EE3605: Renewable Energy in Power Systems

Mini Project in Renewable Energy – 2017/8

1. **Background/Introduction**

This assignment reinforces the material you have learned in the module and assesses your ability to research additional material. The information gathered will also need to be analysed and presented in a coherent form.

**2. Learning Outcomes**

After completing this coursework, you will be able to

* Design renewable energy systems.
* Analyse the operation of renewable energy technologies.
* Be aware of the key operational requirements that determine the design and operation of power systems (including power generation, transmission, and distribution) with renewable energy technologies.
* Evaluate and discuss relevant complex scientific, environmental and socio-economic issues.
* Learn how to enhance learning and professional development through utilization of additional material not handed out in the class.

**3. Assignment Brief and Guidance:**

The mini project provides you with an opportunity to investigate one of the renewable energy technologies in some detail. The nature of the project is a feasibility study of a new project.

The project must be academically challenging, with an appropriate level of theoretical content, and it must be relevant to renewable energy. The subject will need to be agreed as suitable with the module leader.

Your project need not consider any novel or leading-edge technology (but it could if you want it to). In many ways, for this project, it is probably better if you stick to the better established renewable energy technologies as more information on devices is available. Either way, try to make your report “factually snappy”. Try not to become side tracked when writing. Make good use of sub headings to structure the report for you and your readers (but never beyond the third heading level).

In order to help you understand the kind of report required, overleaf there is an example table of contents.

**4. Submission Format and Process**

There is no minimum word limit required for the study. The maximum page limit is 20 single-sided pages including photos, diagrams and tables, excluding title page, tables of contents, lists of figures, list of tables, abstract introduction section, and appendices (No marks will be lost for exceeding this limit). An additional section listing all references cited should be provided separately. Other useful sources should be recorded in a bibliography section when not cited in the main body of the work.

**Font & Size: Times New Roman typeface should be used with font size 12 points.**

This is an individual assignment. You may discuss your ideas and problems in a general way with other students, but you must not copy or share text, data files, specific scenarios, calculations, etc. Any material ‘cut and paste’ from the web, or copied from any source, must be presented as a quotation (e.g. within “quotation marks”) and clearly referenced at the point where it occurs in the report. Violation of these rules is regarded as plagiarism which will result in significant penalties being applied.

**TYPICAL REPORT LAYOUT AND CONTENT**

**Title page**

**Table of Contents**

**List of Figures**

**List of Tables**

**Abstract**

**Introduction**

* Background
* Aim and Objectives

**The Resources Exploited**

* Site consideration. The following questions should be answered: What area? Current use? Land designations? Access?
* The resource exploited should be explained together with its defining characteristics. The following questions should be answered: What is the source of the resource? How intense is the resource? How long does the resource last? How intermittent or variable is the resource?

**The Technology Used**

* The technology used to harness the resource should be outlined. The following questions should be answered: How is the alternative energy captured? How is the captured energy converted into a form that is useful? What type and model of the technology are used? What auxiliary equipment is needed?

**The Energy Produced or Saved**

* An estimate of the energy produced or saved (if the project concerns energy efficiency) should be quantified, and the form this will take specified (i.e.: work, heat or electrical power).
* The total annual production in kWh can be calculated.

**The Process of Installation of the Technology**

* The process of installation of the technology should be described, with due emphasis placed on the key enabling or limiting factors. The following questions should be answered: How long will it take to install? How many people are required? Is specialist equipment needed? Can access be gained at all times? Where is the nearest grid infrastructure? Where are the nearest trunk roads?

**Energy Economics**

* Capital and operating costs can be calculated and compared against expected savings/revenues expected in the future.
* The cost of energy delivered to market in £/kWh can be calculated.

**Environmental Issues**

* Likely environmental issues/concerns should be identified. The following questions should be answered: What are the impacts the scheme makes on its environment? Will the scheme disturb anyone? 
* Carbon footprint in tonnes/kWh can be calculated.

**Evaluation and Recommendations**

* Prediction of any long-term problems, social, economic and political issues which may affect the project in its working lifetime, i.e. FIT tariffs, effect of future interest rates on finance.

**References**

**Bibliography**

**Appendices**