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# Campus Sustainability Project

Something that I have noticed on Hanover College's campus is the bright lampposts that are left turned on all night. Even when it is 3 a.m. and the roads and sidewalks are clear, the lights still burn bright regardless. This is essentially electricity that is burning all night even when it is not needed, which results in a waste of electricity and money. Since this problem is relating to electricity usage and financial spending from energy usage, it would fit into the economy portion of the sustainability model. Hanover is practically paying for electricity that provides zero utility for hours every night. This is a financial drain since you are throwing away money and getting no return. This problem can also fall into the environment section of the sustainability model. Having these lampposts constantly burning at 100% capacity every night causes light pollution into the environment. Hanover is historically known for being a beautiful campus located on the Ohio River and is surrounded by fields and woods, which results in the campus supporting local ecosystems. One effect from light pollution is the disruption of the natural light cycles that plants and trees utilize for growth and reproductive behaviors. Another effect from light pollution is the increased brightness during the night that interferes with nocturnal animals' nighttime navigation and habits. Another effect is the impact light pollution has on bird behavior, which is relevant because of the wide variety of birds that can be found on campus. The lighting from these lampposts can interfere with the "Reproductive behaviors of certain birds that typically rely on

natural light cues for their mating habits." (1). These are all reasons that support Hanover's current method of using lampposts as outdoor lighting throughout the night as being an unsustainable way of going about things. These older lights, approximately 300, all require lots of wattage to be powered constantly throughout the night, which requires the burning of fossil fuels to produce the energy necessary to power these lampposts. Coal accounts for about "42% of Indiana's net electricity generation." (2). Which means fossil fuels are actively being burned in order to generate energy for electricity in Indiana, which includes Hanover. When the college is spending money on an inefficient lighting system and replacing dead bulbs, it takes away from the college's long-term financial health.

The overall cost associated with the current practice of having the lampposts turned on all night isn't able to be estimated in a meaningful or accurate way due to most of the lampposts being tied into nearby buildings, therefore the electricity usage isn't tracked or billed separately for just the lampposts. There are approximately 300 light fixtures spread out across campus, a traditional campus lamppost uses 150-watt bulbs. These bulbs burn at 100% power every night for roughly 11 hours. This results in the lights burning for roughly 4,015 hours a year. Combined with being a 150-watt lightbulb, it would require around 602 kWh to power one lamppost for a year. 1 kWh is roughly $0.12, which would result in the cost for powering 1 lamppost for a year to be around $72. To power all 300 lampposts for the year, it would be around $21,600.

My proposed solution to this problem is to update these old lampposts with newer light fixtures that have improved detection technology and more efficient downlighting. This is improved

detection technology and more efficient downlighting would allow for the lampposts to operate at 100% power only when necessary. Lampposts would be able to sit at a lower power percentage when there is nobody around, allowing for energy savings. The detection technology would allow the lampposts to ramp up the power usage to get brighter when people or traffic is detected in the area and then return to the low power mode once the area is cleared again. “The adoption of photodetectors, presence and motion sensors, which detect and regulate the luminous flux of the environment and the people present, then lowers consumption by 20 to 40 per cent.” (3). By cutting down the time the lampposts are burning at max power, you are cutting down the energy usage, which in result lowers the financial cost to operate the lampposts. Not only does this solution provide benefits for the economy, but it also benefits the environment by reducing light pollution. “Unlike conventional bulbs that emit light in all directions, LEDs are inherently directional. This means that light is emitted where it’s needed, minimizing wasted light that scatters upwards or sideways.” (4). This means that the light from the lampposts is being focused on the pathways and streets where it is needed, rather than causing sky-glow, which reduces the negative effects that the current lighting fixtures have on the local ecosystem. Along with this environmental benefit is the reduction of carbon footprints. “The significantly longer lifespan of LEDs drastically reduces the energy and carbon footprint associated with manufacturing and transportation of replacement lamps.” (4). By having a longer lifespan, LEDs aren’t required to be changed out as often as traditional bulbs, which means you aren’t having to worry about the manufacturing, shipping, and use of maintenance trucks to constantly swap out dead bulbs. This also means that Hanover is spending less money on replacement bulbs and labor costs to have these lamppost lights replaced. This would be roughly a $50,000 investment as estimated by Willie Liter, the Director of Operations at the power plant on campus. The cost for this

investment includes the costs for updating the light fixtures to include the improved benefits, the labor costs to install these updates, and any other costs associated with the transition to updated lighting fixtures with improved detection technology and more efficient downlighting. This investment would allow for roughly 10-12 light fixtures to be replaced each year. This solution would be more of a long-term solution aimed at improving the future sustainability of the campus.

In conclusion, making the investment to replace the outdoor lighting fixtures on campus would prove beneficial for both the economy and environment by providing energy savings, financial savings, reduced light pollution, and a reduced carbon/energy footprint. Making this upgrade will disrupt the current inefficient, fossil fuel energy loop, and protect local ecosystems. This solution is a financially responsive investment that is a long-term commitment to the environmental and economic well-being of the campus.

Works Cited:


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