

CHAPTER 1

INTRODUCTION

1.1 Project Background

Sustainability is based on a simple principle: everything we need to survive and thrive depends directly or indirectly on our natural environment. Pursuing sustainable development means creating and maintaining conditions in which humans live in harmony with nature to support present and future generations. Often understood as an effort to reduce the waste of natural resources, sustainability for many means recycling and energy efficiency. But sustainability is both more challenging and more rewarding. As we participate in the expansion and shift of global networks, it pushes us to better understand our world and ourselves. It fosters a sense of responsibility to maintain the integrity, health, and resilience of the environmental, social, and economic networks that support us.

The United Nations adopted the Sustainable Development Goals (SDGs), also known as the Global Goals, in 2015 as a universal call to action to end poverty, protect the planet, and ensure peace and prosperity for all by 2030. The 17 SDGs are integrated - recognizing that actions in one area affect outcomes in other areas, and that development must balance social, economic, and environmental sustainability. Countries have pledged to prioritize progress for the most backward countries. The SDGs aim to eradicate poverty, hunger, AIDS and discrimination against women and girls. Achieving the SDGs in any context requires the creativity, expertise, technical and financial resources of society as a whole.

Implementing sustainable practices on college campuses is one way to combat global climate change. A key aspect of developing a sustainable university campus is evaluating activities related to carbon dioxide (CO₂) emissions, such as the burning of fossil fuels, which contribute to a warming campus atmosphere. Global warming is due to current technological practices supporting the use of fossil fuels as the primary energy source. The energy consumption of human activities leads to an increase in carbon dioxide emissions. Given global concerns about climate change, many universities and organizations are taking stock of greenhouse gas emissions to determine their global warming potential and are targeting emissions reductions as a path to a zero-emission and sustainable university campus environment.

It is not uncommon to assess the environmental impact of university campus activities. However, until recently, it was not common to calculate CO₂ emissions from university campuses in Indonesia. This may be due to a lack of sufficient data for existing tools, mainly developed for regions outside Indonesia, but also because most energy assessment methods and existing energy software are complex, expensive, and difficult to understand. Therefore, the use of CO₂ emissions as a driver of sustainability assessment is not popular on Indonesian university campuses.

In this study, factors that contribute to the amount of carbon emissions from Indonesia International Institute for Life Sciences (i3L) will be identified, and a prototype model will be developed

to calculate the carbon emissions generated by i3L. With intensive research, a recommended model of learning will be formulated to reduce carbon emissions in i3L.

1.2 Research Objective

The objectives of this research are listed below:

- To compare the effects of different modes of transport toward carbon emissions during offline learning
- To determine the carbon emissions during hybrid learning under different scenarios
- To compare the carbon emissions during offline learning and hybrid learning, assuming the mode of transport is the same

1.3 Research Hypothesis

The hypotheses of this research are listed below:

- In learning model of i3L during offline learning, using public transport generates significantly less emissions than using private transport for staff and students' travel commute
- In learning model of i3L during hybrid learning, the total carbon emission is significantly affected by both the amount of days of offline and online learning, and other appliances that's used
- The learning model of i3L during hybrid learning generates significantly less carbon emissions than the learning model of i3L during offline learning, assuming the mode of transport is the same

1.4 Research Scope

This study will be done by using a computer (dry lab). The scope of this project will include:

- Data collection from various databases (i3L, PLN), as well as qualitative data collection to support the result
- Develop learning model scenarios to calculate the amount of carbon emissions from i3L
- Examine the effect of mode of transportation towards carbon emissions in i3L
- Examine the effect of equipment/device/appliance consuming energy towards carbon emissions in i3L
- Determine the model of learning that generates the least carbon emissions in i3L