Technical Assistance Request

Team Trident proposes integrating solar-thermal energy with a non-membrane-based desalination technique, Temperature Swing Solvent Extraction (TSSE) to reduce brine concentrates from reverse osmosis and maximize reclaimed water for inland agricultural and industrial purposes. Our team consists of experts in the fields of commercialization, desalination, engineering, and solar systems analysis with support from the Brackish Groundwater National Desalination Research Facility.

In order to round out our project, we are seeking assistance to optimize our system for the most efficient use of thermal energy. With our relatively low thermal input requirements, we want to evaluate various options for solar-thermal optimization, including heat exchangers and thermal storage. However, we first need to establish clear parameters for our prototype's solar thermal integration and optimization.

A partner that can assist us in evaluating state-of-the-art heat exchangers and thermal energy storage devices would be highly preferred. We anticipate the lab will work closely alongside our engineering team members in order to assist in sizing and cost efficiency analysis. This knowledge will inform our techno-economic decision making and play a key component in finalizing our integrated process schematic.

It is also our preference that a solar facility be available on site or nearby so that we can assess on-sun test designs. To that end, we would require assistance modeling data to evaluate thermal efficiency over a range of flux, flow-rate, and process temperatures (+/- 100°C).

Technical Assistance Request Summary:

1. Establish parameters for the prototype's concentrated solar thermal integration:
    a. Consultation on state-of-the-art heat exchanger and thermal energy storage designs
    b. Assist in sizing/cost efficiency analysis based upon integration process scheme
    c. Consultation on design concepts that integrate concentrated solar thermal in our desalination processes.
2. Develop on-sun test designs at a solar thermal test facility
    a. Assist with modeling data to evaluate thermal efficiency over a range of flux, flow-rate and process temperatures (+/- 100 °C) for the TSSE desalination process.