

# Optimasi Pola Suplai LPG di Pulau Jawa Menggunakan Metode Minimum Cost Network Flow Problem = Optimizing LPG Supply Patterns in Java Island Using the Minimum Cost Network Flow Problem Method

Galan Atmagita, author

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## Abstrak

Pentingnya penggunaan Liquefied Petroleum Gas (LPG) sebagai sumber energi non-transportasi di Indonesia, terutama dalam industri Food and Beverage, telah meningkat seiring dengan pertumbuhan penduduk. LPG mendominasi konsumsi energi Migas non-transportasi dengan persentase yang tinggi. Distribusi LPG di Indonesia menunjukkan bahwa Pulau Jawa memiliki konsumsi terbesar di negara ini. Namun, pola suplai LPG di Pulau Jawa masih belum optimal, mengakibatkan kelangkaan di beberapa wilayah. Perusahaan MIGAS menghadapi tantangan dalam memenuhi kebutuhan LPG, terutama dalam penyediaan LPG untuk SPBE dari terminal depot. Penelitian ini mengembangkan model matematika menggunakan metode Minimum Cost Network Flow Problem dengan simplex method untuk mengoptimalkan pola suplai LPG di Pulau Jawa. Model ini mempertimbangkan batasan dan mampu memenuhi permintaan SPBE sebesar 8.866,94 MT. Selain itu, model ini mengurangi biaya operasional perusahaan MIGAS hingga 28% atau Rp 2.134.977,00. Hasil penelitian ini menunjukkan bahwa model matematika yang dikembangkan dapat meningkatkan efisiensi pola suplai LPG di Pulau Jawa dan memberikan peluang pengurangan biaya bagi perusahaan MIGAS. Penelitian ini memberikan kontribusi positif dalam mengatasi permasalahan distribusi LPG di Pulau Jawa dan bermanfaat dalam mengurangi biaya operasional perusahaan MIGAS.

.....The importance of using Liquefied Petroleum Gas (LPG) as a non-transportation energy source in Indonesia, especially in the Food and Beverage industry, has increased along with population growth. LPG dominates non-transport oil and gas energy consumption by a high percentage. The distribution of LPG in Indonesia shows that Java Island has the largest consumption in the country. However, the LPG supply pattern in Java Island is still not optimal, resulting in scarcity in some areas. MIGAS companies face challenges in meeting LPG demand, especially in supplying LPG for SPBE from terminal depots. This research develops a mathematical model using the Minimum Cost Network Flow Problem method with simplex method to optimize the LPG supply pattern in Java. This model considers the constraints and is able to meet the demand for SPBE of 8,866.94 MT. In addition, this model reduces the operational costs of MIGAS companies by 28% or Rp 2,134,977.00. The results of this study indicate that the developed mathematical model can improve the efficiency of LPG supply patterns in Java and provide cost reduction opportunities for MIGAS companies. This research provides a positive contribution in overcoming LPG distribution problems in Java and is useful in reducing the operational costs of MIGAS companies.