INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

INFO 2304 - SYSTEM ANALYSIS AND DESIGN

SECTION 2

SEMESTER 2, 2023/2024

PROJECT TITLE: ENERGY TRACKING FRAMEWORK

GROUP NAME: BIT BYTE

GROUP MEMBERS:

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1.1 GENERAL PROJECT INFORMATION

Our project, titled "Energy Tracking Framework", aligns with the Sustainable Development Goal 7 (SDG 7) set forth by the United Nations in the 2030 Agenda for Sustainable Development. SDG 7 emphasizes the importance of ensuring universal access to affordable, reliable, and sustainable energy, acknowledging its pivotal role in broader sustainable development objectives. The company aims to create a cutting-edge system that facilitates access to modern and sustainable energy, contributing to economic growth. In line with the key components and targets of SDG 7, the project will focus on universal energy access, the promotion of renewable energy, building sustainable energy infrastructure, fostering research and innovation, and implementing Tracking and reporting mechanisms. Bit Byte Company's primary objective is centered on pioneering modern innovations that support these sustainable energy goals within university classroom environments.

1.2 ORGANIZATIONAL BACKGROUND

Bit Company is a team of dedicated people specializing in energy efficiency Tracking systems. We were founded with the mission of promoting sustainable and environmentally responsible energy consumption. The team comprises expertise, innovation, and a commitment to excellence to drive the transition towards a greener future. The company focuses on the 7th Sustainable Development Goal (SDG) which is affordable and clean energy, out of the 17 SDG goals. Therefore, the company targets to increase efficiency in energy consumption by Tracking its usage as a first step in achieving clean energy.

Executive leadership:

1. Tengku Abduh - CEO
2. Yusuf Mohammad Yunus - COO

Manager:

1. Ahmad Syawqi - Product Manager
2. Nur Jannah - Marketing manager

Technical experts:

1. Aman Shafeeq - Senior Software Engineer

Bit Byte Company's mission is centered on empowering individuals, businesses, and institutions to reduce energy consumption, cut costs, and contribute to a sustainable future with data-driven information. With the team's expertise and passion for energy conservation, we are the leading company in energy efficiency Tracking systems.

1.3 PROBLEM DESCRIPTION

1.3.1 BACKGROUND OF THE PROBLEM

The inefficiency of energy management within educational institutions poses a significant challenge, primarily due to the absence of reliable Tracking systems. This absence inhibits the identification of energy waste and inefficiencies. To foster a more sustainable and cost-effective educational environment, there's a pressing need to enhance Tracking and Tracking systems, raise public awareness, and prioritize energy-efficient practices.

1.3.2 PROBLEM STATEMENTS

1. **Lack of Real-Time Energy Tracking Systems:** Educational institutions lack sophisticated, real-time energy Tracking systems that detect areas of energy waste and inefficiency. These systems are necessary for institutions to understand their energy usage patterns and implement effective energy-saving measures, otherwise it leads to energy wastage. (Granderson & Piette, 2009).

2. **Lack of Benchmarking and Performance Standards which leads to increased energy consumption and high bills:** The absence of clear benchmarking and performance standards for energy consumption in educational institutions makes it challenging to set realistic energy-saving goals and track progress (Sullivan & Gouldson, 2013).

3. **Insufficient Awareness and Training:** There is a significant gap in awareness among stakeholders in educational institutions regarding the benefits and practices of

energy efficiency. This lack of knowledge extends to both the financial advantages and environmental impacts of energy-saving measures (Thollander & Palm, 2010).
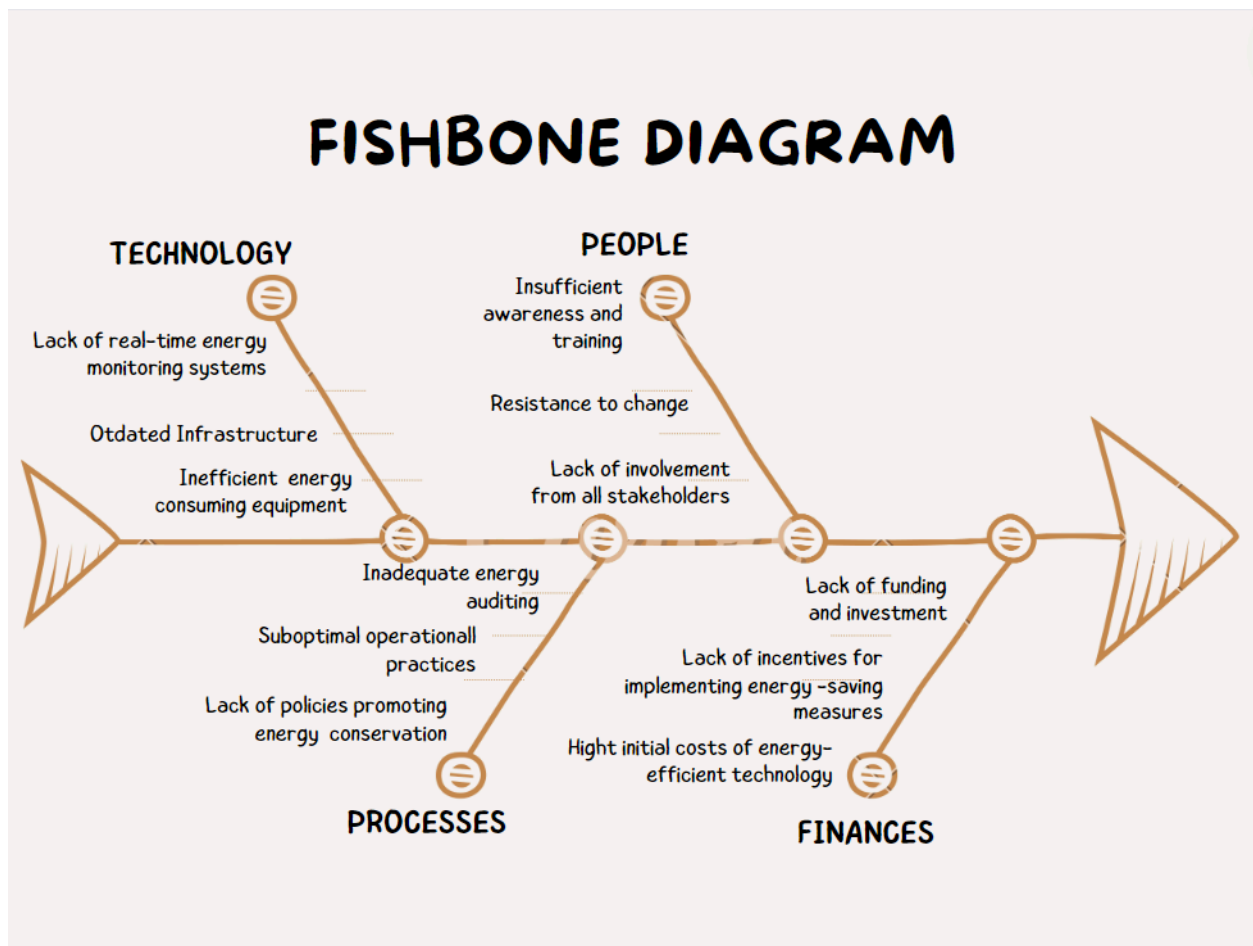
1.3.3 FISHBONE DIAGRAMS

Figure 1: Fishbone Diagram for The Energy Tracking Framework

1.4 PROJECT OBJECTIVES

The primary objective of our project is to create a system that keeps an eye on energy use. We want to stop wasteful energy habits and encourage using energy wisely, especially because of rapid global population growth and increased energy accessibility. We're worried that wasting energy could make it harder for some people to get the energy they need. Our main aim is to set up a simple way to watch how much energy is used and make sure it's used efficiently to help the environment.

To achieve this, our strategy involves developing a comprehensive energy tracking framework capable of accurately Tracking energy usage within various settings, such as classrooms or multipurpose halls. Instead of focusing solely on device deactivation, our framework emphasizes real-time data collection and analysis coupled with artificial intelligence algorithms to optimize energy utilization within these spaces. By tracking energy usage patterns and identifying inefficiencies, our framework enables proactive measures to minimize waste and promote sustainable energy practices.

1.5 PROJECT SCOPE

1.5.1 TARGETED USERS

1. **KICT Students**

   Description: The KICT student body makes up this user group.

   Requirements: They want energy-saving technologies like motion-activated lighting to improve their educational experience and encourage sustainability.

2. **Lecturers and Academic Staff of KICT**

   Description: Professors, academic staff, and teaching staff in KICT are all included in this group.

   Requirements: They value a system that uses less energy and improves the learning environment.

3. **KICT Staff & Facility Managers (Daya Bersih)**

   Description: This user group is made up of the janitorial and cleaning staff who are in charge of keeping KICT buildings neat and orderly.

   Requirements: To perform their duties safely and efficiently, cleaning personnel need an energy-efficient system and a well-lit workplace.

4. **General KICT Population**

   Description: All KICT individuals, including visitors and maintenance personnel.

   Requirements: To maintain convenience and safety, they appreciate well-lit, energy-efficient environments in common areas and outdoor areas for example the hallway.

1.6 SIGNIFICANCE OF THE PROJECT

This software project carries great importance for several reasons related to software. By optimizing energy use through software, educational institutions can achieve significant cost savings, enabling them to invest in improving infrastructure and resources. Additionally, software-driven energy waste reduction aligns with global initiatives aimed at reducing environmental impact, making a notable contribution to environmental sustainability. Furthermore, the cultivation of environmental responsibility is facilitated by introducing energy-efficient practices in schools and universities through software. This project not only promotes long-term sustainability goals but also establishes educational institutions as role models, inspiring similar initiatives across various industries. Hence, this software project has far-reaching implications for environmental sustainability, cost savings, and cultural change within educational institutions and beyond.

1.8 PROJECT DELIVERABLES & GANTT CHART

GANTT CHART
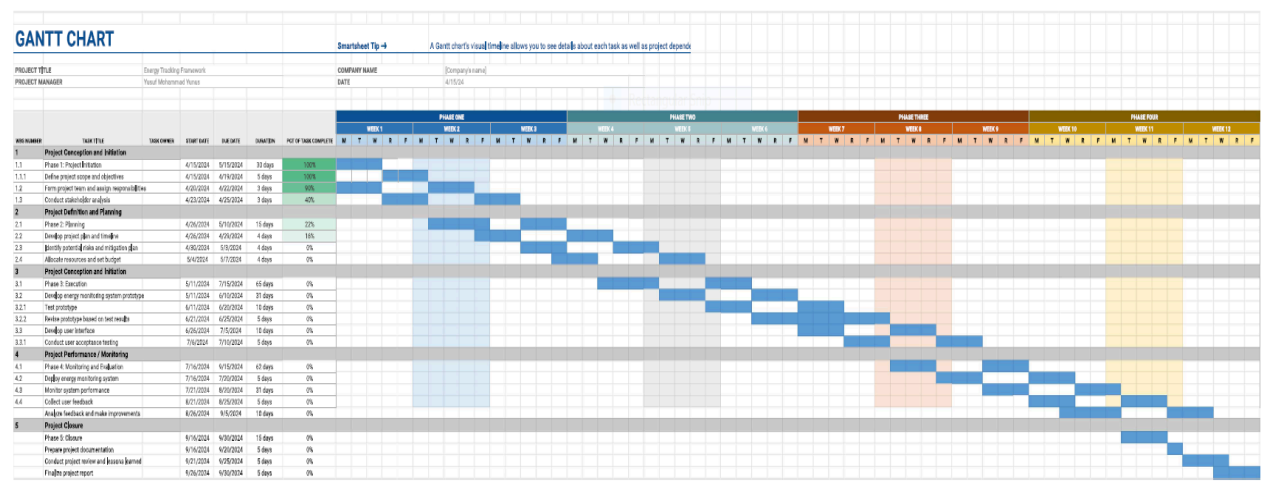
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2.0 PROJECT SUMMARY

The "Energy Tracking Framework" project by Bit Byte Company aims to create an innovative software solution to monitor and optimize energy usage in university classroom environments. This initiative aligns with the United Nations' **Sustainable Development Goal 7**, emphasizing affordable, reliable, sustainable, and modern energy for all. The project addresses the critical issue of inefficient energy management in educational institutions, where there is a lack of real-time energy tracking, benchmarking, and awareness of energy conservation practices. The proposed software solution includes AI capabilities to automatically control energy consumption by shutting off unnecessary digital systems when no human presence is detected, thus conserving energy. Target users include KICT students, lecturers, academic staff, facility managers, and the general KICT population, all of whom will benefit from an improved, energy-efficient educational environment.

Possible Challenges:

1. Implementing an AI-based software system that accurately detects human presence and controls various digital systems could be technically challenging.
2. Resistance from staff and students accustomed to current practices may hinder the adoption of new software technologies.
3. The initial investment for developing and installing the energy efficiency management software may be significant.

Risks:

1. The system's need to monitor human presence could raise data privacy concerns.
2. Dependence on the software for energy savings puts pressure on its reliability and uptime.
3. Rapid advancements in technology could render the software outdated if not regularly updated.

Mitigation Plan:

The "Energy Tracking Framework" project adopts a comprehensive approach to mitigate potential challenges and risks. Technical complexities will be addressed by employing seasoned consultants and subjecting the software to rigorous testing. Change management strategies, such as educational workshops, will ensure user acceptance by highlighting the software's benefits and operational procedures. Financial constraints will be tackled by seeking government grants, sustainability incentives, and forming partnerships with environmental organizations.

For maintenance, a detailed schedule and staff training will ensure routine checks, supplemented by a service contract with the software provider. Data privacy concerns will be managed through compliance with strict data protection laws and the implementation of advanced security protocols. Redundancy features and a contingency plan will fortify the software's reliability.

To mitigate the risk of technological obsolescence, the software will be developed with scalability and modularity in mind. A pilot project will be conducted to evaluate the energy-saving claims empirically, thereby reducing financial risk. This comprehensive strategy

aims to guarantee the project's success and align with the objectives of sustainable energy management within educational environments, potentially serving as a template for comparable initiatives in other sectors.

REFERENCES

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2. *Granderson, J., & Piette, M. A. (2009). Energy information systems (EIS): Technology costs, benefits, and best practice uses. Ernest Orlando Lawrence Berkeley National Laboratory, LBNL Paper LBNL-1975E.*
3. *Sullivan, R., & Gouldson, A. (2013). Ten years of corporate action on carbon reduction: What do we have to show for it? Energy Policy, 60, 733-740.*