Proceedings of the 2014 International Conference on Industrial Engineering and Operations Management
Bali, Indonesia, January 7 – 9, 2014

Electricity Generation Schemes in Java-Bali Power System with CO_2 Reduction Considerations

Farizal and Wenty Eka Septia
Industrial Engineering
University of Indonesia
Depok, West Java, 16425, Indonesia

Abstract

This research considers the problem of reducing CO_2 emissions from a power grid consisting of a variety of power-generating plants: coal, natural gas, oil, and alternative energy. The problem is formulated as a linear programming and implemented in LINGO 10. The model is applied to Java-Bali Power Generation Interconnected System and was developed for a nation to meet a specified CO_2 emission target. Two carbon dioxide mitigation options are considered in this study: fuel balancing and fuel switching. In order to reduce the CO_2 emissions by 26% in 2021, PLN has to generate up to 30% of electricity from Renewable Energy (RE) and the cost of electricity (COE) is expected to increase to Rp 617.765 per kWh for fuel balancing option While for fuel switching option, PLN has to generate 29% of electricity from RE and the COE is expected to increase to Rp 532.96 per kWh.

Keywords
Linear programming**,** electricity generation, CO_2 mitigations, renewable energy

Biography

Farizal is currently a fulltime senior lecturer in Industrial Engineering in the Industrial Engineering Department at University of Indonesia. He earned Bachelor Degree in Physics from University of Indonesia, Masters from Ohio University, and PhD in Industrial Engineering from Ohio, USA. He has published journal and conference papers. Mr Farizal has done several research projects with many institutions and organizations. His research interest include energy, optimization, statistic, and engineering economic.

Wenty E. Septia is a graduate student in Industrial Engineering Department, University of Indonesia. She holds a Bachelor of Engineering degree and Master of Engineering degree in Industrial Engineering from Industrial Engineering, University of Indonesia. She earned fasttrack scholarship from Ministry of National Education. His research interest include energy, environment, and optimization.