WEB APPLICATION DEVELOPMENT FOR STANDARDIZED CO_2 EMISSION CALCULATION IN CEMENT MANUFACTURING USING THE CSI CO_2 AND ENERGY PROTOCOL

FINAL THESIS

DHANI AMANDA PUTRA
41521010116

DEPARTMENT OF INFORMATICS ENGINEERING
FACULTY OF COMPUTER SCIENCE
UNIVERSITAS MERCU BUANA
JAKARTA
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Submitted as one of the requirements to obtain a bachelor's degree

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2025

STATEMENT OF ORIGINAL WORK PAGE

I, the undersigned below:

Name	:	Dhani Amanda Putra
Student ID	:	41521010116
Study Program	:	Informatics Engineering
Final Project Title	:	Web Application Development for Standardized CO_2 Emission Calculation in Cement Manufacturing Using the CSI CO_2 and Energy Protocol

I hereby declare that this final project report is my own work and is not plagiarized, and that I have stated all sources, both quoted and referenced, correctly. If it is found that my final project report contains elements of plagiarism, I am prepared to accept the academic sanctions applicable at Universitas Mercu Buana.

Jakarta, 25 August 2025

Dhani Amanda Putra

APPROVAL PAGE

This Final Thesis Report is submitted by:

Name	:	Dhani Amanda Putra
Student ID	:	41521010116
Study Program	:	Informatics Engineering
Thesis Title	:	Web Application Development for Standardized CO_2 Emission Calculation in Cement Manufacturing Using the CSI CO_2 and Energy Protocol

Has been successfully defended at the hearing before the Board of Examiners and accepted as part of the requirements needed to obtain a Bachelor's degree in the Informatics Engineering Study Program, Faculty of Computer Science, Universitas Mercu Buana.

Approved by:

Supervisor	: Ir. Emil R. Kaburuan, Ph.D., IPM., PMP, CISM, ASEAN Eng., SMIEEE	( )
NIDN	: 0429058004	
Head Examiner	: Ilham Nugraha, S.Kom ,M.Sc	( )
NIDN	: 307098904	
Examiner 1	: Dr. Hadi Santoso, S.Kom., M.Kom.	( )
NIDN	: 0225067701	
Examiner 2	: Dr. Afiyati, S.Si., M.T.	( )
NIDN	: 0316106908	

Jakarta, 25 Agustus 2025

Acknowledged by,

Dean	Head of Study Program
Dr. Bambang Jokonowo, S.Si., MTI	Dr. Hadi Santoso, S.Kom., M.Kom
NIDN : 0320037002	NIDN : 0225067701

ACKNOWLEDGEMENTS

Praise be to God Almighty, for all His grace and pleasure so that the author can complete the research proposal which is one of the requirements for graduation of the Bachelor of Computer Science (S1) Study Program in the Department of Informatics Engineering, Universitas Mercu Buana.

The author realizes that this thesis is still far from perfect, because true perfection belongs only to God Almighty. Therefore, constructive suggestions and inputs are always accepted by the author with pleasure. As well as thanks to the support, motivation, help, guidance, and prayers from many parties, the author would like to thank:

1. Prof. Dr. Andi Adriansyah, M.Eng. as the Rector of Universitas Mercu Buana.
2. Dr. Bambang Jokonowo, S.Si., M.TI as the Dean of Faculty of Computer Science.
3. Dr. Hadi Santoso, S.Kom., M.Kom. as the Head of the Informatics Engineering Study Program Universitas Mercu Buana.
4. Ir. Emil R. Kaburuan, Ph.D., IPM., PMP, CISM, ASEAN Eng., SMIEEE as my final thesis supervisor who has provided direction, motivation, provided time, energy, and thoughts so that during the making of this research proposal it was well scheduled.
5. My parents who have always supported me during my studies as a student of Universitas Mercu Buana.
6. Ethan, Dinda, Cal, Fei, and Goza—the best friends I could ever ask for—who are always there for me.

Finally, the author hopes that God Almighty will repay the goodness and always pour out grace, guidance, and long life to all of us, amen. Thank you.

Jakarta, 25 August 2025

Dhani Amanda Putra

STATEMENT OF APPROVAL FOR FINAL PROJECT PUBLICATION FOR ACADEMIC PURPOSES

As a member of the academic community of Universitas Mercu Buana, I, the undersigned, hereby state the following:

Name	:	Dhani Amanda Putra
Student ID	:	41521010116
Study Program	:	Informatics Engineering
Final Project Title	:	Web Application Development for Standardized CO_2 Emission Calculation in Cement Manufacturing Using the CSI CO_2 and Energy Protocol

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Jakarta, 25 August 2025
Signature,

Dhani Amanda Putra

ABSTRACT

Name	:	Dhani Amanda Putra
Student ID	:	41521010116
Study Program	:	Informatics Engineering
Research Proposal Title	:	Web Application Development for Standardized CO_2 Emission Calculation in Cement Manufacturing Using the CSI CO_2 and Energy Protocol
Supervisor	:	Ir. Emil R. Kaburuan, Ph.D., IPM., PMP, CISM, ASEAN Eng., SMIEEE

The cement industry is a significant contributor to global greenhouse gas emissions, making accurate and standardized CO_2 emission reporting crucial for sustainable development. This study addresses the challenges faced by Indonesian cement producers in adopting the complex Cement Sustainability Initiative (CSI) CO_2 and Energy Protocol, a globally recognized framework for emission calculation. Many plants in Indonesia lack the resources and expertise for seamless implementation, and existing tools often lack regional relevance. To bridge this gap, this study focuses on the development and evaluation of a web-based application designed to streamline and automate CO_2 emission calculations according to the CSI protocol. The primary objective is to create a user-friendly, accessible, and scalable platform tailored to the specific needs of the Indonesian cement industry, simplifying data entry and automating the generation of standardized reports. Employing a descriptive research design and a prototype development model, the study will first analyze the complexities of the CSI protocol and the specific implementation barriers in Indonesia. Subsequently, a web application will be designed and built using technologies such as HTML, CSS, and JavaScript. The platform's effectiveness will be validated through a multi-faceted evaluation process, including expert validation for computational accuracy, usability testing using the System Usability Scale (SUS), and User Acceptance Testing (UAT) with industry stakeholders. This study is expected to deliver a practical tool that simplifies reporting, enhances data accuracy and transparency, and provides data-driven insights for process optimization. By facilitating standardized CO_2 reporting, the application aims to support Indonesia's cement sector in its transition towards more sustainable and environmentally responsible practices, contributing to national and global climate mitigation goals.

Keywords: GHG Emission, CSI Protocol, Web Application, Reporting.

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