

Grant Proposal--Bucknell University Green Fund

Retrofitting Shower Head Fixtures in Trax Dormitory

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Project Title

Retrofitting Shower Head Fixtures in Trax Dormitory

Applicant(s)

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Project Leader(s)

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Project Description

This project includes replacing the 32 shower heads in Trax Dormitory with low flow fixtures. These low flow fixtures will help minimize the flow of each shower head from the current 2-3 gallons per minute to 1.5 GPM. The initiative will save thousands of gallons of water per year along with energy costs associated with heating and cooling current levels of water used. This will also be an economically prudent initiative by saving the school thousands of dollars in water/sewage costs and generating a ROI of less than a year.

This is a continuation of the low flow renovations in Carey House but with slight variation. After communicating with Steve Durfee and researching case studies at Colgate and Duke University it appeared that shower heads were the main culprit when it came to water consumption in dorms. To see if this is in fact the case we will start this implementation in Trax dormitory allowing Kress, an identical dorm, to serve as a controlled variable. Not only will this give us a gauge for whether implementation of low flow fixtures should include all fixtures or simply shower heads, but will also allow the University to experiment with the project in a dorm environment.

There will be significant sustainability benefits generated from this project. It will conserve resources and be financially savvy through its conservation of water and the associated costs. The scrap metal and other materials will be recycled in order to ensure that proper supply chain measures are carried out. On top of all of this, there will also be educational pamphlets that hang from the shower curtains to educate the students of the changes in the dorm and hopefully ignite more responsible water consumption in these students lives.

Project Origin

Overall Desire to Ignite Sustainable Change on Campus:

Bucknell claims to “Elevate Sustainability as a Guiding and Unifying Principle throughout University Decision-making” in the report to advance the University’s sustainability leadership (Second Nature). Bucknell contains an office for Sustainability, a goal for Advancing Comprehensive Sustainability Leadership, and a Managing for Sustainability Major, clearly encapsulating its acute desire to “do well by doing good.” Students and faculty alike have an opportunity to participate in advancing the actualization of the sustainable utopia and to take immediate actions towards instigating this strategy. As a Managing for Sustainability major I have been exposed to material preaching and describing the process of cultivating an entirely sustainable organization. Initial stages in this endeavor always include

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addressing low hanging fruit. Low flow shower heads epitomize this opportunity and can spark even greater change in the future if education is tied into the process. This project emerged from the consideration of through sustainable change within the organizational setting.

Inspiration for specific project:

The Managing for Sustainability II course challenges students to implement a sustainable feature on campus. Though the campus beholds a myriad of opportunities in this realm, statistics of our staggering water consumption resonated with me and sparked a desire for change. After meeting with Steve Durfee numerous times I was fortunate to have acquired Josh Berliner's research regarding existing water fixtures on campus. After understanding what Berliner did on campus and seeing how the process was enacted in Carey House, I decided to take the next step in his original goal of retrofitting all water fixtures on campus. Currently, Trax is the second least efficient dorm (behind Larison) in water consumption. While this is the case, Kress could be used as a controlled variable in an experiment for these shower heads and would easily allow for quantifiable results in this dorm setting. Due to this circumstance it made sense that this was the next building altered.

I have been working closely with the facilities team whom believe the project is not only feasible, but necessary for the campus. I pursued this application due to its correlation with the Green Fund's goals. This grant will help a student support a sustainability initiative and engage members of our community in the reduction of the University's environmental footprint.

Project Endorsement

This project is endorsed by the Facilities Department and Managing for Sustainability Department. The team includes Steve Durfee, Greg Koontz, Merritt Pedrick, and Eric Martin. Eric Martin has helped facilitate the educational process in MSUS 301. Steve has been fully supportive and has planned out many of the specifics including the model that will be replacing the current fixtures. He has also helped provide me with the cost and savings analysis. Greg will help plan out how the project is actually enacted after funding, and Merritt will assist in the pickup and recycling of the old fixtures.

Projected Project Cost and Savings/Reinvestment Plan

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Current Cost of Water	\$24477.04	\$24477.04	\$24477.04	\$24477.04	\$24477.04	\$24477.04	\$24477.04
Savings (per year) from Low Flow Showerheads	\$3113.62	\$3113.62	\$3113.62	\$3113.62	\$3113.62	\$3113.62	\$3113.62
Cost of water after implemented	\$21,363.42	\$21,363.42	\$21,363.42	\$21,363.42	\$21,363.42	\$21,363.42	\$21,363.42

Commented [SPD1]: \$3,509 is actual savings

Estimated Total Installed Cost (\$): ____\$1,216__ (To replace all showerheads that do not meet low flow standards at \$38 dollars apiece (total installed cost) would cost \$1,216. (Steve Durfee))

Estimated Annual Savings (\$): ____\$3113.62____

Simple Payback (Years): ____0.4 years____

Net Savings after 7 Years: **\$20,552** (\$3114x 6.6 years)

Prevalence of Sustainability

Intended Impact

(*Sustainable Practices*)

Outputs

- 31324.16 gallons of water saved per month when compared to current showerhead
- Return on investment generated in 0.4 years
- Reduced water use will be reducing the energy required to heat & cool water
- Lessening the strain on the Susquehanna Watershed

Outcomes

- Will be able to “Elevate Sustainability as a Guiding and Unifying Principle throughout University Decision-making”-- a motive in the report to advance the University’s sustainability leadership.(Second Nature)
- Money generated as a result of the low flow will circulate back into the Green Fund
- Used as experiment to test the effectiveness of water fixtures-- can involve classes and professors in analyzing and interpreting the data received to incorporate education into the process
- Compete with similar schools in the continued implementation of low flow, sustainable features-- These shower heads are prevalent at other highly respected schools such as Duke, Colgate, Notre Dame, and the Claremont Colleges through actions of their Sustainability Offices

(*Promotional Opportunities*)

- Depiction of the hands on nature of the Managing for Sustainability Major on and off campus.
- Example of how Bucknell continually searches to enact more sustainable practices campus wide
- Educational signs in these showers will serve as a visual representation of sustainable practices for those that go in and out of the dorm's bathrooms
- Promotion as a case study for showerheads and their effect on water consumption

Theory of Change

- The effects of this project will not only be the sustainable changes above. The goal of this project is to gauge whether water from showering is the main culprit for water consumption. The results from Trax will be compared with the results from the Carey House project which included the total overhaul of all water fixtures. It is predicted by Steve Durfee that showering utilizes the most water in the dorm setting, so this pilot project will help the Facilities Department whether to continue retrofitting each building with low flow fixtures, or to primarily invest in low flow shower heads in all dorms and then build from there.
- This will continue to promote cross collaboration between professors, students, and other faculty and will create an environment that enhances this type of learning on campus.
- By incorporating an educational sign that accompanies these showerheads it will allow these students to understand or consider their water consumption patterns and yield more environmentally conscious individuals. Through changing the mindset along with the fixtures themselves students will create even greater change. They will contribute to the water savings through the actual utilization of the low flow showers, and through the knowledge and practices they derive as a result of their educational exposure (educational benefit in hanging pamphlets as mentioned above).

Implementation Plan

Processes

Pilot Program

- Start replacement in Trax (across from Kress) in Fall 2016. The buildings are identical so one building can remain a controlled variable. This will make measurements easy for Steve Durfee. The low flow fixtures will be placed in the dorm in late July/ early August but the study will begin upon the student's arrival.
 - Project Endorsement—endorsed by the Facilities Department. Steve Durfee is fully on board with the project and will help with monitoring the water and cost savings over time. Michael Patterson will oversee the general logistics. Greg Koontz will help create the exact plan for how the showerheads will be applied, and Merritt Pedrick will be handling (recycling) of the scrap materials after the project is complete. All members have worked on a similar project with Berliner in the past and know how to effectively approach this type of application.
 - The scrap metal from the structures will be recycled at Staiman recycling and will be compensated for \$0.07 per pound of metal.
 - Unrecyclable material will be taken to the Lycoming Landfill
 - Replace current showerheads with Moen 6313 Chrome 1.5 GPM Shower Heads. Durfee has confirmed the reliability of this brand. It is also the same model that Colgate used to generate their extreme water reduction.
 - Moen Showerheads Unit Cost: \$38.00
 - Educational Benefit- through the CAP center I will be placing 32 hanging pamphlets along the shower curtain. This will cost \$32 in total and will highlight the unsustainable water usage on campus and how the showerheads are helping to mitigate this waste.
 - I will be creating these posters (See below) in August after receiving confirmation of the switch to the low flow fixtures from Steve Durfee.
 - **On the poster:**
 - The average college student uses about 75 gallons of water per day when 15 gallons can sufficiently satisfy any Americans typical daily needs (including proper hygiene)
 - We waste 30 gallons of water by taking a 10 min shower with most shower fixtures on campus
 - Individuals require 13 gallons of water a day to survive
 - Water scarcity had been predicted to be the cause of the next great war (Water: The Epic Struggle for Wealth Power and Civilization)
 - 1 in 10 people lack access to clean, safe water (water facts)
 - Compared to today, five times as much land is likely to be under “extreme drought” by 2050.
 - WAYS TO SAVE:** turn off the sink while brushing your teeth, completely turn off shower/sink after use, try cutting your shower time by at least one minute!
- This combined with the low flow fixtures can save up to 20 gallons per day

Analyze

- Steve will review the water and cost savings after 5 months. We will compare these results to the same month in Kress, which is an identical dorm. If results are negative, showing that Trax is using the same amount of (or more) water than Kress, or we receive negative results from the survey proving that students did not notice/learn anything, the project will be terminated. If positive, Trax can be the first of many buildings to include the low flow water fixtures.

Expand

- Low flow shower fixtures added to all dorms on campus after analyzing. The process will remain the same if above of effective.