ABSTRAK

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Judul   : "Analisis Konsep *Green Retrofit* Sesuai Pedoman Permen PUPR No. 21 Tahun 2021 Pada Bangunan Industri Kimia Berbasis *Blockchain*-BIM Untuk Efisiensi Biaya"

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Green Industry diterapkan secara luas dalam industri manufaktur sebagai upaya untuk mengurangi dampak negatif terhadap lingkungan. Implementasi *green industry* dipengaruhi oleh berbagai faktor. Industri kimia menjadi salah satu sektor yang memiliki tantangan dalam menerapkan *green industry*. Penelitian ini mengkaji konsep *green retrofit* dalam industri kimia dengan menggunakan penilaian sesuai PUPR No. 21 Tahun 2021. Penelitian dilakukan di salah satu industri kimia di Kota Cilegon, Banten, Indonesia. Metode penelitian menggunakan kombinasi *Blockchain-Building Information Modeling (BIM)* untuk menganalisis efisiensi biaya *green retrofitting* dan SEM-PLS sebagai alat untuk mengolah data dari kuesioner dan mengidentifikasi faktor-faktor yang berpengaruh. Hasil menunjukkan bahwa penggunaan *Blockchain-Building Information Modeling (BIM)* dapat mengurangi biaya *retrofitting* sebesar 4,42% untuk pratama, 4,43% tingkat madya, dan 4,38% tingkat utama. Hal ini membuktikan bahwa *Blockchain-BIM* memiliki pengaruh yang signifikan dalam meningkatkan kinerja biaya dalam proses *retrofitting*.

Kata Kunci: *green retrofit, green industry,* industri kimia, *blockchain-BIM*, SEM-PLS, efisiensi biaya.

ABSTRACT

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Study Program	: *Master of Civil Engineering*
Title	: *"Analysis of Green Retrofit Concept According to Minister of Public Works and Housing Regulation No. 21 of 2021 on Chemical Industry Buildings Based on Blockchain-BIM for Cost Efficiency"*
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Green Industry is widely implemented in the manufacturing sector as an effort to reduce negative impacts on the environment. The implementation of green industry is influenced by various factors. The Chemical Industry is one sector that faces challenges in implementing green industry practices. This research examines the concept of green retrofitting in the chemical industry using an assessment based on the Ministry of Public Works and Housing Regulation No. 21 of 2021. The study was conducted in a chemical industry located in Cilegon, Banten, Indonesia. The research method combines Blockchain-Building Information Modeling (BIM) to analyze the cost efficiency of green retrofitting, and Structural Equation Modeling-Partial Least Squares (SEM-PLS) as a tool to process data from questionnaires and identify influential factors. The results indicate that the use of Blockchain-BIM can reduce retrofitting costs by 4.42% for low-level, 4.43% for medium-level, and 4.38% for high-level categories. This demonstrates that Blockchain-BIM has a significant impact on improving cost performance in the retrofitting process.

Keywords: Green Retrofit, Green Chemical Industry, Blockchain-BIM, SEM-PLS, Cost Efficiency