



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

FACULTY OF COMPUTING

SECD2523 DATABASE

SECTION 05 (SECJH)

PHASE 1 (P1) – PROJECT PROPOSAL & DATABASE REQUIREMENT (5%)

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1.0 Introduction

Overview of the project



Low carbon can be defined as the way organisms such as humans, animals, and plants produce and consume that helps to release less carbon dioxide and other gasses that can cause pollution to the air. It is really important to reduce our carbon blueprint because it helps to diminish global climate change, maintains biodiversity and boost public hygiene. Malaysia has taken serious measures to stop harmful gasses from being polluted into the air. By the year 2050, they want to have zero harmful gas emissions. And by the year 2030, they want to reduce CO₂ intensity compared to how much money they make (Md Shahril, 2023)

Organization Background

Our client, Majlis Bandaraya Iskandar Putri - MBIP, is a key stakeholder in the drive towards a Low Carbon Society (LCS) in Johor Bahru and Kulai Jaya districts, Malaysia. As a corporation deeply dedicated to sustainability, they have actively participated in diverse tasks and programs, demonstrating their determination to lower carbon emissions and fostering eco-friendly practices inside their community. The assigned target audiences are including residents in multi-story and landed houses, institutions, MBIP divisions, and MBIP staff.

Planning for the Improved/New System

We plan to develop a data collection and analysis platform that can simplify every issue for everyone. In addition, this system can also overcome the previous problems. The system improvements we will make include mapping the carbon footprint within the MBIP region, calculating carbon reductions for electricity, water, waste, and recycled cooking oil consumption, identifying communities with high CO₂ emissions, and creating a self-monitoring dashboard for carbon emissions among users.

Concurrently with our goals, a robust database infrastructure will serve as the backbone of our system. This database will be meticulously designed to handle diverse data sets, ensuring seamless storage, retrieval, and analysis. We plan to implement a relational database model that accommodates the intricacies of carbon footprint data, user profiles, and community statistics. This database will be optimized for scalability, enabling it to grow alongside the expanding dataset and evolving user needs.

Purpose

The purpose in making this Phase 1 report is to explain all our detailed planning to complete a whole new data collection and analysis platform. Our plans include problem definition, feasibility study (economical), and project planning (Work-Breakdown Structure (WBS), and Gantt Chart). It functions as a valuable guide for our joint endeavors in attaining the client's sustainability objectives and progressing towards a society with reduced carbon emissions.

By providing our detailed roadmap of the project we are aiming to align our efforts with the client's sustainability goals, strengthen collaboration to push us towards a society with significantly reduced carbon emissions.

2.0 Background study

The case study focuses on the endeavor of Iskandar Puteri City Council's (MBIP) initiative to develop a Low Carbon Initiatives Community Monitoring System. This system aims to address challenges related to carbon emission concerns and foster a low-carbon society in alignment with the Low Carbon Cities Framework (LCCF) and the Low Carbon Blueprint for Iskandar Malaysia 2025.

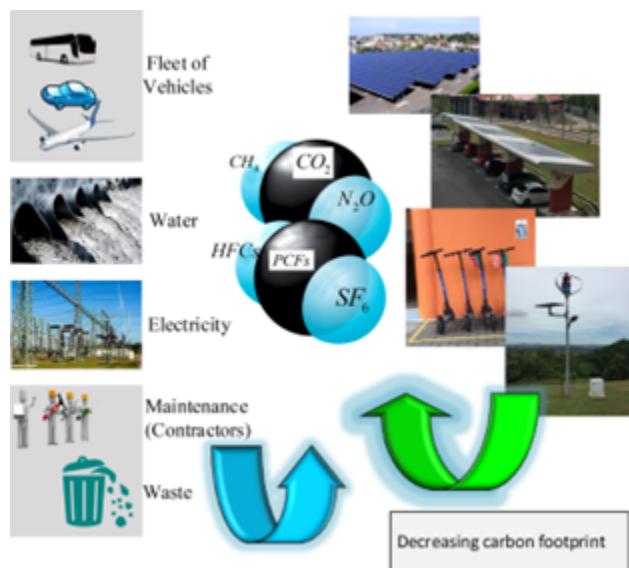
1. National Initiatives: Malaysia's Low Carbon Cities Framework and Johor's Low Carbon Blueprint create the basis for carbon reduction strategies.
2. Existing Initiatives: Initiatives like IMELC and e-Lestari put emphasis on diverse user groups, promoting the importance of awareness of low carbon emissions.
3. Challenges faced by MBIP : The Iskandar Puteri Low Carbon Calendar Competition faced difficulties such as data entry complexity, manual calculations, and varied user profiles.
4. Proposed Solution: MBIP plans a data collection and analysis platform akin to e-Lestari, targeting diverse community categories and emphasizing mapping carbon footprints and self-monitoring dashboards.
5. Data and Analysis Requirements: The system will handle electricity, water, waste, and recycled cooking oil consumption, requiring robust analysis capabilities.
6. Language and User Base: The system will be available in Bahasa Melayu and cater to residents, institutions, MBIP divisions, and staff.
7. References: For the theoretical basis, the project relies on literature such as the Malaysia Sustainable Cities Program and the Low Carbon Society Action Plan for Johor Bahru 2025 .

3.0 Problem Statement

Efforts by Majlis Bandarai Iskandar Putri in Johor Bahru and Kulaijaya districts are continuing to put the low-carbon state in the face of major challenges.

- Scattered and incomplete emissions data:

The MBIP is currently being confronted with the intermittent and unconsolidated collection of carbon emissions data. This makes it difficult to obtain a comprehensive and accurate picture of the region's carbon footprint, which includes emissions from electricity and water consumption, waste generation and others



In Measuring Carbon Reduction Effectively:

Existing tools and methods are not effective enough to accurately estimate carbon reduction. These limitations pose a significant challenge, especially in assessing the effectiveness of various green initiatives undertaken by the MBIP and in determining the strategy for implementation.

4 STEPS OF CALCULATING CARBON FOOTPRINT

- Difficult to identify areas with high concentrations of carbon dioxide

Without advanced data analytics capabilities, identifying specific regions or areas within MBIP that contribute significantly to carbon emissions is more challenging. Identifying this is critical to defining environmentally friendly efforts that meet its way in the most efficient and effective manner.



- Deficiencies in community participation in sustainability efforts

Inconsistent with Malaysia's environmental aspirations: Given Malaysia's ambitious target of substantial reductions in extreme CO₂ emissions by 2030 and zero harmful emissions by 2050, current shortcomings a there is a need for the way MBIP manages carbon emissions to align with these national objectives

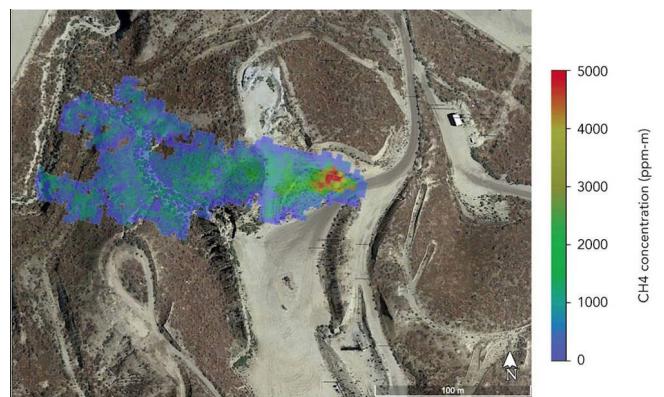


Closing this gap requires a complex combination of data collection and research design. This platform addresses these issues, aligning MBIP activities with Malaysia's environmental objectives.

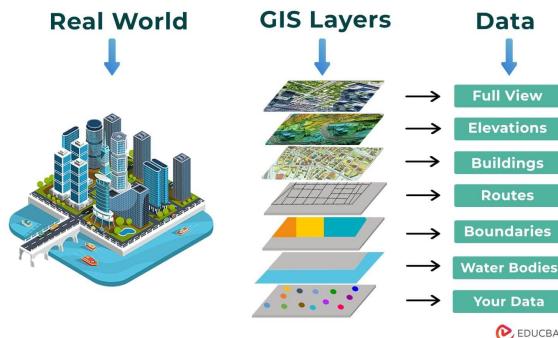
MBIP can effectively manage and reduce carbon emissions, engage their communities in sustainability programs, and use these solutions to make appropriate decisions that are the goal of the National Low Carbon Association types.

4.0 Proposed Solutions

- To meet the complex challenges outlined above, we propose to build a comprehensive data collection and analytical framework. This state-of-the-art system will incorporate the following:
- Integrated carbon emissions data: A specialized carbon emissions database will enable more accurate footprint mapping in the MBIP region.



- Enhanced tools for estimating carbon reductions: Using advanced data, the system will more accurately quantify the impact of various non-environmentally friendly measures
- Radiation emissions with geographic indicators: The use of GIS technology will facilitate the development of detailed maps, highlighting high-carbon areas for focus



- Interactive dashboards for personal monitoring: Interactive user-designed dashboards allow individuals and organizations to actively monitor and manage their carbon emissions..



- Assessment reports for strategic decisions: A comprehensive set of data analysis tools is available for use by the MBIP, which will assist in developing policies and monitoring progress towards environmental goals.
- Flexible and scalable design: The design of the system will be flexible, aligning future development with broader environmental policies

These solutions help transform MBIP's carbon management strategy to support Malaysia's sustainable future through community engagement .

In this way, MBIP's carbon management can be changed. A very good approach combines community engagement, accurate data, and national environmental aims that can move the region towards a more sustainable, carbon-free or lower carbon future lead.

Feasibility Study (Economical)

We believe the project is economically feasible because it can be developed and implemented within the estimated timeline and budget. After calculating the CBA we can see that the profitability index is larger than 1 so we can conclude that the project is a good investment and economically feasible

Assumptions	
Discount rate	10%
Sensitivity factor (cost)	0.5
Sensitivity factor (benefits)	1.1
Annual change in production cost	5%
Annual change in benefits	4%

Estimated Cost	
Hardware	40000
Software	60000
Consultant	10000
Supplies	2400
Maintenance	3500
Salary	20000

Estimated benefits	
Inventory Savings	RM 1800 per week

Criteria	YEAR			
	0	1	2	3
Cost				
Development				
Hardware	20000			
Software	30000			
Consultant	5000			
Total	55000			
Production				
Supplies		1200	1260	1323
Maintenance		1750	1838	1930
Salary		10000	10500	11025
Annual Prod cost (Present Value)		12950	13598	14278
		11772	11238	10727
Accumulated Costs		66772	78010	88737
Benefits				
Reduced inventory costs (Present Value)		102960	107078	111361
		93600	88494	83667
Accumulaed benefits (Present Value)		93600	182094	265761
Gain or Loss		26878	104084	177024
Profitability Index	3.21			

5.0 Objectives

1. Advanced data processing

Purpose: Captures and integrates carbon emissions from a variety of sources including electricity use, water use, waste generation, and the role played by recycled cooking oil. Includes complex systems integrating data collection. Integrating data from multiple sources provides a comprehensive view of system emissions, enabling accurate tracking and analysis.

2. Accurate Carbon Footprint Analysis

Objective: To accurately map the carbon footprint of a specified area, including emissions from various sources. The objective of this objective is to provide MBIP with an accurate understanding of the environment. This objective is very important for informed decision-making. A comprehensive carbon footprint map helps identify areas of high carbon emissions, so that MBIP can better target interventions and measure the effectiveness of carbon reductions.

3. Community engagement and empowerment

Objective: To engage and empower citizens, businesses and MBIP team of workers through user-friendly dashboards to monitor and decrease carbon emissions. This purpose is to support living beings in good and sustainable efforts. The user-friendly dashboard allows the user to actively monitor their carbon emissions quantity, whilst embracing a sense of duty and love for the environment. By attractive neighborhood communities, this objective increases the effectiveness of a sustainable environment.

4. Informed Decision Making

Purpose: To offer advanced facts evaluation and reporting gear that guide information-pushed decision making for MBIP. Users can reveal the effectiveness of sustainability initiatives and regulate techniques consequently. Data analysis equipment allow MBIP to summarize records and gain insights which may be used. By providing meaningful facts to decision makers, this objective increases the potential to make the best decision so one will be able to optimize low carbon emission.

5. Data Protection and Privacy Compliance

Purpose: To ensure the protection of sensitive environmental information and data. Privacy policies shall conform to legal requirements for the protection of privacy. Data security and protection of privacy are of utmost importance. Compliance protects important and sensitive data, builds the stakeholder's confidence, and reduces risks with data breaches or unauthorized access.

6. Scalability Adaptability f: Scalability Adaptability

Goal: Application design with scalability in mind, allowing user requirements to evolve along with its expanding and growing dataset. This value ensures longer processing time. Scalability ensures that the application can accommodate increasing amounts of data and user demands as the job runs. The scalable design makes the system future-proof, meaning it can withstand the future technologies keeping it in line with evolving environmental goals and technological advances.

7. Technical Support and Maintenance

Objective: To provide ongoing technical support and maintenance to ensure implementation reliability, safety and performance, and enable seamless support for low-carbon projects. Ongoing support and maintenance is essential to address issues, apply updates, and ensure system reliability. This goal assures that the application remains a reliable tool for MBIP's long-term sustainability efforts.

6.0 scope

6.1 System

GreenScape Systems : Data Collection and Analysis Platform

Mobile Application and Website:

- Enable users to register and log in to their accounts.
- Facilitate the viewing of carbon-related information within the MBIP region.
- Empower F&B businesses to analyze carbon emissions data effectively.
- Implement a comprehensive feedback system for user engagement.

6.2 User Categories

Customers:

- Allow users to inquire about carbon-related information.
- Provide a platform for users to enter specific instructions related to carbon management.
- Enable users to contribute feedback on sustainability initiatives.
- Offer real-time tracking of carbon reduction progress.

MBIP (Majlis Bandaraya Iskandar Putri):

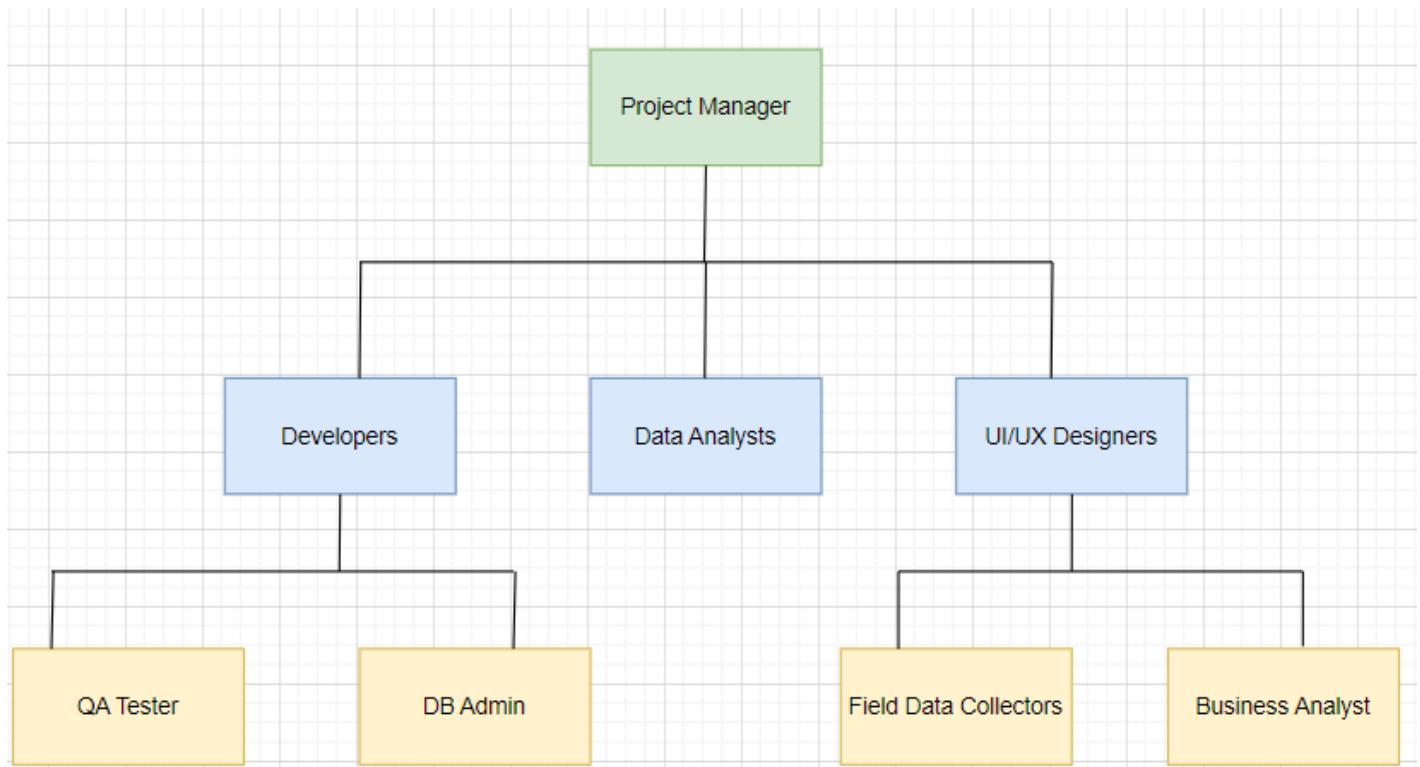
- Assist MBIP in recording and processing carbon-related data.
- Enable MBIP to review feedback from community members.
- Facilitate daily sales tracking for sustainability initiatives.
- Provide tools for checking and managing environmental stock.
- Support data analysis for strategic decision-making.
- Enable MBIP to monitor the location of field data collectors.

Field Data Collectors:

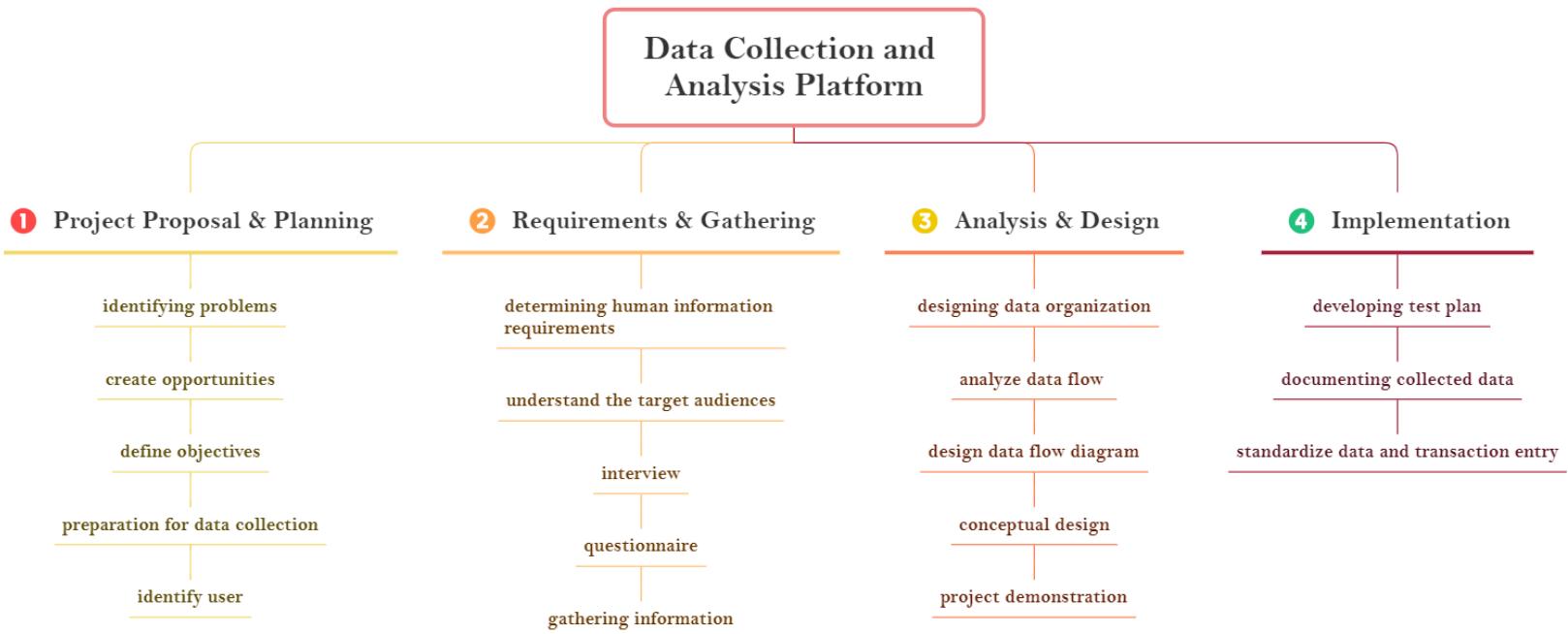
- Allow authorized personnel to collect and input data related to carbon emissions in the field.

7.0 Project Planning

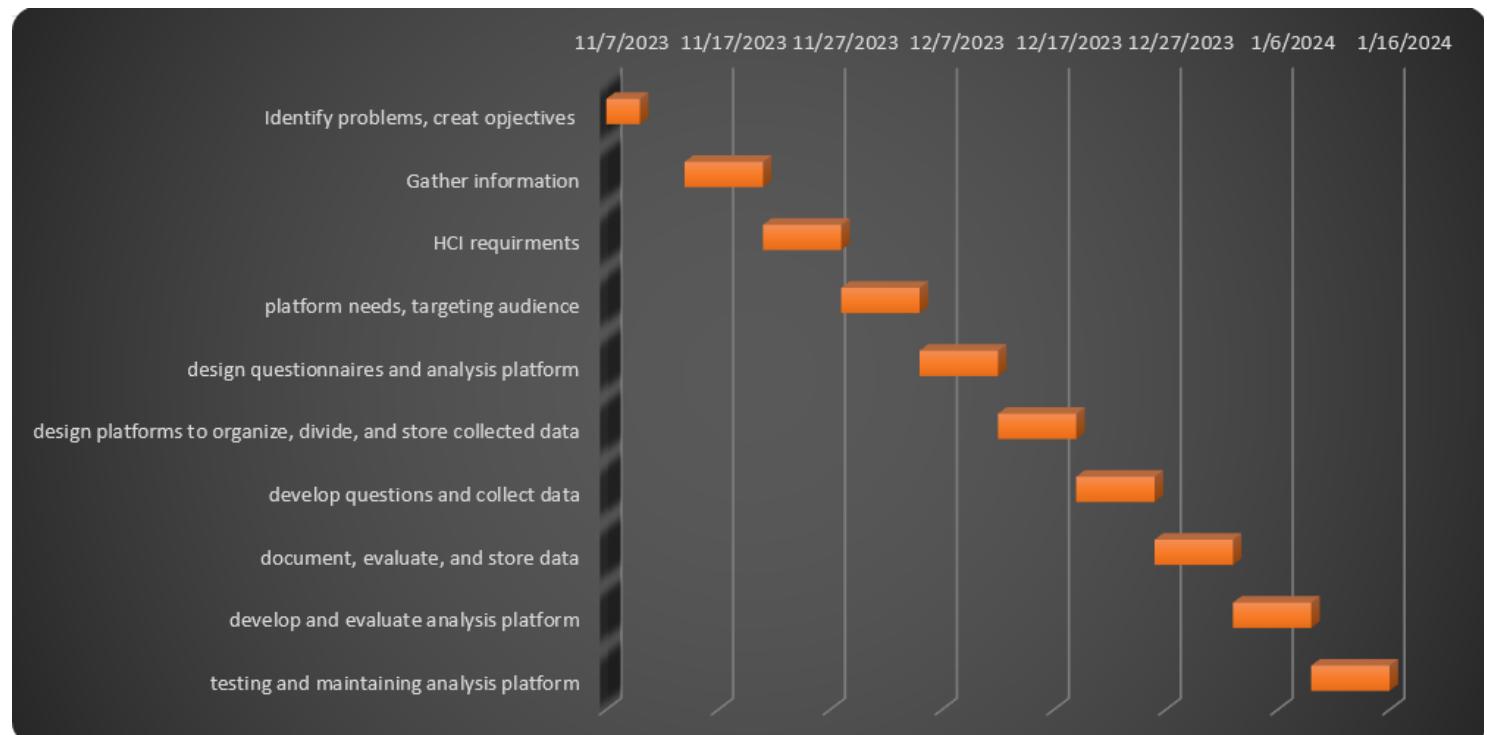
Human resources



Work-Breakdown Structure (WBS)



Gantt Chart



8.0 Requirement Analysis (based from AS-IS analysis)

8.1 Current business process (scenarios, workflow)

to be continued

9.0 Transaction requirement (data entry, data update/delete, data queries)

9.1 Data Entry

Enter the details for user participation in the carbon management program

Enter the details for user to input data related to carbon emissions

Enter the details for user to input data on electricity, water, waste and recycled cooking oil consumption

Enter the details of information in the survey

9.2 Data Update/Deletion

Update/ Delete the details of the user participation

Update/ Delete the details of data related to carbon emissions input by user

Update/ Delete the details of data on electricity, water, waste and recycled cooking oil consumption input by user

Update/ Delete the details of information in the survey

9.3 Data Queries

List details of participation made by user

List details of information in the survey

List details of carbon emissions data input by user

List details of electricity, water, waste and recycled cooking oil consumption made by user

List the total user participation

List the total electricity consumption made by user

List the total water consumption made by user

List the total waste consumption made by user

List the total recycled cooking oil consumption made by user

Identify which individuals/ organizations participate the program

Display the data consumption made by the user

Display the carbon reduction calculation from data consumption

Display the summary of user participation

10.0 Benefit and Summary of Proposed System

Finally, it is very important that we follow through with our plan to create a Low Carbon Society (LCS) in Johor Bahru and Kulai Jaya, Malaysia, with the help of Majlis Bandaraya Iskandar Putri (MBIP). Malaysia has big environmental goals, like reducing carbon emissions and toxic petrol emissions to zero by 2050 and a huge drop in CO₂ intensity by 2030.

We have made an effort to address the significant issues that MBIP must pass in order to become a Low Carbon Society. Identifying high emission sites, compiling the fragmented and inadequate emission data, and evaluating carbon reduction efficiently are a few of these issues.

You can use the updated tools for handling data, the interactive dashboards to keep track of your own progress, the better tools to guess how much carbon will be saved, and the analytical reporting tools to help you make big decisions. This is very important: the system is designed to be scalable and flexible, so it can work with bigger environmental efforts and changes in the future..

By implementing a relational database model it will serve as the foundation of efficient data storage, retrieval, and analysis. This initiative promises to integrate a range of data, from carbon footprint data to user profiles to community statistics. The relational database's design goes well with accommodating the environmental data complexity, giving us a structured and organized path for handling complex information.

It's clear that this project can be made and used within the planned time and cost, as a lot of thought has gone into making sure it's profitable. This span has the class "highlight-item editor-bg-green" and the data-bs-toggle attribute is set to "on." Since the profitability number is above 1, the Cost-Benefit Analysis (CBA) shows that the project is a good use of money and an investment.

11.0 Summary

This project proposal aims to develop a data collection and analysis platform named GreenScape Systems in conjunction with Majlis Bandaraya Iskandar Putri (MBIP) to help the construction of a Low Carbon Society in Johor Bahru and Kulai Jaya, Malaysia.

The plan outlines MBIP's problems, such as dispersed emissions data and poor carbon reduction estimation algorithms . GreenScape Systems proposes a solution with a specialized carbon emissions database, improved estimating tools, GIS technology for mapping, and interactive dashboards for user monitoring.

The economic feasibility study indicates the viability of the project with a profitability index greater than 1 . The objectives of this project are advanced data processing, precise carbon footprint analysis, community interaction, educated decision-making, data protection, scalability, flexibility, and continuing technical support.

The proposal appropriately identifies the database application's scope, limits, and primary user views. Data needs for information storage are appropriately represented, and transaction requirements are described in accordance with business norms.

The proposal is well-organized, addresses the stated problems effectively , and presents a clear path for project delivery. Overall, the proposal establishes the foundation for the development of GreenScape Systems.