*Please submit this completed application, the supplemental budget spreadsheet, and any relevant supporting documentation by the deadline indicated in your Step 1 notification letter to* *Sustainability-Committee@Illinois.edu**.The Working Group Chairs will be in contact with you regarding any questions about the application. If you have any questions about the application process, please contact the SSC at* *Sustainability-Committee@Illinois.edu**.*

# General Information

**Project Name:** Reducing bathroom water consumption in the UGL: replacing high flow units with low flow units

**Total Amount Requested from SSC:** $5,714.64

**Project Topic Area(s):** [ ] **Energy** [ ] Education [ ] Food & Waste

 [ ] Land [ ] **Water** [ ] Transportation

# Contact Information

### Project Lead

Applicant Name: Johnny Uelmen

Unit/Department: Pathobiology

Email Address: uelmen@illinois.edu

Phone Number: 920-979-9888

### Financial Contact *(Must be Full-time University of Illinois Staff Member)*

Contact Name: Lesli Lundquist

Unit/Department: Facilities Manager for the University Library

Email Address: lapettit@illinois.edu

Phone Number: 217-333-2290

Organization Code: apologies, I do not have this information

### Facilities Management Contact *(If Applicable)*

Contact Name: Jeff Schrader

Email Address: jschrade@illinois.edu

**Primary Project Team**

|  |  |  |
| --- | --- | --- |
| **Name** | **Department** | **Email** |
| Johnny Uelmen | Pathobiology | uelmen@illinois.edu |
| Lesli Lundquist | Facilities Manager, University Library | lapettit@illinois.edu |
| Name | Department/Organization | Email Address |
| Name | Department/Organization | Email Address |

# Project Description

**Please provide a brief background of the project, the goals, and the desired outcomes:**

This proposal continues from the momentum I’ve built as motivation from a very recently- funded sustainability proposal I submitted at the University of Wisconsin-Madison last semester. I study climate change and infectious disease as it pertains to not only humans, but also animals and the environment. I’ve always wanted to “practice what I preach” and find ways to easily reduce our carbon footprint. Last year, while working in my office, it dawned on me that the old building I was in so often (and ironically home to the center for the Office of Sustainability and the Global Environment) had only one very inefficient and outdated bathroom on the main floor. Every time I used this restroom, I became bothered by how much energy and water I was consuming …and I was only one of many men who frequented this restroom daily. It was then that I knew I had to try to make a change.

After calculating some estimations based on my usage alone in that one dilapidated men’s’ restroom, I became excited to see just how much energy and water my university could save if spread across multiple, busier bathroom facilities. To make a long story short, my idea (and promising calculations) caught on with the University of Wisconsin Housing Department and the Office of Sustainability’s newly established Green Fund. The idea was simple: find outdated, high-flow toilet units and convert them into low-flow, highly efficient units. Luckily, the implementation was also simple: retrofitting the valve stems is all that needed to be done, despite have existing toilets 30+ years of age.

I recently transferred to UIUC this semester and wanted to continue my trajectory for making my campus a more sustainable place. After meeting with F&S, ISEE, and SSC representatives, my idea is absolutely feasible for implementation at UIUC. Designed as a pilot project (in anticipation this will be successful and transformed into a larger project next application cycle), the main goal is to reduce wastewater consumption at the undergraduate library restroom facilities. What is unique about this project is that it is designed to be relatively simple and practical, providing a means that is projected to save thousands of dollars each year without altering the daily study use as they conduct their business. I aim to replace all toilet fixtures in both the men’s and women’s restrooms (Rooms 259 and 246, respectively, n=12), as well as the urinal flush valves (n=4). Based on my prior work at UW-Madison, the quote from the campus plumbing department provided that an hour of labor should be more than enough time to remove an old unit and install a new unit.

The data from recording the foot traffic of men and women entering the restrooms in the undergraduate library (two 15-minute intervals on different days and times of day, see attached bathroom use document) formed the basis of my estimations for baseline use and potential savings after intervention. The desired outcomes are promising: this project is estimated to save the undergraduate library $6,511.92 in utility costs, reduce 4.28 million gallons of water, and cut down on CO2-equivalent greenhouse gases by 393,489 pounds annually (Figure 1). The toilet units are expected to pay themselves off after 0.69 years and the urinal units are expected to pay themselves off in 2.6 years.

**How will the project improve the sustainability of the Illinois campus and how will the project go above and beyond campus standards?**

I am delighted to understand that ISEE and the SSC have made incredible advances in making the campus more sustainable. However, there is a lot of work yet to be done. While any effort towards improving our carbon footprint is fantastic, this project is estimate to make relatively drastic improvements in energy savings and reductions in costs and GHG emissions – all for a low-cost intervention. The pilot study alone will be impressive, but the main prize is pending success for a future campus-wide implementation. If (and hopefully when) this occurs, the campus will be a leader among our nation’s flagship universities in wastewater management and sustainability.

**Where will the project be located? Will special permissions be required to enact the project on this site? If so, please explain and submit any relevant letters of support with the application.**

The project is targeted for implementation in the men’s and women’s restrooms (rooms 259 and 246, respectively) on the 2nd floor of the undergraduate library. I have the support from Jeff Schrader (Assistant Dean of Libraries for Facilities), Lesli Lundquist (Facilities Manager, University Library), Thaddeus Bales and Morgan White (Facilities & Services).

I also checked with the Capital Projects and Campus Master Plan contacts and they confirm that the UGL is not in any immediate conflict of interest or immediate plans for upgrades to the restrooms. Brad Klein (Deferred Maintenance Program) has subsequently approved of this proposal and any funded interventions that are implemented.

**Other than the project team, who will have a stake in the project? Please list other individuals, groups, or departments affiliated directly or indirectly by the project. This includes any entity providing funding (immediate, future, ongoing, matching, in-kind, etc.) and any entities that will be benefitting from this project. Please attach letters of commitment or support at the end of the application.**

No other parties have affiliation with this project.

**Please indicate how this project will involve or impact students. What role will students play in the project?**

The most immediate involvement will be from the end result of the project itself – using highly efficient and hygienic toilet units in a student-oriented, focused, and highly used undergraduate building. I myself am a new transfer student to the UIUC and anticipate being the lead on overseeing the design, calculations, and implementation of this project.

With the high volume of students (estimate from Craig Grant, Campus Code Compliance, is ~30,000 patrons a week) that visit the library, these restrooms experience frequent use. As a pilot study, I will create and distribute education materials throughout the library and restrooms, providing students with the basis of understanding how simple changes can make drastic environmental impacts. Placing this project at the UGL, we hope that students will become more cognizant and self-aware of their carbon footprint, simply from using the restrooms.

Pending the success of this pilot study, I anticipate to recruit a small team of inspired and passionate undergraduate students to serve as ambassadors for the larger project. Collectively, we will promote sustainable practices in other, less-traditional means (like simply changing water units in the bathrooms). We will also select the next appropriate building for a large-scale intervention (anticipated proposal submission to SSC: Spring 2019).

# Financial Information

*In addition to the below questions, please submit the supplemental budget spreadsheet available on the Student Sustainability Committee website. Submission of both documents by the submission deadline is required for consideration of your project.*

**Have you applied for funding from SSC before? If so, for what project?**

No I have not applied for funding from SSC in the past.

**If this project is implemented, will there be any ongoing funding required? What is the strategy for supporting the project in order to cover replacement, operation, or renewal costs?

Please note that SSC provides funding on a case by case basis annually and should not be considered as an ongoing source of funding.**

This project is intended to be a pilot study for a larger project (e.g. an appropriate university building, requiring all fixtures to be replaced). As such, this study is designed to be for the replacement of the fixtures in two medium-sized, but strategically important bathrooms in the undergraduate library. There are no ongoing requirements for funding as a result of this proposal. However, it should be noted that regularly scheduled maintenance, cleaning, etc. will still continue as they normally would in any bathroom on campus.

**Please include any other sources of funding that have been obtained or applied for. Please attach any relevant letters of support as needed in a separate document.**

No other sources of funding have been sought after.

Support has been provided from Thaddeus Bales (Facilities & Services) and Jeffrey Schrader (Assistant Dean of Libraries for Facilities). I do not have a formal letter of support, but I have Mr. Schrader’s e-mail correspondence providing support (in attached document labeled “supporting documents”).

# Environmental, Economic, and Awareness Impacts

*In addition to the below questions, please indicate specific measurable impacts as applicable on the supplemental budget spreadsheet.*

**Which aspects of sustainability does your project address, and how? Does the project fit within any of the iCAP goals? If so, how does the project go beyond the university status quo standards and policies.**

This project addresses both water and energy conservation. This project fits within the following iCAP goals and objectives:

**Energy Conservation and Building Standards** to reduce EUI by 33% by 2020:

1. Maintain or reduce the campus gross square footage relative to the FY10 baseline.

4.Engage and incentivize the campus community in energy conservation including a comprehensive energy conservation campaign, with at least 50% of units participating in FY20

**Water and Stormwater** to reduce water consumption by 30% by FY20:

15. Obtain and publicize more specific water use data by FY16, including water quantity and quality data where available (specifically for total water use and per capita).

17. Perform a water audit to establish water conservation targets and determine upper limits for water demand by end-use (specifically restrooms) for incorporation in facilities standards by FY16.

Additionally, this project aims to reduce GHG emissions from reducing overall water and energy consumption from a simple intervention. Furthermore, this will provide significant economic and environmental savings for the undergraduate library. I am optimistic that the undergraduate library facilities managers will recycle these saved funds for continued improvements as scheduled for the building.

The ultimate goal is to provide a highly successful and practical solution to meet multiple iCAP goals for the university, one building at a time. By focusing on restrooms, we can implement savings without changing daily routines or practices.

**How will the environmental impacts of your project be measured in the near and long term? What specific monitoring and evaluation processes will you be using to track outcomes and progress?**

The environmental impacts of this project will be measured two ways: 1. Overall water consumption and 2. Overall energy consumption for the building. Near and long-term progress will be monitored by annual building energy reports. In theory, the difference in water use after 1 year would be attributed to the intervention, or implementation of the newly installed low-flow toilets and urinals. There are key assumptions in these calculations:

* There will be a similar volume of students visiting and using the restrooms year to year in the UGL
* There will be no other major interventions to water consumption for the building

I realize that nearly all university buildings are targeted for major renovations, many of which include water and energy systems. For the purposes of this study, I did not include water meters as a method for recording water consumption. The installation of a water meter for the cold main water feed is a major undertaking and will incur substantial costs. However, this is something that can be considered for future, larger-scale studies.

**What is the plan for publicizing the project on campus? In addition to SSC, where will information about this project be reported?**

The main targeted location for publicizing the project on campus will be primarily within the UGL itself. However, I plan to also target buildings frequented by undergraduate students, particularly that of the Union and dormitories.

**What are your specific, measurable outreach goals? How will these be measured?**

My specific outreach goals are to increase the awareness of energy waste and the daily consumptions of every student on campus. Ultimately, I hope that most students will learn that this project is an overwhelmingly positive change that they can be proud of.

I plan to measure their awareness by interviewing students at random in the UGL in the weeks shortly after the wastewater units are replaced.

**Do you have any additional comments or relevant information to aid in evaluation of this application?**

I stated this earlier, but wanted to reiterate that I am very excited to have the opportunity to submit a proposal like this. To have the chance to improve our campus and environment at the same time means a lot to me. I absolutely love my graduate studies and cannot wait to start a career in infectious disease epidemiology, but I can’t help to state that I have found something I am equally passionate about – sustainable practices (albeit in bathrooms!).

|  |
| --- |
| Comparison of Annual Water Consumption |
|   | Toilets in UGL | Urinals in UGL |
| *Existing Units (3.5gpf)* | *New Units (1.6/1.1 gpf)* | *Existing Units (1.0 gpf)* | *New Units (0.5 gpf)* |
|
|
|
| *Water Consumption* | 6,581,224.07 gallons | 2,538,420.22 | 480,760.31 gallons | 240,380.16 gallons |
| reduce consumption by 4,042,803.85 gals (61.4%) | reduce consumption by 240,380.16 gals (50%) |
| *Water Utility Costs* | $10,005.74 | $3,859.28 | $730.92 | $365.46 |
| save $6,146.46 in utility costs | save $365.46 in utility costs |
| *C02-equivalent Greenhouse Gas Emissions* | 53,116.48 lbs CO2-equivalent greenhouse gases | 20,487.37 lbs. CO2-equivalent greenhouse gases | 3,880.17 lbs. CO2-equivalent greenhouse gases | 1,940.09 lbs. CO2-equivalent greenhouse gases |
| reduce greenhouse gas emissions by 391,549.37 lbs. | reduce greenhouse gas emissions by 1,940.09 lbs. |
| *Buyback Period* | N/A | 0.69 years | N/A | 2.64 years |

 Figure 1. Summary of project before and after intervention consumption and savings.