

# Estimasi emisi CO<sub>2</sub> aktivitas stevedoring dan cargodoring di beberapa Terminal Peti Kemas Indonesia = Estimating CO<sub>2</sub> emissions from stevedoring and cargodoring activities in Indonesian Container Terminals

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## Abstrak

Peningkatan emisi CO<sub>2</sub> akibat dari aktivitas operasi pelabuhan terbukti menjadi penyebab perubahan iklim global, sehingga diperlukannya pemantauan emisi CO<sub>2</sub> di pelabuhan untuk mengontrol kualitas udara sebagai penerapan konsep Green Port. Penelitian ini bertujuan untuk mendapatkan gambaran emisi CO<sub>2</sub> akibat dari operasional peralatan bongkar muat pada aktivitas stevedoring dan cargodoring di beberapa terminal peti kemas Indonesia yang dapat dijadikan data pendukung untuk mengontrol kualitas udara dengan mengurangi emisi CO<sub>2</sub>. Model perhitungan dalam penelitian ini menerapkan perhitungan bottom-up terhadap aktivitas operasional di terminal, yang menjadikan nilai konsumsi bahan bakar sebagai hasil perhitungan. Data yang digunakan sebagai variabel input yaitu data operasional terminal peti kemas pada tahun 2019 meliputi jumlah throughput, proses perpindahan peti kemas, modalitas transportasi, dan layout terminal. Hasil dari penelitian ini menunjukkan TPK Banjarmasin, TPK Palaran dan TPK Teluk Bayur mengeluarkan total emisi CO<sub>2</sub> selama satu tahun berurutan sebesar 7.1 kiloton, 4.3 kiloton, dan 1.2 kiloton dan emisi CO<sub>2</sub> per TEU's nya sebesar 15.174 kg, 16.071 kg, dan 13.749 kg. Kontribusi emisi CO<sub>2</sub> per peralatan bongkar muat pada TPK Banjarmasin ; QCC 48.37%, RTG 23.82%, TT 27.81%, pada TPK Palaran ; QCC 45.67%, RTG 22.32%, TT 31.99%, dan pada TPK Teluk Bayur ; QCC 54.20%, RTG 26.29%, TT 19.50%.

.....The increase in CO<sub>2</sub> emissions as a result of port operating activities has proven to be the cause of global climate change, so it is necessary to monitor CO<sub>2</sub> emissions at ports to control air quality as an application of the Green Port concept. This study aims to obtain an overview of CO<sub>2</sub> emissions resulting from the operation of cargo handling equipment on stevedoring and cargodoring activities at several Indonesian container terminals which can be used as supporting data to control air quality by reducing CO<sub>2</sub> emissions. The calculation model in this study applies a bottom-up calculation to operational activities at the terminal, which makes the value of fuel consumption as the result of the calculation. The data used as an input variable is the operational data of the container terminal in 2019 including the amount of throughput, the process of moving containers, transportation modalities, and terminal layout. The results of this study show that Banjarmasin Container Terminal, Palaran Container Terminal and Teluk Bayur Container Terminal emit a total of 7.1 kilotons, 4.3 kilotons, and 1.2 kilotons of CO<sub>2</sub> emissions for one year respectively and their CO<sub>2</sub> emissions per TEU's are 15,174 kg, 16,071 kg, and 13,749 kg. CO<sub>2</sub> emission contribution cargo handling equipment at Banjarmasin Container Terminal; QCC 48.37%, RTG 23.82%, TT 27.81%, at Palaran Container Terminal; QCC 45.67%, RTG 22.32%, TT 31.99%, and at Teluk Bayur Container Terminal ; QCC 54.20%, RTG 26.29%, TT 19.50%.