**Quiz Questions for Lecture 1:**

1. What are the three biggest types of renewable energy? Why?
   * Wind power, solar power and hydropower. They are broadly distributed and in many cases close to population centers.
2. Why is there more wind energy in mid-latitudes (35N to 60 N or 35S to 60S) than in other latitudes ( i.e. tropics or arctic)?
   * The differential heating between pole and equator creates frontal cyclones in these mid-latitude regions.
3. How do frontal cyclones impact all three renewable energy types: wind, solar and hydro) ?
   * Frontal cyclones have strong winds that drive wind turbines. Their clouds and precipitation impact hydro and solar power
4. Are the USA and China both in “mid-latitudes”?
   * Yes. Both lie mostly between 35N and 60N.
5. Why does the renewable energy resource (wind, solar and hydro) vary with season? Which season has more renewable energy?
   * For wind, winter is better. There is more global differential heating in winter and thus more frontal cyclones.
   * For solar, summer is better. The sun angle is steeper in summer and there are fewer clouds
   * In most places, there is more precipitation in winter and less evaporation, so more hydropower. In a few places, summer snowmelt feeds the rivers.
6. Why do locations with rising air in the atmosphere have more hydropower but less solar power?
   * Rising air in the atmosphere causes cloud formation and precipitation. Clouds block the sun’s rays reducing solar power. Precipitation provides water for hydropower.
7. What are the four ways that mountains help create hydropower?
   * Mountains cause air to rise causing precipitation (i.e. orographic precipitation).
   * Mountains capture precipitation before it falls to sea level, giving the water potential energy.
   * Mountains channel the water into narrow rivers.
   * Mountain tops are cold, so they can store water as snow with little evaporation.
8. What are two ways that mountains create more wind power?
   * Airflow accelerates over mountain tops.
   * Airflow accelerates in narrow mountain gaps.
9. Why do offshore (i.e. ocean) locations have more wind power than forested landscapes or cities?
   * The surface roughness in forests and cities slows the wind by friction. Thee ocean surface is smoother, so the wind is stronger.