

# Providing Access to Clean Water

## National Academy of Engineering: Grand Challenges

Clara Martinez Rubio



### Introduction

The world's water supplies are facing new threats. Climate change is making available water much more erratic. We are seeing areas around the world that are experiencing much more extended dry periods. It is easy to forget that the quest for water has been one of the defining struggles of human history. The difference between having and not having access to clean water quite literally means the difference between life and death for nearly 3 billion people. This means that 1 in 9 people in the world do not have access to clean water. This makes it impossible to farm, to create housing, to maintain health, to attend schooling, and to build a self-sustaining community.

### Interdisciplinary Competency

A challenge like providing access to clean water can be approached solely from a technical standpoint. However, this would be a mistake and likely a failure. A key component of developing a water purification project in a country is to teach the local people how it works, how to repair it if needed, to spread the knowledge so it cannot be monopolized by a single group, and to make it accessible for all groups of people. I have taken several relevant classes: Energy Resources, Hydrology and Water Resources, and Gender and Language. These classes have helped me not only to understand more about the challenges of water systems but also about the possible impacts they could have on the communities involved.

### Research Competency

There is an issue of water waste where significant loss of potable water comes from pipe leakage such as in Mexico, where 42% of its water network is lost due to this. In order to avoid the costly and inefficient pipeline system, my idea is to create water stations. These water stations would be refilled based on their water level by a solar powered delivery system.

I am currently completing a research-based design project where I am developing a long range, low frequency, low power communication system. This plays a key role in my water purification system since it would be necessary for the central hub to receive and process all sorts of information. This includes location, temperature, water quality, and water level.



### Service Competency

I currently serve as the President of IEEE. As someone who is passionate about sustainability, I am aware of how much the topic is set aside in the engineering curriculum. I planned this year's activity calendar to include copious opportunities for the members to get involved in not only the GCSP, but also to attend various talks, panels, and events on climate change, sustainability, and entrepreneurship. I believe it is very important for engineers to be aware of our responsibility to help in these time-sensitive challenges facing our world.



### Global Competency

Growing up between urban Madrid and a very rural part of Spain, showed me firsthand how essential access to potable water is and how much we can take it for granted and misuse or waste it. Madrid is known to have the best water in Spain and some of the best in the world. With plenty of reservoirs, lakes, and rivers, and being the wealthiest state in Spain, Madrid meets the demand of all its 6 million inhabitants with perfect water year-round. The other half of my experience was quite different: the village is in the north of Spain and has fewer than 30 inhabitants. Despite being surrounded by water and having the most rainfall in the country, the water that reaches the houses is not drinkable. Although the problem is not as urgent or dramatic as in many other places in the world (the water can still safely be used for crops, animals and sanitation) it makes the quest for water expensive and inaccessible. This experience was crucial to my understanding of how difficult and cumbersome the quest for water can be. My opportunities for global education have further demonstrated to me the urgency for finding a solution to this Grand Challenge.

### Entrepreneurship Competency

My team and I decided to enter the 2020 Youth Citizen Entrepreneurship Competition, which is a program that empowers social entrepreneurs to solve the most urgent problems as designated by the UN in 2015. We are entering the competition with the same idea, to provide access to clean water by using solar power while being aware of the potential socio-economic ramifications. The most rewarding part of this process has been learning from my multi-disciplinary team and combining our expertise to tackle such a challenge.