

Going Low Flow at ASU

Cohort # 11

Introduction

Arizona State University is always working towards a better tomorrow through the use of innovation. Today's society is full of change and as humans we are always adapting. As college students we have a right to explore all the possibilities that are out there. We are the face of the future. We need to make sure that the environment we are currently in is healthy and sustainable. There are many things we can approve and change to be more environmentally friendly on campus, but water usage is one of the main issues we need to tackle right now. Water is an important element to survival and it is scarce in some parts of the world. We need to be more aware of how much water we are using and make sure we are not wasting it. If we run out of water, then life cannot go on. There is still a lot of water on Earth but this doesn't mean it'll be this way forever. Arizona is facing its twenty-sixth year of a long-term drought. We need to work together as a university to cut back on our water usage, so we can help end this drought and conserve water. Do you know how much water we use here at ASU? How does this affect yearly operating costs? How does this affect our surrounding communities? These are the questions we are going to answer and the problems we want to solve. Many other public and private institutions throughout the country have started to crack down on their environmental impact, so we propose ASU's first step to a cleaner, more environmentally friendly future is to make Tempe campus "Low Flow". This "Low Flow" campaign would involve the introduction of faucet aerators, low flow showers heads, and dual flush toilets. We believe that our plan will

not only be cost and time effective to install these items, but will show rapid results by cutting water usage in dorms up to 50% and putting money back into the stockholders pockets. This plan will also benefit the environment substantially. Arizona State University is a large school with four campuses in total. In 2020 Arizona State University roughly used 991,490,761 gallons of potable (safe to drink) water. The university used a total of 1,044,286,769 gallons of potable and non-potable water. Now keep in mind that in 2020 Covid hit midway through the academic year and campus was shut down for a little while. We are in 2021 and Covid is still here and the campus isn't fully active. Many students are still at home, so this means that we can conclude that these numbers are lower than "normal". These numbers also show that Arizona State University's water usage mostly consists of drinking water. Most of the drinking water on campus is used in the dining halls, classrooms, and on campus housing. We are choosing to focus on on-campus housing because there are multiple flaws in the water systems for the dormitories and other on-campus housing options. There really isn't much data provided by the university that gives precise numbers of dormitory water usage. Students also don't have much knowledge on how important water conservation is. We need to spread awareness so that students and faculty can fully understand the issue at hand. If someone is educated on an issue they are more prone to taking action and changing the way they do things. Students are also more than likely using way too much water. We can become oblivious to the idea of how much water we use on a day-to-day basis. By installing the faucet aerators, dual-flush toilets, and low-flow shower heads Arizona State will see significant changes in the numbers of water usage. We need to start small and work our way up the ladder. Even with this change many factors will help work towards fixing the issues of water usage and conservation. Taking action now will lead to drastic changes in the future and we need to work together as one.

The Issues and Problems

Although ASU currently does an above average job at maintaining sustainability at the university, they still happen to face many challenges, hurdles, and have many ways that they can improve the present situation. The reason that we know Arizona State is above average when it comes to sustainability is because of the fact that it received a score of 87.10, also known as a platinum overall rating, after being rated by STARS. STARS stands for: sustainability tracking, assessment and rating system, and as the name suggests, they rate institutions based on their practices regarding sustainability, as well as providing sustainability goals in the long and short term. Regardless of this high rating however, the campus still faces issues, for example: according to the World Resources Institute Aqueduct Water Risk Atlas, Arizona State's main campus has an "extremely high" physical risk quantity. What this means is that there is a much higher risk of dealing with issues such as: drought severity, flood occurrence, groundwater stress, baseline water stress, etc, than other areas.

In a single year (July, 2018 to June 30th, 2019) the total water withdrawal at ASU was 1,044,286,769 gallons. This number includes the withdrawal of both potable and non-potable water. Potable water is water used for sanitary purposes, including showers, toilets, cooking, etc. The amount of this portion that was specifically potable water, also known as tap or drinking water, was 991,490,761 Gallons. This shows that the vast majority of the water usage at ASU is made up of potable water. In order to aid in water conservation, ASU has started to implement low flow fixtures within multiple buildings on campus. Some examples of these fixtures would be low flow: toilets, faucets, showers, and in rare cases waterless urinals.

Another plan of action that Arizona State is taking in order to reduce water consumption is landscaping water conservation. At the moment, ASU's campus is the largest arboretum within the state of Arizona. The facilities management have implemented a multitude of measures in order to do their part in reducing water consumption on campus, specifically when regarding landscaping practices. For example, approximately $\frac{2}{3}$ of the campus is watered every single night in order to avoid water evaporation. There is a next step in the works as well, that being a fully automated system that knows exactly how much to water different plants. These differences may be based on how much water the different plants require, the recent weather conditions experienced on campus, and the plants evapotranspiration rate.

Now with all this said, even though ASU has already begun to carry out techniques and plans to conserve water, there is still more work to be done. For example if you look at the water conservation rates for the state of Arizona, you'll see that water's marginal price per ten thousand gallons is still significantly cheaper than other regions within the United States. While at first glance this may seem like it is a positive, in reality, conservation pricing is simply the notion that the amount of water consumed and/or used by an individual decreases as the price of water increases. To provide some context as well as some examples, the median water marginal price currently in Alabama is \$4.05 per thousand gallons above ten thousand gallons/month, and the median water marginal price in North Carolina is \$4.32 per thousand gallons above ten thousand gallons/month. This shows that, at the time being, utilities in the state of North Carolina are sending a slightly stronger price signal as utilities in the state of Alabama. Now, to compare that to Arizona, they have a median water marginal price of \$3.25 per thousand gallons above ten thousand gallons/month. This clearly shows that Arizona's utilities are sending a significantly

weaker price signal than the two states I happened to use as an example above. Also, according to a 2014 government accountability report, 80% of all the states currently in America have had their water managers come out and say that they expect water shortages within some part of their states in the next decade, even under average conditions. The average American also uses around 82 gallons of water every single day. This creates a huge ecological footprint, one that needs to be reduced through water conservation methods that we plan to implement on campus, more specifically in student dormitories.

Our Solution

Our proposal consists of three base changes to bathroom units in the student dorms, excluding extended housing and greek life residences. Our Solution is not only to make ASU an environmental friendly institution but also to teach students how to practice smart water habits and save money in the process. This is not a revolutionary concept in the past 10 years many other college institutions have made successful campaigns to reduce their water usage. One example of this is SUNY Stony Brook located in Long Island NY where fresh water resources are relatively limited, and quite expensive as the water needs to be drilled out of the ground from bedrock. In this example they were able to achieve an almost 50 percent cut in dorm water usage. Now that we know its works, what's the first step?

First we need to educate students on how to have smart water habits. Such as taking shorter showers turning the faucet off when brushing your teeth or shaving. This can be achieved through paper flyers, guest speakers, or zoom lectures. In addition new students should be informed of the campus policies and how to save water during the orientation Process. Next is the Physical Implementations. We propose the installation of low flow aerators as these are the cheapest and quickest option with an average unit price of \$5 a unit(not in bulk) and a less than

one minute installation time. The airtor Mixes air into the water stream. This maintains steady pressure and flow while reducing the amount of water needed to achieve normal flow. This would be the easiest and most cost effective solution and could be installed during routine maintenance or over a long weekend in a simple 3 step process. First, Apply a single wrap of white pipe tape around the threads of the aerator. Next ,Put the rubber washer inside the end and screw the new aerator by hand onto the faucet. Lastly Run water to test.

Why stop there? In order to achieve the goal of 50 percent reduction we must do more. In order to increase the water savings we recommend the use of low flow showerheads and the replacement of normal dorm toilets with water saving dual flush ones. Dual flush toilets operate by letting the user select how much water is used during the flush depending on the type of waste. One brand of dual flush toilet claims 20-60 percent reduction in water usage The cost of these items can vary greatly based on brand and amount of units ordered. Dual flush toilets and range from 200-400 a unit. Toilets also take more time and labor to install this would mean that they should be installed over summer break or if a toilet needs to be replaced. Low flow Showerheads operate in much the same way as the aerators by mixing the water with air to produce the same pressure with less water. Low flow showers operate at 1.5 GPM(Gallons Per Minute) as compared to normal shower heads which operate from 2.5-4 GPM. In addition the showerheads have an average price of \$25 a unit again based on brand and quantity and have the same basic installation steps as the aerators so they can be installed in a matter of minutes during a break or normal maintenance cycles.

We concede that if all of the aforementioned steps are taken not only will Tempe Campus and possibly the entirety of ASU see drastic improvement in dorm water consumption but stockholders and investors will be able to see the difference in the annual utilities budget.

The Conclusion

Going low flow at Arizona State University would help solve the issue of using too much water in the dorms and on campus. Water usage is an issue we can solve if we all work together. Installing faucet aerators, low-flow shower heads, and dual-flush toilets is an easy solution with a big change of impact. This solution is convenient in the long haul due to the effects and changes that will pan out. Dorm water usage is a big issue at ASU and our solution would help solve this crisis. Taking action is a big step to solving this problem and raising awareness will help others be more aware of what is going on. Going low flow is a campaign designed to help decrease the numbers that are seen now in ASU's water usage percentage. By taking action and going low flow we are able to reduce the numbers significantly. The solution we are proposing is sustainable and is relevant to not just students living on campus, but all faculty and staff at ASU and Arizona as a whole. Solving this water usage issue will also help the environment and make a huge impact on the overall water usage in Arizona. We need to take action now and spread awareness about going low flow. This campaign will also broaden ASU's passion for innovation. Arizona State is a community that is bonded together tightly through innovation, passion, and pride. This campaign will continue to show that ASU is a strong university and that we care about what goes on in the world. It will also project that we care about the people of Arizona and the United States. As a whole, Arizona State University strongly contributes to the fight against environmental issues, and the low flow campaign we are proposing will strengthen this fight. Partaking in this campaign will provide great relief among many parties. The changes that will take place are astonishing in many ways and will leave a remarkable impact and legacy. This solution isn't just focusing on the present, but also the past and future. This campaign will align

the wrongs from the past and will help better the future by focusing on the now. We have a right to fight for a cleaner and greener environment. The human race is always evolving and adapting. Arizona State University is also adapting and looking to improve things. The low flow campaign is something everyone can partake in. No one is left out. Let's stand together and fight for a low flow university.

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