System Research Part 1 (SR1)
Due Date: 09/26/2024

Please fill this Google Worksheet once you choose your team-mate and region–
https://docs.google.com/spreadsheets/d/1p_v8nH0b1bWV30xKV8WRlorirE2JL2uDVuU5GAUkAkM/edit?gid=0#gid=0
Note: please read the prompt in full (there is important information towards the end!)

Assignment: Select one of the three interconnects in the US: Eastern, western and ERCOT interconnect. Note that we will only be modeling the US portion of each interconnect. Basic power system data for each interconnect will be provided to you. You must find the rest of the data corresponding to your research question.

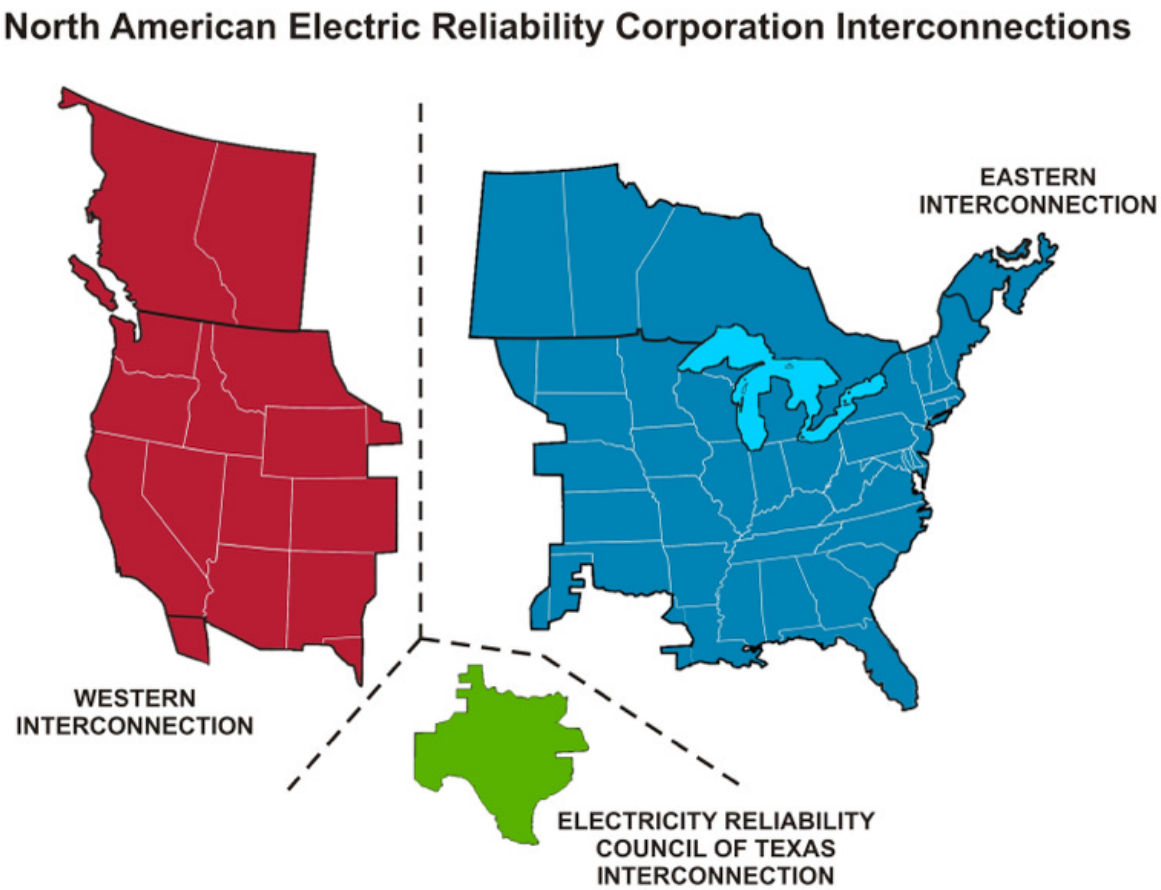

Figure 1: The three interconnections in the US electricity market. Note that we will only be modeling the US portion of each interconnect.

Throughout the semester, you will research how the energy sector in your chosen interconnect is structured and regulated, producing a concise summary report on the following aspect of the regional energy sector.

- The composition of the electricity generation/supply mix;
- The transmission & distribution network utilities serving the location and the vertical structure of the electricity sector;
- The energy demand in the industrial, transportation, residential, and commercial sector and energy/climate policies implemented/proposed in the states in your region.

At the conclusion of the semester, a final term paper will challenge you to diagnose a leading research question in the region and use mathematical modeling to propose several improvements to regulation, policy and technology capacity that will facilitate affordable, reliable, and environmentally friendly electricity service, with attention to accelerating decarbonization of the energy system.

The following questions will help you get familiar with your chosen interconnect.

Stick to the following directions strictly:

A) Answer each question ***separately***.

B) No more than *half a page of text* (Times New Roman, 11 pts, single space) per question. Graphics or images do not count. You may add as many as you wish.

C) You may "cut and paste" information from resources you find as you answer each question within the prescribed space limits, as long as you ***think carefully*** about what information you are including. *Quote* any direct quotes and *include the references* that you have used for each item as both links to online resources and in a bibliography listing all references found at end of post (use whatever citation format you prefer).

Simple, direct writing style is fine, but, please, be careful with typos, misspellings, etc. Do not exceed the maximum length that has been specified, but no problem if you use less.

These are the questions:

1. *Brief* basic geographical, economic, social, political or other salient features of the chosen region.
2. Is there an official energy statistics agency for your region? If so, what organization, are they a governmental agency or something else? What is their website? Start with EIA's Annual Energy Outlook.
3. Annual electricity consumption, peak demand, and characteristic electricity demand (load) shape for each state in a region. Start with National Renewable Energy Laboratory's Electrification Futures Study.
4. Breakdown of electricity consumption into sectors (residential, industrial, services). Start with National Renewable Energy Laboratory's Electrification Futures Study.
5. Installed generation capacity and technology mix (capacity). Start with EIA 860M database - https://www.eia.gov/electricity/data/eia860m/.
6. Annual fuel mix or energy shares from each fuel source (e.g., natural gas, coal, nuclear, wind, solar, hydro, biomass, geothermal). Start with EIA 923 database - https://www.eia.gov/electricity/data/eia923/
7. Name the major companies that provide electricity services in your chosen region. Note the basic activities in electricity supply (distribution, retail supply, wholesale/bulk generation, transmission, system operation, power exchange) with these companies.