Style Guidelines

Please check your spelling and grammar. Be sure you give references for any information you use from outside the class (material found in the lecture notes and/or other class materials does not need a reference). References should follow APA referencing style. Your report should not be more than ten pages and would likely be more like five pages. It must be submitted in pdf format. Be sure to include your group name and the members of your group. Overall quality of the report is worth **10 CORE marks**.

Content Guidelines

Your report should contain the following.

1. Introduction with Cabin location and design (CORE 15 marks)

Introduce the project, explaining what needs to be done. Specify your cabin location by GPS coordinates and describe the site. Provide a simple sketch of the cabin and its orientation on the site.

2. Solar resource analysis (CORE 10 marks)

Download data from SolarView for your site for a day near the Summer Solstice and the Winter Solstice. Include a graph of how much energy is delivered over the day.

3. Cabin power and energy load characterisation (CORE 20 marks)

Calculate your energy use for a typical day near the Summer Solstice and a typical day near the Winter Solstice. All of your numbers will be approximate and your methods might vary from one energy use to another. For example light bulb energy use can be calculated from Energy = Power * Time directly. Other energy uses you might need to calculate differently. For example, look up the annual energy use of your refrigerator and divide by 365. Look up the energy required for a shower. Since the results depend strongly on your assumptions about your lifestyle, spell out your assumptions. For example, you can assume two minute warm showers or thirty minute hot showers or anything between. Similarly you may have no space heating at all and little water heating during winter if you use a wood burning stove. Just state your assumptions. At the end of this you should have two numbers for energy use: anticipated energy use in kwh for a day near the Summer Solstice and a day near the Winter Solstice. You should also have two numbers for power: maximum power draw for each of those days.

4. Specification of the suggested solar PV/battery system (COMPLETION 30 marks total divided as below)

4.1. Modelling of the system (15 marks)

Calculate the required area of solar panels as discussed in lab and review lecture. Calculate the required battery size (at least one full day of energy use in either summer or winter, which ever was higher). You already know the maximum power draw from step 4. Be sure to include a safety margin of at least 10% for all your specs.

4.2. Components and Costs (15 marks)

Specify the components you want to use. Ideally these are actually available locally. Your solar panels Specify prices. Remember to include labour ($10,000) and minor supplies ($2,000).

5. Uncertainties and Contingencies (CHALLENGE, 10 marks)

Discuss how variations in available solar energy and household energy use will affect your calculations. For example, should you add some extra solar panels or perhaps a bigger battery? Perhaps check energy the amount of energy available at the equinoxes rather than the solstices. This is meant to be open-ended.

6. Conclusions and recommendations (COMPLETION 5 marks)

Conclusion/reflection on the practically and cost of your cabin.