ENGR 491  Scalable Clean Water

Our Grand Challenge
Currently, the Texas population is 27.61 million and increases by 0.43 million per year, or 1200 per day. Many regions of Texas have insufficient water, so meeting the water needs of a growing population is a challenge. Our approach is to desalinate water, whether from the ocean or from saline aquifers.

Project Goals
The project will focus on assessing water demand and its supply in various regions of Texas. We will employ Advanced Vapor-Compression Desalination (VCD), a technology that has been developed through AggiE Challenge for the past three years. In coastal regions, Advanced VCD will desalinate seawater directly. In inland regions, Advanced VCD will concentrate brine from an RO plant, which will increase water recovery and reduce disposal costs by a factor of 4.

Key challenges
The key challenge is to gather data and select an electricity source. We will explore conventional electricity from the grid, but also carbon-neutral energy sources such as wind, solar, and nuclear. It is important to perform economic analysis on different scenarios including energy costs from renewable sources.

Impact to Society
With increasing population, Texas will face increasing water demand. Considering the unpredictable nature of precipitation, it is necessary to equip with reliable water sources such as desalination. Advanced VCD technology is economical and can be incorporated in future plans of water distribution in Texas.

Desired Engineering Majors
- Chemical engineering – process design
- Mechanical engineering – equipment design
- Civil engineering – water supply and distribution
- Aerospace engineering – wind turbine design
- Nuclear engineering – nuclear energy
- Electrical engineering – solar collector design
- Industrial engineering – system optimization

Faculty Mentors
Dr. Mark Holtzapple  Dr. Mahmoud El-Halwagi  Dr. Pavel Tsvetkov