**Day 9: Issues in Generating Electricity 12.5, 12.8** **Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

The electricity that comes from outlets can be generated by a variety of means. It can be generated by turbines that are rotated by water (hydro, tidal), steam (nuclear, coal, natural gas, geothermal) or wind. It can also come from solar cells. What methods should be used to supply the growing need?

1. Look at page 536-537.
2. Figure 1: What % of **Ontario’s** electrical energy comes from **coal**? (0%, 5%, 10%, 15%, 20%, 25%)
3. Table 1: What % of **Canada’s** electrical energy comes from **coal**? (0, %5%, 10%, 15%, 20%, 25%)
4. Table 2: Increased carbon dioxide causes climate change. Does this method produce CO2? (Yes, No)
5. Some energy sources are variable and need to be stored. There are large energy losses when energy is transferred to another energy form for storage. Does it require storage? (Yes, No)
6. Should this method increase, continue or decrease? Why?
7. Answer the above questions for the type of electricity generation that your group is assigned and fill in the table with the results for each energy type.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Ont | Can | CO2 | Store | Future |
| coal |  |  |  |  |  |
| gas |  |  |  |  |  |
| oil |  |  |  |  |  |
| biomass |  |  |  |  |  |
| tidal |  |  |  |  |  |
| hydro |  |  |  |  |  |
| wind |  |  |  |  |  |
| solar |  |  |  |  |  |
| geothermal |  |  |  |  |  |
| nuclear |  |  |  |  |  |

1. The use of nuclear energy is very controversial.
2. Is nuclear power dangerous under normal operations?
3. What about natural disasters or war?
4. The textbook information stops in 2005 and doesn’t consider the whole world. This graph provides the needed information. <http://energyeducation.ca/encyclopedia/Electricity>
5. Choose ‘bar graph’ and look at the regions of the world. When you push the play button, you can see how the numbers have changed from 1985 to 2013. What was the biggest change?
6. **Coal**: **Predict** what you will see when the play button is pushed. **Observe**.
7. **Natural Gas**: **Predict** what you will see when the play button is pushed. **Observe**.
8. **Hydro**: **Predict** what you will see when the play button is pushed. **Observe**.
9. **Nuclear**: **Predict** what you will see when the play button is pushed. **Observe**.
10. **Solar**: **Predict** what you will see when the play button is pushed. **Observe**.
11. **Wind**: **Predict** what you will see when the play button is pushed. **Observe**.
12. It is extremely important that we produce electrical energy without producing CO2. <http://energyeducation.ca/encyclopedia/Electricity_generation>
13. What is the % of energy generated in the world by the non-CO2 sources?
14. Select North America and then Canada. Why is there such a big difference with the world average?
15. **Contest**: Not every country has access to waterfalls for hydro generation. Predict which country has the highest non-hydro, non-CO2 electrical energy production.

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1. How much of the world’s electrical energy do you think can come from ‘green’ sources in the next twenty years? (Green energy sources do not produce CO2 or nuclear waste.) Explain. Where should the rest of the energy come from? Explain..
2. 30% B) 50 % C) 70% D) 90%

 **Textbook reinforcement: Read pages 518 - 528**

1. The textbook gives each source of energy about the same importance.
2. It makes hydro and tidal generation look equally important. Are they? Explain.
3. On pages 521-522, 524-525 it makes geo and bio look equally important. Are they? Explain.
4. On pages 521 and 523 – 524 it compares coal, natural gas and nuclear fuels for thermal generation. They seem equally good and bad. Are they? Explain