**Solar Data Project Requirements Specification**

**1. Introduction**

**1.1 Problem Statement**

Data is currently being collected on energy generated by installed solar panels at several locations. The system needs to use this data to calculate monetary savings in dollars created by the use of the solar panels at various locations, for varying periods of time and display the request to the user in an easy to use interface.

**1.2 System Personnel**

End users - Dr. Skon, Mr. Karl, website visitors

Development team - Jeremy Myser, Jeremy Hendricks, Wade Gooch, Nicolas Isley

**1.3 Operational Setting**

Currently, there is a database and a website that displays data collected from the solar panels. A new interface will be created that utilizes the existing database to display the monetary savings using the solar panel data and user inputs.

**1.4 Impact Analysis**

The system will show cost savings created by the use of the solar panels. This data can be used for financial purposes and/or to analyze the potential for future solar panel installations at new sites.

**1.5 Related Systems**

**1.5.1 Belize Solar Project website**

The current website with which this software will be integrated displays data representing the energy generated by the solar panels at all locations. There is a summary that shows the most recent energy reading with timestamp. The locations section will show the current power, statistics for each bank of panels at the site, watt-hours per hour for the day, and kWh per day for the current week. The graphs section shows graphs of energy readings for all locations for a given day. The new software will use the same database to augment existing output with monetary savings created by the energy that the solar panels produce.

**2. Functional Requirements**

**2.1 User Interface**

Inputs – search frame in dates or dates and hours, start of search period, end of search period, rate at which electricity is priced, location to be checked.

Outputs - Monetary value of energy produced during specified time period, margin of error percentage reflecting missing data against expected data.

**2.2 System-Specific Requirements**

The user should be able to enter a time period and a rate that they would expect to pay for electricity, and see a dollar value showing savings over that time period. The user should also see a percentage margin of error to account for missing data.

The existing database must be functioning and accessible for use by the new software.

**3. Non-Functional Requirements**

**3.1 System-Related Non-Functional Requirements**

The new software needs to be compatible with existing database - Node.js with MySql.

The new software needs to be developer friendly, created with a common set of best practices to ensure ease of future modification.

No specifications were made on the performance of the site, but it should at least match the performance of similar modern web software. Hardware specifications are outside the scope of this project, but the software platform is a new web interface built with Node.js that will use data from a MySQL database. Full error-handling will be implemented for the web interface. Any inaccuracies in data will be represented as a margin of error for the output. The website should reasonably account for modern security such as prevention of SQL injection and cross-site scripting.

**3.2 Process-Related Non-Functional Requirements**

Deliverable on 12/13/2016

Deliverables consist of additional tables in existing database, a public repository on GitHub containing source code, documentation, and if pre-caching is needed, a set of daily jobs run on a batch server. Location table should include longitude, latitude, and first date of data collection.

Development team has access to existing website’s code and a database dump with a create command and existing data.

Accurate cost savings analysis will require the user to provide the correct rate for energy for the requested location.

**4. Formal Specifications**

See System Architecture Document.

**5. Requirements Specification Rationale**

Development team decided to work with existing data only. Speculations cannot be made regarding what data may be missing or why; this is outside the scope of this project, and is in progress by a different team per discussion with Dr. Skon.

**6. Feasability**

Basic system: search and compile results from existing database.

Expanded system: data is partially pre-cached into a new table using a daily batch job, database operates with improved structure.

Appendix A: Notes from client meeting (see attached)