \times 25 \text{ Fixtures}$ $= 3,000 \text{ Watts} \times \frac{1KW}{1000W}$ $= \mathbf{3 \text{ Kilowatts Total}}$
At approximately 4300 hours of operation per year: $(4300 \text{ hours/year}) \times (9KW + 12KW) = \mathbf{51600 \text{ kWh/Year}}$			

New Energy Use (Ballast Input Levels)

Cobrahead Fixtures		Hokie Light Fixtures	
<i>Cobrahead Leotek Fixtures</i>	$= 105 \text{ Watts/Fixture}$ $= (105 \text{ Watts}) \times 30 \text{ Fixtures}$ $= 3150 \text{ Watts} \times \frac{1KW}{1000W}$ $= \mathbf{3.15 \text{ Kilowatts Total}}$	<i>Hokie Light LED Fixtures</i>	$= 50 \text{ Watts/Fixture}$ $= (50 \text{ Watts}) \times 25 \text{ Fixtures}$ $= 1250 \text{ Watts} \times \frac{1KW}{1000W}$ $= \mathbf{1.25 \text{ Kilowatts Total}}$
At approximately 4300 hours of operation per year: $(4300 \text{ hours/year}) \times (3.15KW + 1.25KW) = \mathbf{18920 \text{ kWh/Year}}$			

Energy Difference:

$$\text{Old Energy Demand} - \text{New Energy Demand} = \text{Energy Savings}$$

$$51600 \text{ kWh/Year} - 18920 \text{ kWh/Year} = \mathbf{32,680 \text{ kWh/Year}}$$

Net Price Difference:

$$32,680 \text{ kWh/Year} \times \$0.097 \text{ per kWh} = \mathbf{\$3,169.96 \text{ Savings/Year}}$$

Break Even Point:

The cost of the project is \$16,650.00 and with average savings of \$3,169.96 a year, Virginia Tech would begin seeing profits in little over 5 years.

$$\text{Break Even Point:}$$

$$\frac{\$16650}{\$3169.96} = 5.25 \text{ years}$$

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

One-time **X**

Ongoing

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

VTES can fund \$15,000-\$20,000

**STUDENT ORGANIZATION SUSTAINABILITY INITIATIVE PROPOSAL FORM
(Continued)**

Part IV- Requestors/Reviewers

Joe Girgente, Ryan Moore, Hannah Sylvester, Tania Kazi

Prepared By (Name of Student Organization)

Date 10/28/18

Robert Glenn, VTES Director

Date 10/28/18

Reviewed By (Name of Appropriate University Official)

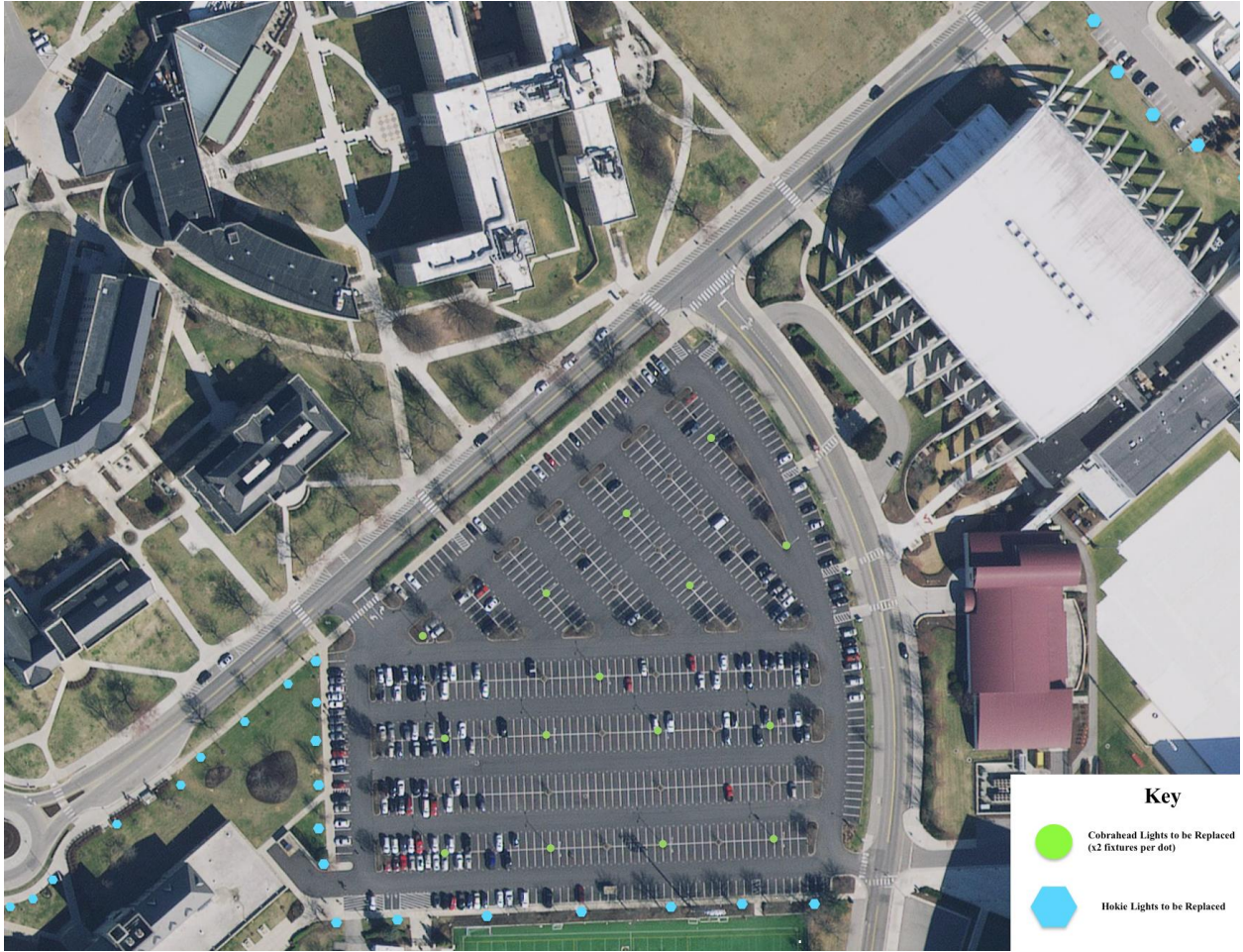
Reviewed By (Name of Office of Energy and Sustainability Representative)

Date

**STUDENT ORGANIZATION SUSTAINABILITY INITIATIVE FUNDING PROPOSAL
CONTACT LIST**

In the preparation of your Green RFP form, we encourage student organizations to seek input and guidance from the following list of university employees. These individuals are familiar with the form and the process. They can address the feasibility of your proposal, can provide a technical review, and can evaluate the cost & potential savings.

Area of Expertise	Name	Title	Email Address
Energy Management	Ruben Avagyan	Campus Energy Manager	rubena@vt.edu
Facilities: Housing & Residence Life	Todd Pignataro	Associate Director of Facilities	ptodd@vt.edu
Facilities: Buildings & Grounds Water Bottle Refill Stations	Jim McDaniel	Project Coordinator	jmcdani@vt.edu
Exterior Lighting	Bob Dellinger	Assoc. Director, Utilities	rdelling@vt.edu
Student Engagement & Campus Life	Eric Margiotta	Association Director	margiotta@vt.edu
Dining Services	Anthony Purcell	Assistant Director	purcella@vt.edu
Alternative Transport (Bike, Bus, Walk, etc.)	Jeri Baker	Director, Parking & Transportation	jab518@vt.edu
Landscape Architect	Bob Massengale	Site Planner	rnmassen@vt.edu
Hahn Horticulture Garden	Scott Douglas	Director/Instructor	dsd1@vt.edu
Recycling	Denny Cochrane	Sustainability Program Manager	denniscc@vt.edu
Miscellaneous	Karlee Siepierski	Campus Sustainability Planner	Skarlee3@vt.edu



Key

● Cobrahead Lights to be Replaced
(x2 fixtures per dot)

⬡ Hokie Lights to be Replaced