

HEIF Idea Proposal  
Spring 2017

**Proposal:** HYDRAO: Shower-Time Indicator

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**Abstract:** Replacing showerheads in campus dorms with HYDRAO, a smart shower head that aims to reduce water usage in a fun, interactive, and eco-friendly way. The showerhead has an integrated LED system that lights up with different colors based on the amount of water used. The colors are similar to a traffic light, ranging from green to red. The shower head also comes with an optional monitoring app. It allows the user to monitor their water consumption in real-time.

**Project Description:**

At the 2017 Consumer Electronics Show, a French company known as Smart & Blue unveiled a new affordable smart showerhead that is now available internationally. HYDRAO is a smart shower head that is extremely easy to install. HYDRAO lights up the water spray with different colors depending on the amount of water that is used. These colors change approximately every 2.5 gallons of water. From 0 to 3 gallons the light is green, from 3 to 5 gallons the light is blue, from 5 to 8 gallons the light is purple, from 8 to 10 gallons the light is red, and once the user surpasses 10 gallons, the red light begins to blink. Power and compatibility should not be an issue when installing these shower heads in the dorm bathrooms. HYDRAO has a water turbine inside it's head and is powered by the shower's natural water-flow, therefore no external power supply is needed.

**Need Statement:**

The mission of the Humboldt Energy Independence Fund (HEIF) is to reduce the environmental impact of energy use at HSU through student driven projects. By installing these smart shower heads in the dorm bathrooms, students will be able to visually see how much water they have used while showering. Many people are unaware of their time spent in the shower. Showering for a prolonged amount of time can lead to significant water and water heating costs. Therefore, being aware of how much time is spent in the shower may motivate the user to spend less time in there. This shower-time indicators is not meant to shut off water or make loud intrusive noises. They merely indicate when the user has surpassed the recommended showering time/water usage. HYDRAO would be an innovative and creative way to learn and teach students living on campus about water conservation. It would also cut the energy needed to heat and move that water. However, since HYDRAO is a conservation device, it would require significant student involvement and participation in order to see desired results.

**Outcome/Student Learning Opportunity:**

We were informed that the CSU system has a contract agreement with Shell for our energy usage on campus, which means the following assumptions are based on if we were contracted with PG&E. We were unable to see raw water usage data from the dorms, so we assumed all dorm residents within the Canyon Complex (~400 students) shower once a day, for 15 minutes, under a showerhead of 2 gallons per minute which comes to 12,000 gallons a day. We also assumed the initial temperature in our water heaters, which use natural gas, start at 60F and come out at 100F and the water heaters have an efficiency value of 0.60. With PG&E's current rate of \$1.14/Therm, currently this costs the university ~\$28,000 a year to heat water in Canyon, not including heating sink water. If we were to install a HYDRAO-like system and students stop showering at the first red light with the same assumptions as earlier, the new water heating bill for Canyon would be ~\$9,700. Showers would most likely use 4,200 gallons a year in Canyon which is a 65% difference from before. HYDRAO currently charges ~\$100 for one

new shower head, if this was bought for all of Canyon (72 total), it would cost ~\$7,200. There would be a payback of about 1.5 years before it pays itself off. A system that alerts students while showering on how much water they are using can be very educational and help break habits of taking long shower. In our opinion, this is revolutionizing to break long shower habits via a hands-on device that shows students their shower water usage.

It is worthy to note that UC Santa Barbara implemented a similar project with a similar device in their Santa Cruz dormitory building. They purchased 60 units at the price of \$75 per unit. They saw a reduction of 20% in their shower times, which amounted to an annual savings of \$4,500. In their trial run of the device, they considered the project to be a success.

As an alternative to purchasing HYDRAO shower heads or even as a learning opportunity, it would be possible to have HSU engineering students develop a similar device of their own. The HSU Environmental Resources Engineering Department can take this as a learning opportunity for their students.

### **Partners:**

Possible partners would be HYDRAO for they are the lead company/manufacturer for these systems and specification sheets would need looking at. Also, UC Santa Barbara Environmental Affairs Board may have strong data on how successful their implementation outcome was and any tips. Locally, collaboration between HEIF, Facilities Management/Dorm Maintenance, Green Campus, Housing & Residence Life, and HSU Environmental Resource Engineering Department would be beneficial.

### **Appendix:**

HYDRAO website

<https://www.hydrao.com/>

HYDRAO product video

<https://www.youtube.com/watch?v=dijY3WBWXIM>

HYDRAO product video #2

<https://www.youtube.com/watch?v=6Weee1inryk>

UC Santa Barbara Sustainability Collection

<http://www.sustainability.ucsb.edu/>

UC Santa Barbara Shower-Minder Project Results

[http://www.sustainability.ucsb.edu/TGIF/08-09/final/ShowerMinders\\_FinalReport.pdf](http://www.sustainability.ucsb.edu/TGIF/08-09/final/ShowerMinders_FinalReport.pdf)