

LEVERAGING STUDENT RESEARCH TO REDUCE WATER

FOCUS ON EFFICIENCY

A student research project in partnership with the Sacramento State sustainability team earns a \$595,000 grant to help reduce campus water consumption. Implementation of the project resulted in a water-use reduction of 1.2 million gallons.

Over the last few years, Sacramento State has researched methods to reduce campus domestic potable water usage. One proposed method was replacing manual faucets throughout campus with automatic infrared (IR) fixtures; however, a lack of non-biased research and a skeptical plumbing department led the campus sustainability team to work with a university student on its own study of infrared faucets. Results of this student research project led to a \$595,000 grant for campuswide faucet replacements and an estimated domestic water reduction of 1.2 million gallons annually.

The sustainability team worked with biology student Alyssa Harmon and designed and implemented a three-phase research study measuring water usage before and after the installation of infrared faucets, also known as automatic or motion-activated faucets. The study began with the campus plumbers installing temporary water meters on faucets in both the men's and women's restrooms in a regularly used building.

Faucet usage data was gathered in gallons over a period of 42 days. Data was collected for both men's and women's restrooms, comparing manual and IR faucets, using both .5 and .35 gallon-per-minute (GPM) aerators. Findings showed that replacing campus manual faucets with IR faucets including a .35 GPM aerator could potentially cut domestic water usage associated with campus faucets in half.

Following the IR faucet study, the sustainability team used the data gathered to apply jointly with the CSU Chancellor's Office for a Department of Water Resources (DWR) Water-Energy Grant. In late 2016, DWR awarded Sacramento State \$595,000 to replace 537 faucets and a variety of other inefficient pieces of equipment campus wide.

MILESTONES

Spring
2018

- Installation of new infrared faucets begins.

Apr
2019

- Installation of new infrared faucets is complete.

QUANTIFICATION AND RESULTS

Following water meter installation, usage data was gathered for 14 days during the first phase of the study with manual-operation faucets and .5 GPM aerators. The results were 132 gallons of water used in the men's restroom and 240 gallons used in the women's restroom.

In the second phase of the study, manual faucets were replaced with IR faucets with .5 GPM aerators. Data was gathered for a period of 14 days, and the results were 84 gallons of water used in the men's restroom and 172 gallons in the women's.

In the third phase of the study, IR faucets remained installed, and the .5 aerators were replaced by .35 aerators. Data was gathered for a period of 14 days, and the results were 58 gallons of water used in the men's restroom and 111 gallons used in the women's.

This study showed a 32 percent reduction in water usage when comparing a manual faucet to an IR faucet, both with a .5 GPM aerator. When a .35 aerator was used in conjunction with an IR faucet, a 54 percent water reduction was achieved.

IMPACT AND BENEFITS

Water use is reduced on campus by an estimated 1.2 million gallons annually through the use of the replacement of 537 faucets and other pieces of equipment.

The project earned \$595,000 in grant funding for campuswide faucet and equipment replacements.

Including stakeholders from the beginning of the project was beneficial throughout.

Because the project was executed very smoothly, the steps taken will be used as a model for other sustainability-related projects.

PROJECT TEAM

Kristina Cullen
Energy & Sustainability Analyst

Alyssa Harmon
Biology Student

Michael Hendren
Plumber

Michael Kramer
Plumber

LESSONS LEARNED

The team learned that applying for and managing grant awards entails a great deal of attention and detail to implement and manage.



Sacramento State students Christian Watt, left, and Melissa Decastro check the usage on water meters and measure the clearance for new faucets.

FURTHER REFERENCES

To read the study, visit:

<https://www.csus.edu/experience/innovation-creativity/sustainability/internal/documents/ir-faucet.pdf>.