

## ABSTRAK

### **RENCANA REKLAMASI BERBASIS SERAPAN KARBON PADA TAMBANG BATUGAMPING PT SEMEN INDONESIA (PERSERO) TBK PABRIK TUBAN**

Oleh  
Nurmita Aufah Risty  
NIM: 112220196  
(Program Studi Sarjana Teknik Pertambangan)

Kegiatan penambangan batugamping di PT Semen Indonesia (Persero) Tbk Pabrik Tuban berkontribusi terhadap peningkatan emisi gas rumah kaca akibat konsumsi bahan bakar fosil pada alat berat. Upaya mitigasi dilakukan melalui reklamasi lahan pascatambang yang mampu menyerap karbon dioksida (CO<sub>2</sub>) melalui proses fotosintesis yang disimpan dalam bentuk biomassa vegetasi. Penelitian ini bertujuan untuk menganalisis emisi CO<sub>2</sub> tahun 2025, mengestimasi potensi dan efektifitas serapan karbon pada area reklamasi, serta menyusun rencana reklamasi periode 2026-2030 berbasis luasan dan jenis tanaman.

Metode penelitian menggunakan pedoman IPCC Guidelines 2006 untuk menghitung emisi sumber bergerak dari konsumsi solar B40 pada aktivitas *loading*, *hauling*, *supporting*, dan *blasting*. Potensi serapan karbon area reklamasi periode tanam 2014, 2020, dan 2025 dihitung menggunakan persamaan allometrik berdasarkan diameter dan tinggi pohon jati (*Tectona Grandis*). Analisis dilakukan melalui perbandingan antara total emisi tahun 2025 terhadap potensi serapan karbon vegetasi tahunan.

Hasil penelitian menunjukkan total emisi CO<sub>2</sub> tahun 2025 sebesar 7.979.011,15 kg CO<sub>2</sub>/tahun. Potensi penyerapan karbon lahan reklamasi sebesar 4.912.583,16 kg CO<sub>2</sub>/tahun dengan efektivitas serapan sebesar 62%, sehingga serapan karbon vegetasi belum mampu mengimbangi emisi CO<sub>2</sub>eq. Upaya peningkatan serapan karbon dilakukan melalui penyusunan skema reklamasi tahun 2026–2030 dengan penanaman sengon (*Paraserianthes Falcataria*) seluas 11,919 hektar menggunakan jarak tanam 3 × 4 meter. Skema tersebut menghasilkan efektivitas serapan karbon sebesar 112% terhadap emisi yang diproyeksikan pada tahun 2030 sehingga berpotensi melampaui emisi CO<sub>2</sub>eq dari kegiatan operasional tambang.

Kata kunci: allometrik, batugamping, emisi, karbon, reklamasi.

## ***ABSTRACT***

### **CARBON SEQUESTRATION-BASED RECLAMATION PLAN AT THE LIMESTONE MINE OF PT SEMEN INDONESIA (PERSERO) TBK TUBAN PLANT**

By  
Nurmita Aufah Risty  
NIM: 112220196  
(Mining Engineering Undergraduated Program)

*Limestone mining activities at PT Semen Indonesia (Persero) Tbk Tuban Plant contribute to the increase of greenhouse gas emissions due to fossil fuel consumption by heavy equipment. Mitigation efforts are carried out through post-mining land reclamation, which is capable of absorbing carbon dioxide (CO<sub>2</sub>) through photosynthesis and storing it in vegetation biomass. This study aims to analyze CO<sub>2</sub> emissions generated in 2025, estimate the potential and effectiveness of carbon sequestration in reclamation areas, and develop a reclamation plan for the 2026–2030 period based on land area and plant species.*

*The research method used the IPCC Guidelines 2006 to calculate mobile source emissions from B40 diesel fuel consumption in loading, hauling, supporting, and blasting activities. The carbon sequestration potential of reclamation areas planted in 2014, 2020, and 2025 was estimated using allometric equations based on the diameter and height of teak trees (*Tectona Grandis*). The analysis was conducted by comparing the total emissions in 2025 with the annual carbon sequestration potential of vegetation.*

*The results showed that total CO<sub>2</sub> emissions in 2025 reached 7,979,011.15 kg CO<sub>2</sub>/year. Meanwhile, the carbon sequestration potential of the reclamation areas was 4,912,583.16 kg CO<sub>2</sub>/year with a sequestration effectiveness of 62%, indicating that the carbon sequestration potential of the reclamation areas had not yet been sufficient to offset the CO<sub>2eq</sub> emissions. Efforts to increase carbon sequestration were carried out through a 2026–2030 reclamation scheme by planting sengon (*Paraserianthes Falcataria*) on 11.919 hectares using a 3×4 meter planting distance. This scheme resulted in a carbon sequestration effectiveness of 112% of the projected emissions in 2030, indicating its potential to offset and exceed the CO<sub>2eq</sub> emissions from the mining activities.*

*Keywords: allometric, carbon, emissions, limestone, reclamation*