

**Homework 9 Solar Power for Africa**  
**Due Monday November 1, 2021**

This week we have discussed the grid.

- a) Explain the history of power distribution in Texas and how it led to the grid collapse in February 2021. What improvements are needed to prevent similar grid failures?
- b) Explain the history of power distribution in North Carolina and how Duke has addressed grid improvements since Hurricane Florence.
- c) How does the grid need to be modified to accommodate the rapid adoption of electric cars? What benefit can electric cars have for the grid, considering commuters from the suburbs to the inner city.
- d) In a modern grid with renewable energy sources how can the fluctuation of power supply be accommodated. What problems does it present to the grid.
- e) Consider the investment in the Grand Renaissance Dam in Ethiopia. ([https://en.wikipedia.org/wiki/Grand\\_Ethiopian\\_Renaissance\\_Dam](https://en.wikipedia.org/wiki/Grand_Ethiopian_Renaissance_Dam)) How will the grid need to be improved to distribute this power (<https://www.iea.org/articles/ethiopia-energy-outlook>). Consider the advantages of off-grid and micro-grid options compared to a national grid based on large hydropower sources. Is a hybrid system possible?