Worldwide, hundreds of millions of people lack clean drinking water each day. Even in our own country, natural disasters can make water supplies unsafe in a flash. Quick solutions to these unforeseen circumstances must be available to aide such areas, both economically efficient and environmentally friendly. Our group’s vision is just that, by designing a chemical-free slow sand filter paired with a membrane filtration system.

The task of our team is to create a filtration system that will maximize the amount of water treated at a low cost. The driving constraint in such a design is that of the slow sand filter, which takes quite some time to produce enough permeate. Testing dimensions of the tank and sand, as well as other design parameters, will allow us to optimize flow rate from the system. Not only must the quantity of our water be high, but the quality as well. Since this system will be used for drinking water, it will have to meet the primary standards of the United States Environmental Protection Agency (EPA). To help meet this, additional treatment technologies will also be considered, such as powdered activated carbon – to enhance schmutzdeck formation, and type of membrane filtration system. Once such a system is designed to meet both goals of quality and quantity, it sets in parallel alignment to multiply its effect. This idea of making one big system from a bunch of modular small filters is ideal in being able to transport, allowing it to be a solution to the unforeseen disasters in our vision.