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**School of Information and Communication Technology**

**Griffith University**

**3821ICT – WIL Single Project**

**Improving the efficiency and effectiveness of large-scale extraction of electricity demand data published by AEMO as part of the 2022 Integrated System Plan (ISP).**

**Team Organisation**

**Unisoft**

*[05/08/2022 (Trimester:- 2)]*

**Industry Partner:** The Centre for Applied Energy Economics and Policy Research (CAEEPR)

**Client:** Nancy Spencer

**Team members:**

Nathan Cowan -s5143344

Akshay Devnani -s5268458

Joshua Martin -s5220620

Naman Sharma -s5155752

**Revision History**

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Version** | **Author(s)** | **Comments** |
| 09/08/22 | 1 | Nathan Cowan | Uploaded the template, cleaned up the formatting, and added basic team/client info |
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*This template is intended to be a guide for developing the project proposal.  Items that are intended to stay in as part of your document are in bold; italic text is used for explanatory information that should be removed when the template is used.*

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**INTRODUCTION**

*This Section of the Proposal introduces the Project. It should contain the following elements:*

1. **Project Overview**

*This section is a description of the Project and the Client’s Information, including the client’s contact details (e.g. phone number, address, email), the client’s organisation and their designation.*

Project is based on electricity demand

1. **Team Overview**

*This section contains a description of the Team. Include information about the role that each team member will be playing.*

|  |  |
| --- | --- |
| **Team Member** | **Role** |
| Nathan Cowan |  |
| Akshay Devnani |  |
| Joshua Martin |  |
| Naman Sharma |  |

1. **Definitions and Acronyms**

*Provide a table of all acronyms or unusual tools used in the document with a definition.*

|  |  |
| --- | --- |
| **Acronym** | **Definition** |
| AEMO | Australian Energy Market Operator - Organisation responsible for managing Australia’s energy market including gas and electricity. |
|  |  |

1. **PROJECT VISION**
2. **PRODUCT VISION**

*Keep the format below and only fill in the editable fields.*

Product name is:

    For: Centre for Applied Energy Economics and Policy Research

    Who: Analyzing Electricity Demand

    The: Unisoft

    Is a: Data Analysis Software

    That: Product benefit. Reason to buy

    Unlike: Competitors

    Our product: Differentiation or value proposition

1. **CUSTOMERS AND BENEFITS**

*Describe customer problems, solutions, and product benefits.  Who are your customers/ user groups?  What are their primary characteristics (age, education, experience)?  What benefit* *will the product provide to each group?  Are there specific customers that this product will serve?*

* The project will analyze two variations of Probability of Exceedance( POE10 and POE50) for each region(state)/subregional files.
* The problem is to handle large number of csv files for each region that includes data focusing for 11 candidate years from 2011-2021 that is further subdivided into 11 different aspects/technologies that are being used for extracting and generating electricity.
* Furthermore for our solution we will use Step change, Progressive change, and Hydrogen superpower files provided within regional and sub regional data are the three categories that include all the data for 11 candidate years from 2011-2021.
* Our solution will include electricity demand data that is converted into columns  for each candidate year for each sub regional/regional file representing half hourly data within each row.
* Additionally sub regional will include csv files from candidate years 2011-2021. Instead of 11, 3 aspects OPSO\_MODELLING, PV, PV\_TOT is provided within subregional files and will be used for our project solution.
* The input data will be collected from .csv files, then it’s transferred to the database and all the 11 aspects of data for regional, including 3 aspects of sub regional(QLD, NSW) is combined for each candidate year for all the regions(Queensland, Victoria, Tasmania, NSW, South Australia).
* Solution for this problem is to collect all the data given from various technologies that will use electricity or generate electricity, determining electricity demand overall and how these technologies are helping achieve renewable targets.
* The output product will be useful for analyzing large sets of electricity demand and generation from various technologies/aspects collected from each state for each year using predicted data of 2021 - 2051 provided within csv files.
* Our customers are Faculty members of Griffith Business school, Nancy Spencer, Philip Wild and for their industry partner for the National Electricity market operating within Australia called the Centre for Applied Energy Economics and Policy Research (CAEEPR).
* The product will be beneficial to the industry partner of CAEEPR.

1. **KEY FACTORS TO JUDGE QUALITY**

*What does quality look like for your product?  Quantify the product capabilities that are most important to the customer's perception of value.  These can include financial, performance, quality, reliability, scheduling, user acceptance capabilities, or competitive differentiation (what makes your product unique).  What makes your product more valuable than a competitor’s?*

* The quality for our product will look like an interactive GUI, where the users can access various types of output data for analysis.
* Using Test cases is one way to assure that we can check errors for any missing inputs, input data that could corrupt/ stop the program from functioning.
* Checking that our program is reliable and does not crash while querying data for a longer period of time.
* We can check that our program has capabilities that are user acceptable such as  supporting all the queries and operations that our client wants it to perform.
* One of the most differentiating qualities that our project will include is input format such as handling different start and end times, different intervals with new regions/ subregions.

1. **KEY FEATURES AND TECHNOLOGY**

*A simple statement of key technology that may be used, and specific features that are required.  This is high level – the detail is a separate document, for example in the Product Backlog.*

There are several key technological components of this project that will each require different solutions:

The first and most essential of these being a database that can accept AEMO data across different regions,subregions,components, and candidate years in a format that allows for complex queries to be made. We are using mySQL as our database platform as it has been an industry standard and reliable platform for decades with very little overhead to implementing it in our project.

The next is turning the raw data returned from the database into the excel file our client will work with. For this we are using the xlxswriter package to convert the raw binary output into a fully formatted .xlxs file that our client prefers to work with. We have chosen xlxswriter in particular because it is capable of adding not only the data into each exact cell but also the native excel formatting and even custom data formats as needed which makes it a very powerful and versatile tool.

The last is constructing a GUI that will make it easy for our client to interact with the database both to input new data and query the database into an excel output. For this we are using Tkinter, a part of the python standard library, a very simple and powerful tool that is commonly used in python applications. In particular it allows for text and button inputs as well as the handling of opening files, in an easily arranged window.

1. **OTHER PRODUCT FACTORS**

*Factors that are not part of the primary functionality but must still be present.  These may include:*

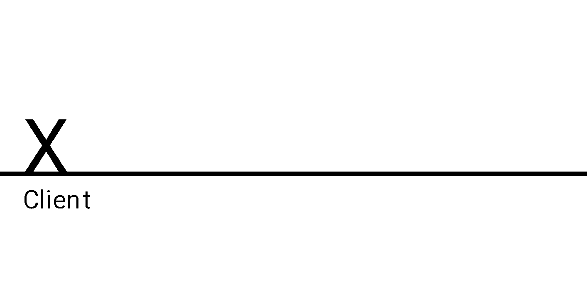
* *Interaction with associated systems or products*
* *Potential for design growth or modification*
* *Physical environment it will be used in*
* *Patent infringement/protection*
* *Safety and liability*
* *Quality and reliability*
* *Ergonomics*
* *Users' abilities*
* *Sourcing and assembly – including partnerships, alliances, dual source needs…*
* *Distribution*
* *Documentation, training, servicing, and maintenance*
* *Unusual equipment or facilities needed*

There are several factors that are not part of the primary function of the product but must still be present. These are the following:

* Any third party libraries used in the creation of the program must have a license that allows their use in such projects.
* The UI created should be simple and easy to use. Any controls should be intuitive to use but also complex enough to retrieve any data the user may be seeking.
* The software made should be reliable with minimal bugs.
* The software should be secure by minimising the potential of exploitation by a malicious entity.
* The software created should be scalable to any amount of data that needs to be processed.
* Any code written for the project should be thoroughly commented to ensure that the program is as maintainable as possible.
* The data should be processed quickly to ensure there are no delays when used.

1. **AGREEMENTS**

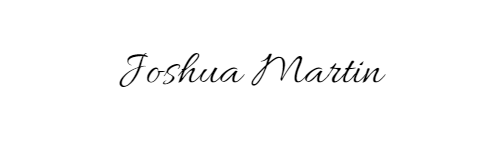
*All persons identified in this document sign the form below to indicate that they have read the Project Vision and Agreement and agree to the contents therein.*

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Nathan Cowan Shape

Description automatically generated with medium confidence

Akshay Devnani  Akshay Devnani

Joshua Martin 

Naman Sharma