**Homework 8 Solar Power for Africa**

**Due Monday October 17, 2022**

This week we have discussed wind power.

1. Derive that the maximum efficiency of a wind turbine (or any power harvesting device using the wind) is about 60%?
2. Explain the difference between a windmill and a wind turbine. What differences in design would you consider for pumping water, grinding grain, and generating electricity and how do these differences lead to different machines used for these purposes?
3. Why can’t a wind turbine in a hurricane generate an enormous amount of energy? What problems with wind turbines does you answer point out?
4. Richard Epstein described the SWET device. Explain the “mobility problem” and derive an equation that describes the net power output from a SWET as a function of the applied voltage and the wind velocity. How would a SWET be operated in a hurricane? Could it collect enormous amounts of energy under extremely high wind velocities?
5. Compare conventional wind turbines, vibrating beams, SWET and the EWICON device at Delft University. What are the advantages and disadvantages of these different technologies for collection of wind energy.