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Resistance network modeling of desalination units

# MD

Basic resistance network models for DCMD/AGMD units alone exist. Borrow Bui et al. DCMD resistance network model to solve for mass transport and calculation of recovery ratio. Based on the geometrical parameters, determine rest of the system details.

## Additions in the system

### Use the friction coefficients for membranes and metallic pipes

### Assume standard length of the hydraulic transport system (should remain constant for all systems)

### Solve for pressure network, calculate the pump capacity

### Determine exergetic efficiency, specific ex eff and overall recovery ratio

### Determine overall cost of the system (standard components)

### Calculate outlet brine salinity

### Brine disposal costs?? (Find out the literature)

### Land cost??

### Spend some time to figure out cost of water infrastructure (probably studies already exist?)

# Thermal based desalination techniques

Use standard models to determine the energy requirements (use linear models, quote assumptions)

1. How to determine pressure drop in thermal techniques remains a question to be answered, do models exist?
2. Determine overall pressure drop in the system, calculate the system size, overall system cost
3. Estimate cost of fuel (Suggest suitable areas considering availability of cheap fuels)
4. Sensitivity analysis of ambient conditions and surface water temperatures on the exergy destruction and overall efficiency, specific ex eff.
5. Brine disposal?
6. Land cost? Should this be a regional parameter??

# Reverse osmosis

Plenty of linear models available for modeling of the recovery ratio and energy requirements

1. Consider prevalent technologies for validated models
2. Cost dispersion, electricity requirements??
3. Maybe try using the RO modeling tool by the DOW guys. It lacks analysis on exergy, but maybe it can be further improved
4. Cost of construction and cost of maintenance
5. Membrane replacement cost as a function of operational salinities
6. Does it show any regional preference?
7. Overall system efficiency, is it any comparable to thermal or MD?
8. Calculate system cost as a function of RO cascade levels