OPTIMIZATION OF THE LPG TRANSPORTATION ROUTES AT PT CAHAYA BINTANG ENAM

FINAL PROJECT

By:

Fadli Pratama
1910933025

Supervisor:

Ir. Jonrinaldi, S.T., M.T., Ph.D., IPU., ESLog

INDUSTRIAL ENGINEERING DEPARTMENT

ENGINEERING FACULTY

ANDALAS UNIVERSITY

PADANG

2025

OPTIMIZATION OF THE LPG TRANSPORTATION ROUTES AT PT CAHAYA BINTANG ENAM

FINAL PROJECT

As One of the Requirements to Complete the Bachelor Program at the Departmentof Industrial Engineering, Faculty of Engineering, Andalas University

By:

Fadli Pratama

1910933025

Supervisor:

Ir. Jonrinaldi, S.T., M.T., Ph.D., IPU., ESLog

INDUSTRIAL ENGINEERING DEPARTMENT

ENGINEERING FACULTY

ANDALAS UNIVERSITY

PADANG

2025

HALAMAN PENGESAHAN

Tugas akhir ini berjudul **Optimization of The LPG Transportation Routesat PT. Cahaya Bintang Enam** ditulis dan diserahkan oleh **Fadli Pratama** sebagai salah satu syarat untuk meraih gelar **Sarjana Teknik** (Bidang Teknik Industri). telah diperiksa dan oleh karena itu direkomendasikan untuk disahkan dan diterima.

Tanggal: 3 Juli 2025

Ir.Jonrinaldi, S.T., M.Eng., Ph.D., IPU
NIP. 197702262006041003
Pembimbing Utama

PANEL PENGUJI
Disahkan oleh Panel Penguji pada Ujian Tugas Akhir
20/06/2025
Tanggal Ujian Tugas Akhir

Tanggal: 3 Juli 2025

Dr.Eng Dicky Fatrias, S.T.,M.Eng
NIP. 198101052005011006
Ketua

Tanggal: 3 Juli 2025

Dr. Ahmad Syafruddin Indraprivatna, MT
NIP. 196307071991031003
Anggota

Diterima dan disahkan sebagai salah satu syarat untuk meraih gelar Sarjana Teknik (Bidang Teknik Industri)

Tanggal: 3 Juli 2025

Dr. Eng Desto Jumeno, S.T., M.T.
NIP. 197612182001121003
Ketua Program Sarjana Teknik Industri

Tanggal: 3 Juli 2025

Ir. Elita Amrina, S.T., M.Eng., Ph.D.
NIP. 197701262005012001
Ketua Departemen Teknik Industri

ACKNOWLEDGEMENT

All praise and gratitude are due to Allah SWT. By His grace and power, I was able to complete this final project entitled "OPTIMIZATION OF THE LPG TRANSPORTATION ROUTES AT PT. CAHAYA BINTANG ENAM." This project was undertaken as a requirement for the completion of the undergraduate program in the Department of Industrial Engineering, Faculty of Engineering, Andalas University. The completion of this project would not have been possible without the support, guidance, and assistance of many individuals and institutions. Therefore, I would like to express my sincere appreciation and thanks to the following:

1. Ir. Jonrinaldi, S.T., M.T., Ph.D., IPU., ESLog as my supervising lecturer, for his invaluable guidance, insights, and knowledge shared during the development of this project.
2. Dr. Ahmad Syafruddin Indrapriyatna M.T., and Dr.Eng Dicky Fatrias S.T, M.Eng., as examiner lecturers, for their constructive feedback and suggestions that greatly improved the quality of this work.
3. All lecturers of the Industrial Engineering Department, for the knowledge and guidance provided during my academic journey, and the administrative staff for their support throughout my studies.
4. Mr. Tasmen, along with the employees, customers of PT Cahaya Bintang Enam. for their cooperation and valuable input during the data collection and research process.

I am aware that this final project may still contain shortcomings in various aspects. Therefore, I warmly welcome any constructive criticism and suggestions for improvement. I sincerely hope that this report will be beneficial for readers, especially for PT Cahaya Bintang Enam, in developing and enhancing their business.

Padang, April 22, 2025

Fadli Pratama

ABSTRAK

Gas merupakan sumber energi utama bagi rumah tangga dan usaha mikro, kecil, dan menengah (UMKM) di Sumatera Barat, menjadikannya sebagai bentuk energi rumah tangga yang dominan. Menurut Badan Pusat Statistik, konsumsi gas di wilayah tersebut meningkat sebesar 104,29% antara tahun 2015 dan 2022. Pertumbuhan yang pesat ini menuntut intervensi pemerintah untuk menjaga rantai pasokan gas yang stabil dan efisien. Menurut Tutuka Ariadji, Direktur Jenderal Minyak dan Gas Bumi di Kementerian Energi dan Sumber Daya Mineral, tantangan utama tidak terletak pada produksi atau pasokan gas, melainkan pada sistem distribusinya.

PT. Cahaya Bintang Enam, distributor gas yang berlokasi di Batusangkar, mengalami peningkatan kuota gas yang signifikan. Namun, sistem distribusi yang ada saat ini tidak memadai untuk mengelola permintaan yang terus berkembang secara efektif. Penelitian ini bertujuan untuk merancang ulang sistem distribusi perusahaan guna meningkatkan efisiensi dan memenuhi volume permintaan yang meningkat.

Penelitian ini menerapkan pendekatan optimalisasi menggunakan pemodelan matematis, khususnya metode Savings Matrix. Berdasarkan analisis, model distribusi yang paling efisien adalah Pengiriman Langsung yang dikombinasikan dengan strategi Milk Run, dengan menggunakan satu truk dan satu kendaraan pickup. Konfigurasi yang dioptimalkan ini mengurangi total biaya distribusi menjadi IDR 7.479.468,76, menandai peningkatan signifikan dalam efisiensi biaya dan keandalan.

Kata Kunci: *Distribusi gas, Savings Matrix, Optimasi distribusi, Milk Run, Direct Shipping, Rantai pasok, Sumatera Barat, PT. Cahaya Bintang Enam, Logistik energi, UMKM*

ABSTRACT

Gas is a primary energy source for households and micro, small, and medium enterprises (MSMEs) in West Sumatra, making it the dominant form of household energy. According to the Central Bureau of Statistics, gas consumption in the region surged by 104.29% between 2015 and 2022. This rapid growth demands government intervention to maintain a stable and efficient gas supply chain. According to Tutuka Ariadji, Director General of Oil and Gas at the Ministry of Energy and Mineral Resources, the primary challenge is not in gas production or supply but in its distribution.

PT. Cahaya Bintang Enam, a gas distributor based in Batusangkar, has experienced a significant increase in its gas quota. However, its current distribution system is insufficient to manage the growing demand effectively. This study addresses the need to redesign the company's distribution system to enhance efficiency and accommodate the increased volume.

The research applies an optimization approach using mathematical modeling, specifically the Savings Matrix method. Analysis reveals that the most efficient distribution model is Direct Shipping combined with a Milk Run strategy, employing one truck and one pickup vehicle. This optimized configuration reduces total distribution costs to IDR 7,479,468.76, marking a substantial improvement in cost-efficiency and reliability.

Keywords: Gas distribution, Savings Matrix, Distribution optimization, Milk Run, Direct Shipping, Supply chain, West Sumatra, PT. Cahaya Bintang Enam, Energy logistics, MSMEs