

Penilaian emisi di terminal peti kemas berdasarkan data lapangan = Study on the carbon emission evaluation in a container port based on energy consumption data

Sirait, Simon Juanda, author

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Abstrak

ABSTRAK

Pemanasan global menjadi fenomena yang terus terjadi, hal ini menyebabkan meningkatnya suhu bumi sebesar 87oC setiap tahun. Saat ini 90% transportasi untuk industri dilakukan melalui jalur laut. Terdapat dua komponen yang paling berperan dalam jalur laut yaitu kapal dan pelabuhan. Penelitian ini akan berfokus pada perhitungan emisi yang ada dalam keseluruhan proses di pelabuhan, mulai dari kapal berlabuh, proses bongkar muat, transfer dari dermaga ke daerah penumpukan, aktivitas penumpukan dan sebaliknya. Metodologi penelitian ini adalah dengan mengumpulkan data kinerja pelabuhan selama satu tahun mulai dari data kapal berlabuh, data alat dan utilitas, konsumsi bahan bakar dan listrik. Pelabuhan yang diteliti adalah Belawan International Container Terminal (BICT), Jakarta International Container Terminal, dan Terminal Teluk Lamong (TTL). Faktor emisi yang digunakan untuk bahan bakar berdasarkan ketentuan yang dikeluarkan Kementerian Lingkungan Hidup yang telah meratifikasi IPCC 2006 dan untuk listrik menggunakan faktor emisi pembangkit Jawa Madura Bali yaitu 0.844 kg CO₂/KWH. Berdasarkan penelitian ini, didapat bahwa emisi berdasarkan keseluruhan peralatan pelabuhan BICT menjadi paling hemat dengan 15.93 kg CO₂/teus kemudian JICT 16.40 kg CO₂/teus dan TTL 18.66 kg CO₂/teus. Untuk emisi yang dihasilkan berdasarkan bahan bakar atau emisi langsung di daerah pelabuhan, TTL menjadi paling rendah emisi dengan 9.00 kg CO₂/teus kemudian BICT 10.64 kg CO₂/teus dan BICT dengan 15.38 kg CO₂/teus. Untuk emisi yang berdasarkan keseluruhan proses di pelabuhan mulai dari kapal sandar hingga peti kemas keluar pelabuhan BICT menjadi paling rendah emisi dengan 29.08 kg CO₂/teus kemudian JICT dengan 36.59 kg CO₂/teus dan BICT 48.56 kg CO₂/teus. Emisi yang sangat besar dihasilkan saat kapal sedang bersandar dan dengan penggunaan power on shore akan dapat mengurangi emisi ini dan secara keseluruhan emisi di daerah pelabuhan menjadi kecil.

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<i>ABSTRACT</i>

The port sector has been playing one of the important roles in global trade as ports are one of the transportation chain-rings in building environmental-social performance. As we all know, the usage of means of transportation are spreading further across the world. Starting with the Kyoto Protocol for ships, the environmentally friendly trend has also drawn in the port sector. However, it is difficult to find a model with the same characteristics as those of the ports as the models. The models can be used to compare the operational performances in the aspect of CO₂ emission production. On that basis, this research aimed at estimating the CO₂ emissions in container ports in order to portray how a port deals with its operational matters using models suiTabel for ideal circumstances based on the available equipment. This calculative system applies the bottom-up calculation of the work activities done in the ports, of the amount of fuel consumption, not as an input variable, but as the result of the calculation of the calculation itself. As for the input variables, they are the throughput, transshipment process, transportation modality and terminal

layout. The result shows that several equipment operational activities can be optimized by comparing the results of the calculation of the CO₂ actual emissions. In this research, it was found that each TEUS produced CO₂ emissions as many as 15.93 kg CO₂ /teus in BICT, 16.40 kg CO₂ /teus in JICT, and 18.66 kg CO₂ /teus in TTL, after calculating the emissions which had either direct or indirect effects. Then, the result of the calculation of only the CO₂ emissions which had direct effects on the ports, i.e. the emissions of non-electrically operated equipment, was each TEUS produced as many as 9.00 kg CO₂ /teus in TTL, 10.64 kg CO₂ /teus in JICT, and 15.38 kg CO₂ /teus in JICT. For emissions that go through the entire process at the port starting from the ship to the container out of the port of BICT it becomes the lowest emission with 29.08 kg CO₂ / teus from JICT with 36.59 kg CO₂ /teus and BICT 48.56 kg CO₂/teus. This research is potentially of considerable use to ports since it shows how to calculate CO₂ emissions in a port under ideal circumstances, the used models can adapt to the characteristics of any port, and the data serving as the input variables are not difficult to get.<i/>