UTM
UNIVERSITI TEKNOLOGI MALAYSIA

School of Computing
Faculty of Engineering

SECD2523 – DATABASE

SEMESTER 1 2023/2024

PHASE 1 - PROJECT PROPOSAL & DATABASE REQUIREMENT

<Carbon Reduction and Sustainability Engagement System>

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1.0 INTRODUCTION

Recently, global warming all around the world has been increasing at an alarming rate, with the global temperature for this year being 0.52 degree Celsius higher than average. With the addition of climate change, this concerning situation will be a threat to our physical health, due to the increasing temperature and unnatural changing weather patterns. Eventually, the planet may even be inhabitable if such issues are left as they are.

One of the main factors of global warming is carbon dioxide emissions. Carbon dioxide is the main contributor to the greenhouse phenomena. As greenhouse gas emissions cover the atmosphere, the sun's heat that is supposed to be reflected is trapped. It can enter the atmosphere through various sources, such as burning fuels and industrial waste. Most of the sources of carbon emissions are man-made.

Malaysia has taken initiatives with the end goal of addressing not just the environment, but also social and economic challenges. One of the initiatives that are worth mentioning is the Low Carbon Cities Framework (LCCF). It aims to help Malaysian cities in strategizing towards low-carbon development. To support the initiative, the government of Johor has formulated a plan to promote a low-carbon society, named Low Carbon Blueprint for Iskandar Malaysia 2025. Its goal is to reduce the carbon intensity by 58 percent by 2025 compared to the 2005 baseline.

2.0 BACKGROUND STUDY

In order to achieve the objectives laid out in the Low Carbon Blueprint, various government agencies have taken their own initiatives. One of them includes the Iskandar Malaysia Ecolife Challenge (IMELC) program, the Johor Education Department's (JPNJ) e-Lestari system, and the Iskandar Puteri City Council (Majlis Bandaraya Iskandar Puteri - MBIP). While they have the same goal in mind, which is to increase public awareness on the importance of ;ow carbon emissions, their methods of approach and overall impacts differ. IMELC program aims to enhance awareness of Low Carbon Society (LCS), the e-Lestari centers around integrating sustainability elements into the curriculum and extracurricular activities.Next, MBIP, with the Iskandar Puteri Low Carbon (IPRK) initiative's goal is to collect data on energy-saving efforts conducted by the community.

However, MBIP introduced the Iskandar Puteri Low Carbon Calendar Competition which has its own problems. This includes a time-consuming and user-unfriendly data entry process, extensive participant information requirements, manual carbon reduction calculations and reporting, insufficient data analysis capabilities, varied user profiles, and participants' unfamiliarity with the Google Form. All these emerging issues had led MBIP to set up kiosks to facilitate form completion for the community to participate.

In order to address the issues at hand, MBIP is planning to develop a platform for data gathering and analysis that will target various community categories, such as residents, institutions, and MBIP divisions. It is anticipated that this particular system will map the carbon footprint within the MBIP region, calculate carbon reduction for domestic consumption (electricity, water, waste, recycled cooking oil, etc.), detect high CO2 emissions, and create a self-monitoring dashboard for carbon emissions among users. Therefore, MBIP's IPRK initiative will be achieved more effectively should such a platform be developed.

3.0 PROBLEM STATEMENT

1. **User-unfriendly data entry process**
   When the Iskandar Puteri Low Carbon Calendar Competition was introduced, Majlis Bandaraya Iskandar Putri (MBIP), the stakeholder, found that the data entering process was laborious and difficult to utilize. This is because participants had to manually enter their data into the system, which took a lot of time, the data entry procedure is time-consuming. Furthermore, the user-unfriendly process made it difficult for participants to navigate and enter data. Participants reported feeling irritated and impatient as well. Participants might enter incorrect information, which would lead to an inaccurate outcome.

2. **Extensive user information requirements**
   The extensive requirements for participant information were causing difficulties for the Iskandar Puteri Low Carbon Calendar Competition. It was required of the participants to submit information regarding waste management, electricity and energy usage, and energy-saving initiatives. The participants may have been bothered by the significant information requirements, which necessitated data collection and submission. It's possible that this deterred the prospective competitors from giving it their all in the tournament.

3. **Manual carbon reduction calculations**
   Manual carbon reduction calculations were a challenge to MBIP. The computation of carbon reduction, which takes into account a number of variables such waste management, power and energy usage, and energy-saving measures, is complicated and takes a lot of staff time and effort to gather participant data and perform the calculation. For the manual carbon reduction estimates, MBIP must invest a significant amount of time and labor. Moreover, due to human error or mistakes, manual carbon reduction calculations may be imprecise and erroneous. Error risk will produce unreliable results, which will impact the data analysis.

4. **Insufficient data analysis capabilities**
   Another issue that MBIP encountered in the Iskandar Puteri Low Carbon Calendar Competition was a lack of data analysis capabilities. There were extensive standards for participant information in order to quantify the carbon reduction of community members. As a result, MBIP's data analysis capabilities were insufficient to handle large amounts of data. The results were erroneous because MBIP was unable to accurately assess the participant data.

5. **Varied user profiles**

   MBIP also was facing an issue in the competition where there was a wide range of user profiles. Participants in the competition came from a variety of community backgrounds, including factories, residential areas, schools, and higher education institutions. Consequently, different categories had different expectations for the competition's outcomes and used diverse carbon reduction techniques. The collection of different kinds of data and the objectives for reducing carbon emissions must be tailored to each category. Therefore, one of MBIP's challenges is gathering data from various user profiles and creating goals for them.

6. **Users' unfamiliarity with the system/platform**

   One challenge that MBIP is facing in the competition is that participants are not accustomed to using the interface, which in this case, Google Form. It was more challenging for the participants to accurately submit the required information because they were unfamiliar with the Google Form or the data entry process. Errors or discrepancies in the collected data led to imprecise and erroneous results. Additionally, it restricted the number of possible participants who have minimal experience with technology, which decreased participation with Google Form. To address this problem, MBIP had to deploy additional staff to install kiosks that would make it easier for the community to complete forms.

4.0 PROPOSED SOLUTION

1. **Implementation of Artificial Intelligent (AI)**

   The data collecting and calculating process can be facilitated with AI rather than being done manually by MBIP staff. The AI can also be trained to verify the information submitted by the participant to ensure the integrity of data. AI uses machine learning algorithms to process large volumes of data to identify patterns and create AI models (How Is AI Used in Data Analysis? Examples and Applied Uses - The Upwork Team, 2023). For example, If the AI detects an invalid or false data, It can automatically contact or notify the participant to update their submission. Thus, it will ease the process of data analysis and can be used to track the carbon emission rate and predict future trends.

2. **Educate the community towards digital literacy**

   In addition to moving towards a low carbon emission community, the participants or specifically the old age citizens could be educated to use the current technology to increase their digital literacy. Digital literacy is the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills (Loewus et al.). In this case, we are educating the community to use the current technology and to not be left behind with the current technological trend..

3. **Develop user-friendly interface**

   The data collecting process can be simplified by developing a more user-friendly interface so that participants can submit their information easily without requiring assistance from MBIP staff. This will increase their motivation to submit their information. Therefore, there is no need for MBIP to open kiosks to facilitate the participant anymore. The development of an interface to better navigate and simplify research attracts not only new users but also makes them want to continue their digital experience (5 Benefits of User Interface Design, 2019).

4. **Create more efficient information gathering method**

Simplifying and optimizing the data input procedure and focusing on obtaining important information about the goals of the low-carbon initiatives can boost participation rates and increase their motivation to contribute towards the low carbon initiative as well as the accuracy of the data obtained. To decide on the right data collection methods, one has to thoroughly analyze their aims and needs (Chatterjee, 2022).

5. **Giving more incentive for participation**

MBIP can award participants with a blockchain digital certificate upon successful submission of their data to acknowledge their effort. On the other hand, MBIP also could consider giving a tax reduction for the factories that are giving utmost cooperation as a token of appreciation. Giving rewards for answering a survey will help to reach audiences that are usually hard to reach. According to the National Center for Biotechnology Information (NCBI), monetary incentives have been used for so long as a method to increase response rates. In fact, their review of 49 studies found that a monetary incentive doubled the odds of participants returning a completed or partially completed questionnaire (Mahmutovic, 2020).

Feasibility Study (Economical)

In the economic context, feasibility studies are conducted to evaluate the profitability and viability of a company's product development (Bause et al., 2014). In this particular case study, the objective is to assess the feasibility of the Low Carbon Community Monitoring System. The development cost of the system can be divided into two parts: hardware and software devices. Both hardware and software devices are necessary for creating the application needed for data collection and analysis in the Low Carbon Community Monitoring System.

i.Development Cost

Hardware:

1. Server:

- Dell PowerEdge R750 Server (2 units): RM 60,000

2. Storage Devices:
    - Synology DS1821+ NAS(2 unit) : RM 12,000

3. Networking Equipment:
    - Aruba 2930F Switch Series(1 unit): RM 11,000

4. Computing Devices:
    - HP Z4 G4 Workstation (2 unit) : RM 20,000

5. Backup and Recovery Disaster:
    - Synology DiskStation DS920+ NAS with multiple hard drives(1 unit): RM 3,000

Estimation Total Cost of Hardware: RM100,000

With the aforementioned hardware, all of the devices are suitable for use in this case study. The advanced technology and robust data collection and analysis capabilities make it easy for the MBIP to gather information about carbon emissions. The Dell PowerEdge R750 Server is equipped with 80 cores, 160 threads, and 2 sockets, making it capable of efficiently collecting data. Its 64 GB 2Rx4 DDR4 3200 MHz RDIMM allows it to handle heavy tasks. As for storage, we utilize the Synology DS1821+ NAS, which has a starting price of RM 5,700. This NAS provides flexibility and efficient data storage. While it does have a few minor drawbacks, such as the switch from Atom to Ryzen processor, it offers positive features like ECC memory, expandability through PCIe slots, and support for popular services like Synology Hybrid RAID (SHR). For network security, the Aruba 2930F Switch Series is the most advanced option for the project. It allows easy access and connection for IoT devices. The 2930F is a specialized device with advanced security and network management features, making it simple to set up and control.

Software:

1. SAS Analytics
2. Talend Data Integration
3. AnyLogic Software Simulation

In our studies, we have delved into the world of Talend Data Integration, AnyLogic Software Simulation, and SAS Analytics, three remarkable computer programs that have revolutionized the way we organize and comprehend information. These cutting-edge tools have

proven to be invaluable in enhancing our understanding and efficiency in data management. Notably, AnyLogic Software Simulation stands out as a particularly remarkable program, as it possesses the remarkable ability to effortlessly amalgamate information from diverse sources, enabling us to derive meaningful insights and make informed decisions.

ii. Production cost

1. Salary
2. Maintenance
3. Supplies

The maintenance expenses for production costs will amount to approximately RM 5000 per year. This estimation takes into account the cost of all the necessary hardware required for maintenance. The specific hardware includes items such as server racks and cooling fans. The need for these supplies will depend on future circumstances, such as whether they will be used to replace old cooling fans or to add additional server installations. In terms of storage devices, the required hard drives will be used to expand storage capacity or replace any faulty drives. Networking equipment will utilize Transceivers or SFP modules to replace any damaged modules or upgrade the network. Additionally, the salary for this maintenance work will be set at RM20,000.

iii. Benefits

1. Savings
2. Cash Prize

The weekly savings amount will be fixed at RM 3500, while the Cash Prize will be determined based on the case study, amounting to RM 15,000.

Estimated Cost	
Development	Cost(RM)
Hardware	100000
Software	70000
Training	30000

Assumption	
Discount rate	0.1%
Sensitivity factor(cost)	1.1%
Sensitivity factor(benefits)	0.9%
Annual change (production cost)	0.07
Annual change (benefit)	0.05

Production	
	Cost(RM)
Salary	20000
Supplies	6700
Maintenance	5000

Benefits	Cost(RM)
Savings	3500
Cash prizes	15000

COST BENEFIT ANALYSIS (CBA) FOR GROUP CHADGPT

CRITERIA	YEAR											
	0		1		2		3		4		5	
1. COST	**ESTIMATED**	**ACTUAL**	**ESTIMATED**	**ACTUAL**	**ESTIMATED**	**ACTUAL**	**ESTIMATED**	**ACTUAL**	**ESTIMATED**	**ACTUAL**	**ESTIMATED**	**ACTUAL**
A. DEVELOPMENT												
Development		sf(c)										
Hardware	100000	**110000**										
Software	70000	**77000**										
Training	30000	**33000**										
TOTAL DEVELOPMENT COST		220000										
B. PRODUCTION												
Production				sf(c)	increase (annual change * production cost)							
Salary			20000	**22000**	22000	**23540**	23540	**25188**	25188	**26951**		
Supplies			6700	**7370**	7370	**7886**	7886	**8438**	8438	**9029**		
Maintenance			5000	**5500**	5500	**5885**	5885	**6297**	6297	**6738**		
ANNUAL PRODUCTION COST				34870		**37311**		**39923**		**42717**		
PRESENT VALUE (PV)				31700		**30835**		**29994**		**29176**		
ACCUMULATED COST			(PV+t.dev cost)	**251700**	PV+acc cost	**282535**		**312530**		**341706**		
2. BENEFIT												
Benefit				sf(b)	increase (annual change * production cost)							
Savings			3500	**163800**	163800	**171990**	171990	**180590**	180590	**189619**		
Cash prizes			15000	**13500**	13500	**14175**	14175	**14884**	14884	**15628**		
ANNUAL BENEFIT				**177300**		**186165**		**195473**		**205247**		
PRESENT VALUE (PV)				**161182**		**153855**		**146862**		**140186**		
ACCUMULATED BENEFIT				**161182**		**315037**		**461899**		**602086**		
GAIN/LOSS			(acc.benefit-acc.cost)	**-90518**		**32502**		**149369**		**260379**		
PROFITABILITY INDEX				**1.18**								

5.0 OBJECTIVE

The primary goal of this suggested solution is to provide a platform for data gathering and analysis that is akin to the e-Lestari system in order to improve data management efficiency and get over all of the obstacles the organization is now facing. The goal of this new platform is to:

- **Make Data Entry Simpler:** To have systematic data and information management, create a more effective and user-friendly data entering process. Numerous factors are involved in this process, including the use of recycled cooking oil, water, power, and garbage. The goal is to improve user accessibility and streamline data entry.

- **Automated Carbon Calculations:** These calculations not only improve efficiency but also minimize errors and inaccuracies. Inadvertently, this will result in faster and more trustworthy results, which are necessary for efficient analysis and reporting.

- **Data analysis and insights:** give MBIP the ability and know-how to use data analysis tools to examine gathered data. Considering that mapping the carbon footprint within the MBIP region, identifying localities with high CO2 emissions, and getting insight into energy consumption statistics should also be part of the projected data and analysis requirements. These realizations are essential for improving and making decisions.

- **Community Involvements and Encouragement:** By using the valuable insights gleaned from the more effective and simplified data entry processes, MBIP is able to guarantee that the diverse user groups, including different residential areas, institutions, MBIP divisions, and personnel, can get involved in low carbon activities.

- **Language Localization:** Bahasa Melayu was used as the primary language during the creation of this platform to provide accessibility and improve comprehension for the local residents or communities. This language selection will support the organization's goal of giving participants an easy-to-use platform.

6.0 SCOPE

System

- **User Registration and Authentication:** Enable users to register and log in to individual accounts including personnel, residents, institutions, and MBIP divisions, ensuring secure access to the site.

- **Mapping Carbon Footprint:** Establish features that allow for the visual representation of carbon emissions across several community types when mapping the carbon footprint within the MBIP region.

- **Carbon Reduction Calculation:** To provide insights into sustainable practices, enable the system to calculate and analyze carbon reductions for waste, water, electricity, and recycled cooking oil use.

- **Self-Monitoring Dashboard:** Create an intuitive self-monitoring dashboard that will help workers, residents, MBIP divisions, and institutions keep track of and comprehend their individual and group carbon emissions by providing real-time data.

- **Localisation support:** Design the platform to operate primarily in Bahasa Melayu, ensuring accessibility and inclusivity for the local community.

Users

- **Residents:**
    - Permit citizens to see and comprehend their carbon footprint.
    - Permit locals to submit data on their use of recycled cooking oil, water, electricity, and garbage.
    - Give residents a way to voice their concerns and efforts related to sustainability through a feedback mechanism.

- **MBIP staff:**
    - Permit access to extensive data on sustainability initiatives for MBIP staff members.
    - Give employees tools to organise and interact with citizens, organisations, and other stakeholders.
    - Assist MBIP personnel in making evidence-based decisions by facilitating data analysis

7.0 PROJECT PLANNING

7.1 HUMAN RESOURCE

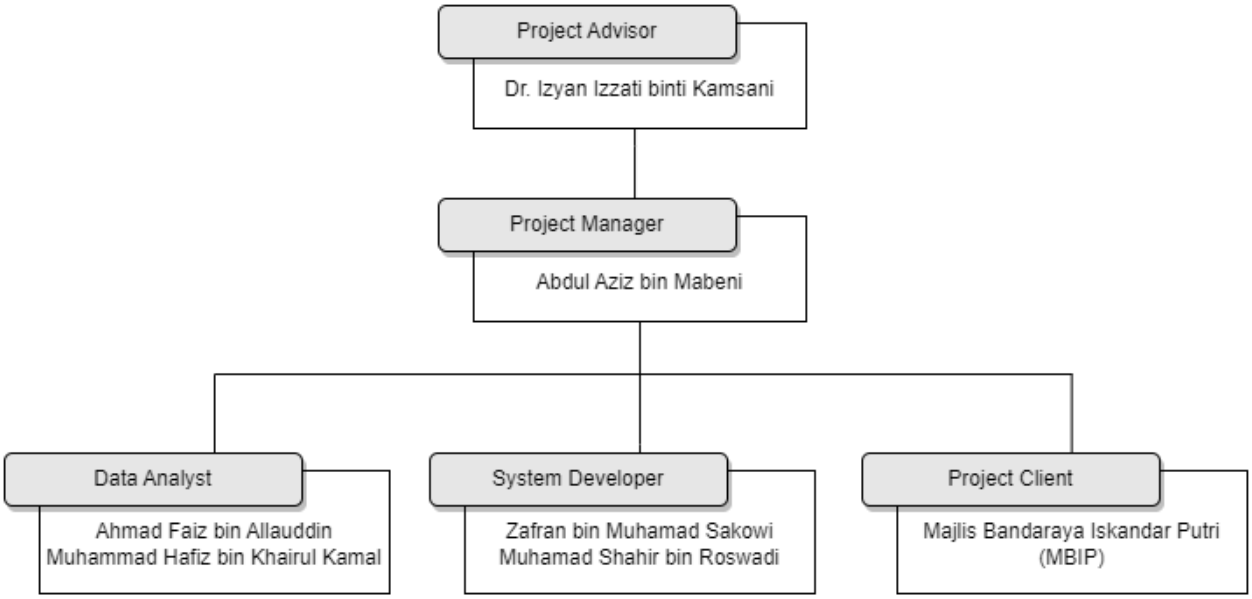


Figure 1 :Human Resource Chart

7.2 WORK BREAKDOWN STRUCTURE

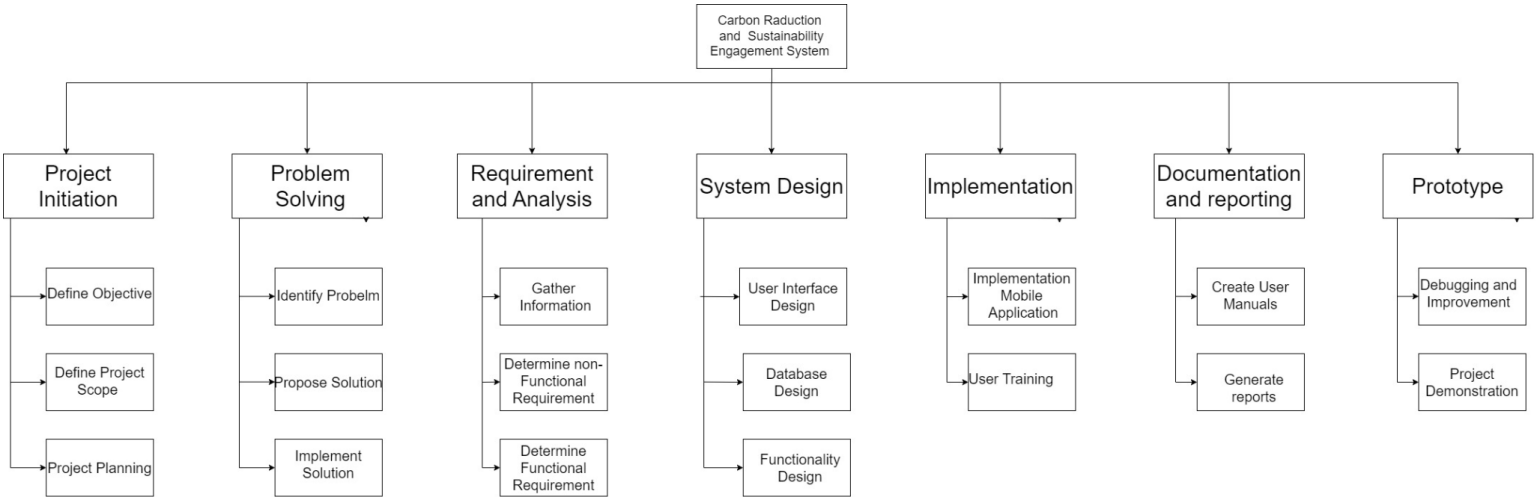


Figure 2 : Work Breakdown Structure (WBS)

A. **Project Initiation**

- Define Project Scope : Determine the market and target audience
- Define Objective : define objective of the project
- Project Planning: From a project team, list the relevant parties, make a schedule and allocate resources

B. Problem Solving

- Identify Problem : Identify the issues that require resolution
- Propose Solution : Propose the Best solution for the problem
- Implementation Solution : Implementation Solution the solution chose

C. Requirement and Analysis

- Gather Information : Gather information for the project like Interview Stakeholder
- Identify Functional Requirements: Analyses competition needs, and determines data entry requirements.
- Identify Non-Functional Requirements: Performance, security and safety.

D. System Design

- User Interface Design : dropdown menus, auto-fill, and immediate data validation.
- Database Design : Identifying data storage needs.
- Functionality Design : the design specifies automated calculation algorithms.

E. Implementation

- Implement Mobile Application: Covers server and database setup as well as security configuration.
- User Training: Developed user training materials and training sessions.

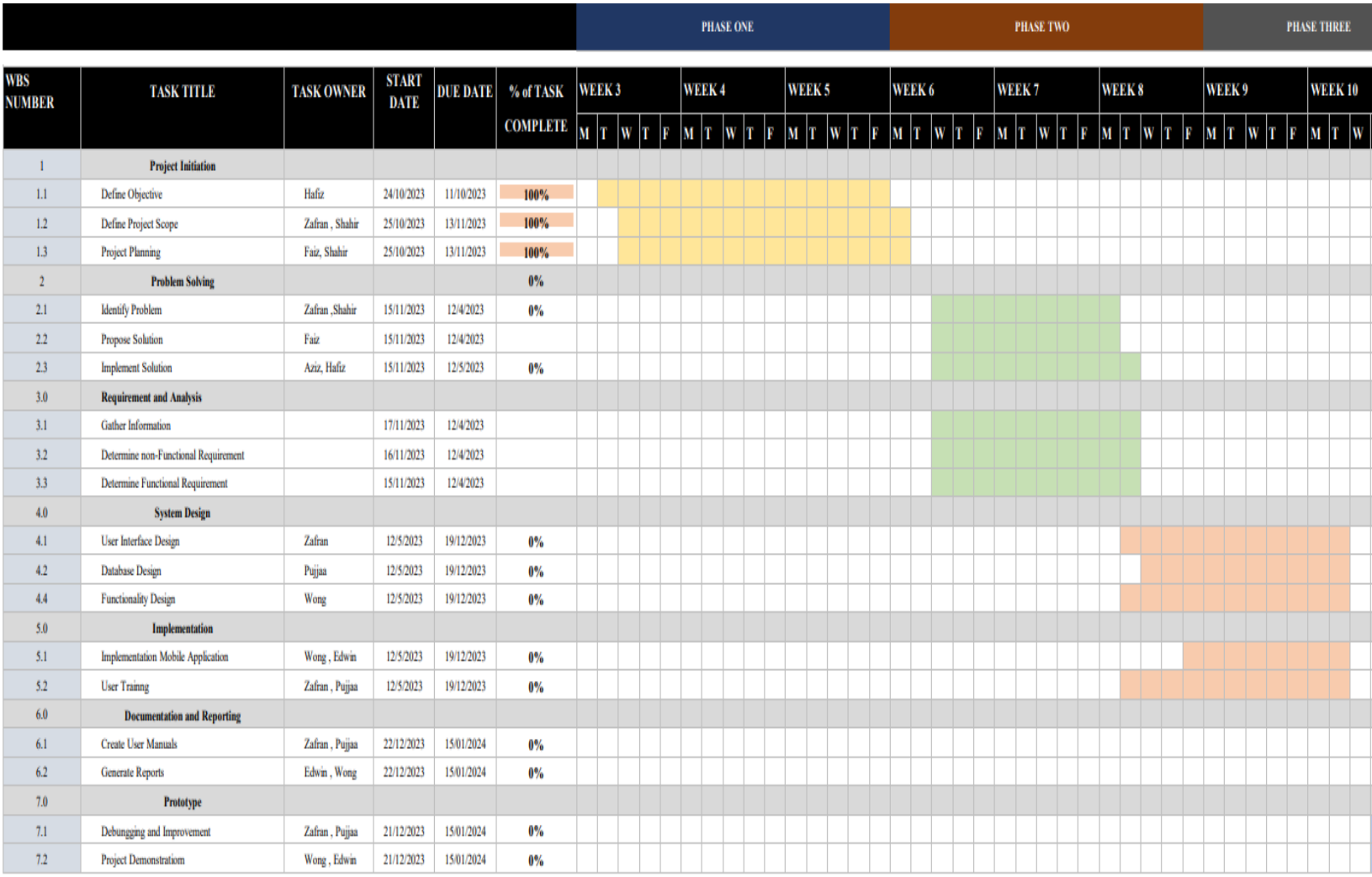
F. Documentation And reporting

- Create User Manuals: For the benefit of the participants and the MBIP department.
- Generate Reports: Periodic reports will be generated for MBIP in the application.

G. Prototype

- Debugging and Improvement : Debug the project and improvise the system
- Project Demonstration :Demonstrate the system to make sure its ready to publish

7.3 GANTT CHART



WBS NUMBER	TASK TITLE	TASK OWNER	START DATE	DUE DATE	% of TASK COMPLETE
1	**Project Initiation**				
1.1	Define Objective	Hafiz	24/10/2023	11/10/2023	100%
1.2	Define Project Scope	Zafran , Shahir	25/10/2023	13/11/2023	100%
1.3	Project Planning	Faiz, Shahir	25/10/2023	13/11/2023	100%
2	**Problem Solving**				0%
2.1	Identify Problem	Zafran ,Shahir	15/11/2023	12/4/2023	0%
2.2	Propose Solution	Faiz	15/11/2023	12/4/2023	
2.3	Implement Solution	Aziz, Hafiz	15/11/2023	12/5/2023	0%
3.0	**Requirement and Analysis**				
3.1	Gather Information		17/11/2023	12/4/2023	
3.2	Determine non-Functional Requirement		16/11/2023	12/4/2023	
3.3	Determine Functional Requirement		15/11/2023	12/4/2023	
4.0	**System Design**				
4.1	User Interface Design	Zafran	12/5/2023	19/12/2023	0%
4.2	Database Design	Puijaa	12/5/2023	19/12/2023	0%
4.4	Functionality Design	Wong	12/5/2023	19/12/2023	0%
5.0	**Implementation**				
5.1	Implementation Mobile Application	Wong , Edwin	12/5/2023	19/12/2023	0%
5.2	User Trainng	Zafran , Puijaa	12/5/2023	19/12/2023	0%
6.0	**Documentation and Reporting**				
6.1	Create User Manuals	Zafran , Puijaa	22/12/2023	15/01/2024	0%
6.2	Generate Reports	Edwin , Wong	22/12/2023	15/01/2024	0%
7.0	**Prototype**				
7.1	Debungging and Improvement	Zafran , Puijaa	21/12/2023	15/01/2024	0%
7.2	Project Demonstratiom	Wong , Edwin	21/12/2023	15/01/2024	0%

Figure 3 : Gantt Chart based on WBS

8.0 REQUIREMENT ANALYSIS

Stakeholders:

1. Iskandar Puteri City Council (MBIP):

- Responsible for implementing the IPRK initiative and monitoring the entire process.
- Requires efficient data collection, analysis, and reporting to measure the success of the initiative.
- Needs a good system to get as many participants as possible.

2. Residents:

- The contributors of data on energy-saving efforts.
- Need a user-friendly and easy-to-use platform for data submission.

3. Institutions:

- Participants in the initiative, contributing data on energy-saving practices.
- Require a platform that integrates seamlessly with their operational processes.

4. Factories:

- Contribute to energy-saving efforts and may have specific data related to their industrial processes.
- Require a platform that allows them to efficiently report their contributions to the low carbon initiative.

Functional Requirements:

1. User Registration:

- Residents, institutions, MBIP staff and factories should be able to register easily for the IPRK initiative platform.

2. Data Submission:

- Participants should have a good and user-friendly interface for submitting data required for the initiative.

3. Automated Calculations:

- The system should calculate carbon emission based on the data submitted by participants automatically rather than manual labor.

4. Real-time Reporting:

- Generate real-time reports on carbon footprints and energy-saving efforts.
- Provide MBIP with visualizations of the data gathered.

5. Dashboard:

- Implement a self-monitoring dashboard for MBIP to track progress and receive insights.

7. Compatibility:

- Ensure the platform is compatible with various devices and browsers for accessibility.

8. Security:

- Ensure security measures to protect participant data and privacy from misuse.

Non-functional Requirements:

1. Performance:

- The platform should perform efficiently, providing quick responses to user interactions.

2. Scalability:

- The system should be scalable to handle a growing number of participants and increasing data over time.

3. Reliability:

- The platform should be reliable, minimizing downtime and ensuring data integrity.

4. Usability:

- The user interface should be intuitive and easy to navigate, catering to users with varying technical proficiencies.

Constraints:

1. Budget Constraints:

- Develop the platform within an expected budget to ensure cost-effectiveness.

2. Timeline Constraints:

- Complete the development and implementation of the system according to a planned dateline.

Assumptions:

1. Participant Engagement:

- Assume that participants will engage with the platform willingly sharing their personal data.

2. Data Accuracy:

- Assume that the data entered by participants is accurate and legit based on their consumption.

3. User-friendly Interface:

- Assume that participants will be able to submit their data with easy

8.1 CURRENT BUSINESS PROCESS

The current business process of MBIP is promoting the Low Carbon Society (LCS) as well as managing the energy saving electricity and energy consumption.

1.Data Collection

The database system must have the capability to execute data transactions among different system applications that are integrated into the database system. Certain integrated applications rely on important data, such as electricity bills, water bills, and waste management, in order to operate effectively. As a result, it is essential for the database to flawlessly carry out the data transactions.

2. Data Transaction

Currently, the gathering of data is done through a Google Form in a manual manner. Individuals are required to provide in-depth information about their energy-saving practices, including

details about their energy consumption. The act of manually inputting this data can be tiresome and may pose challenges for participants, especially because of the extensive amount of information that is being asked for.

3.Carbon Reduction Calculations

MBIP conducts manual calculations by analyzing the data provided by participants to evaluate their accomplishments in reducing carbon emissions. These calculations encompass a thorough examination of various factors such as electricity usage, water consumption, waste management, and the utilization of recycled cooking oil. Through this meticulous evaluation, MBIP can estimate the amount of carbon emissions that correspond to these activities.

4.Data Presentation

In order for the database system to be effective, it is necessary for it to possess the ability to present data in a manner that is both well-organized and structured. This entails ensuring that the data is stored in a way that aligns with its designated relations, such as storing user-related information in the appropriate users' relation. By upholding proper organization and adhering to the specified data requirements, the database system can efficiently manage and retrieve information in a manner that is both meaningful and efficient.

5.Data Backup and Recovery

Having redundancy in your database is essential for keeping your business running smoothly. It's mainly because it helps protect you from major system issues that could cause problems with your database. It also makes it easier to get your data back if something goes wrong. It's up to your system admin to make sure you're doing regular backups of your database and keeping the backup info safe.

6.Reporting and Analysis

MBIP uses data from participants and calculates how much they've saved to create detailed reports. These reports give us an idea of how much the whole community has saved. We can use these reports to see how well our programs are doing and what needs to be improved. These reports are really important because they help us measure how successful our energy-saving efforts are and set us up for success in the future.

7.Security Data

It's really important to keep your data safe and secure if you want to keep your business running smoothly. You need to make sure your system has strong security measures in place, like authentication, controls on who can access it, and encryption. This will make sure that only the right people can see and change the data, and show that your company is serious about protecting it and following the law.

9.0 TRANSACTION REQUIREMENT

9.1 Data Entry

- **Enter the information for user's registration:**
  Users register their account authorization (technical admin, community, MBIP)
- **Enter the type/category of user:**
  Users choose their community category (residents, institution, MBIP divisions/staff)
- **Enter the user's information:**
  Users input their required information
- **Enter the type of data to be provided:**
  Users choose the type of data to provide for the system (consumption of electricity, water, waste, recycle cooking oil consumption)
- **Enter the detailed information for carbon-related domestic consumption:**
  Users provide relevant records/documents data related to carbon emissions based on their choice of data type, such as energy usage, consumption habits, and other related activities
- **Enter the detailed information for CO2 emissions:**
  Users enter the detailed data related to CO2 emissions, to support their provided data

9.2 Data Update/Delete

- **Update/delete the details of user profile:**
  Enable all categories of users to modify the informations of their respective account profile, and allow admin to manage the information of all users' profile
- **Update/delete the details of MBIP region's carbon footprint mapping:**
  Allow admin/MBIP staff to manage the carbon footprint data within the MBIP region
- **Update/delete the information previously provided by users:**
  Enable users to modify their data they provided within a certain duration and allow admin/MBIP staff to manage the data provided by the community
- **Update/delete the details of analyzed data provided by users:**
  Allow MBIP staff/A.I. to analyzed the data provided in certain manners to create statistics for regional carbon footprint mapping, dashboard and to determine communities with high CO2 consumption
- **Update/delete the information of calculated carbon reductions:**
  Allow A.I. to automatically calculated the carbon reductions based on data provided by the community to be included in the analyzed data
- **Update/delete the details of communities with high CO2 consumption:**
  Allow MBIP staff/A.I. to identify and determine the communities with high CO2 consumption based on the analyzed data, and promptly alert the users of that community regarding that matter
- **Update/delete the details on the user's carbon emissions dashboard:**
  Enable all users to manage their self-monitoring dashboard for carbon emissions among users

9.3 Data Queries

- **List detailed information of user profile:**
  Display to users the information of their respective account profile, and display to admin/MBIP staff the information of all users' profile
- **List detailed information of user's carbon footprint analysis:**
  Display to users the analyzed data of respected users' carbon footprint, and display to admin/MBIP staff all users analyzed data
- **List of detailed information of user's consumption history and trends:**
  Display to users their respective previous carbon usage that can be viewed by choosing desired timeframe, and display to MBIP staff all users' previous carbon usage
- **List of detailed information of user's overall carbon emissions data:**
  Provide to users their respective analyzed data of carbon emissions, and provide to MBIP staff the analyzed data of all users' carbon emissions and overall carbon emissions data based on community categories and regions

- **List detailed information of MBIP region's carbon footprint mapping:**
  Provide to admin/MBIP staff the regional mapping of the carbon footprint of the community within the MBIP region
- **List detailed information of user's carbon emission dashboard:**
  Provide to all users the detailed data and insights on the user's carbon emission dashboard

10.0 BENEFIT AND SUMMARY OF PROPOSED SYSTEM

Benefits of the Proposed System:

Efficiency and Accuracy: By utilizing artificial intelligence (AI), automation enables quicker and more accurate data gathering, verification, and analysis while lowering the possibility of errors linked to human procedures.

Improved User Experience: Creating an interface that is easy to use makes the process of submitting data easier for participants to complete, reducing the need for help and ultimately raising user satisfaction.

Enhanced Participation: The suggested solution seeks to increase participation rates by streamlining and streamlining data input processes, guaranteeing a more extensive dataset for analysis and decision-making.

Promotion of Digital Literacy: By training the community—particularly the elderly—digital literacy is improved, enabling participants to interact with the low-carbon initiative's technology components more skillfully.

Incentive Mechanisms: By offering blockchain digital certificates and taking tax reductions into account, incentives are used to promote cooperation and active engagement from factories as well as individuals.

Strategic Decision-Making: By enabling MBIP to make well-informed decisions based on up-to-date information, the suggested system helps analyze data and provide insights, which results in more successful low-carbon efforts.

Language Accessibility: By making Bahasa Melayu the dominant language, the project promotes inclusivity by guaranteeing greater accessibility and comprehension for locals.

Summary of proposed system:

The suggested method uses artificial intelligence (AI) to streamline the Iskandar Puteri Low Carbon (IPRK) project of the Iskandar Puteri City Council (MBIP) by automating data collection, verification, and analysis. The system additionally prioritizes the advancement of digital literacy, the creation of an intuitive user interface, and the streamlining of data entry processes to foster community involvement. The goal of incentive mechanisms like tax breaks and blockchain digital certificates is to recognise and compensate participants. The system's overall goals are to improve participation, boost efficiency, and offer insightful information for strategic decision-making in the effort to create a low-carbon community.

11.0 SUMMARY

In summary, MBIP greatly benefits from the Carbon Reduction and Sustainability Engagement System. as it implements the IPRK project. It lists a few issues that have been discovered, including a laborious and difficult-to-use data entry procedure, voluminous participant information requirements, manual carbon reduction calculations, a deficiency in data analysis tools, a variety of user profiles, and participants' lack of familiarity with the system.

In light of the reflection, this phase 1 project has taught our team a lot. We had to first fully comprehend the needs of the stakeholders. It provides understanding of the organization's broader goals. Next, the viability of the economy is taken into account. The Cost-Benefit Analysis (CBA), which examined both concrete and intangible benefits, helped us choose how much weight to give to long-term benefits over immediate financial gains, such as improving communities' overall health, raising living standards, and protecting the environment.

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