Analytic Solver® Balances Linde's Inventory and Product Distribution

Linde is one of the world's largest industrial gas and engineering companies. They have supplied gas and chemical products to manufacturers for more than a century. Product distribution spans the globe, serving everything from semiconductor manufacturing to clean-fuel vehicles.

Linde engineers needed to solve for uncertain demand while managing complex distribution across Brazil.

Before adopting Analytic Solver, Linde's subsidiary, White Martins Brazil division was optimizing for product distribution without routing capabilities. The dimensions of their data sets grew so large, the models became too complex for their tools.

With hundreds of vehicles, 1,000 drivers, and large product quantities that require monthly distribution and routing, they needed a stable platform capable of solving challenging decision models.

FOCUS AREA:

Inventory & Distribution

COMPANY:

The Linde Group

Key Objectives

1. Manage Product Allocation Across Brazil

2. Coordinate Truck Routing Within a Single Model

3. Solve Cost-of-Service Calculations

CHALLENGES TO SOLVE:

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Demand is a human uncertainty, and we could see failure with a 1% variance. We need calibration to be as close to perfect as possible.

Marcos Guimaraes

OUR APPROACH

Linde Engineers Use Analytic Solver® to Balance Delivery Routes, Production Schedules, and Inventory

Mechanical engineer and logistics director Marcos Guimaraes wanted to bring value to customers in the supply chain through state-of-the-art tools. His vision of running White Martins' logistics as a world-class operation required a tool capable of making real decisions based on real data.

Though he had industry leading products for data visualization, they fell short of the big-picture decision-making needs.

Guimaraes noted, "Analytic Solver's optimization capabilities provide routing and allocation of product to each customer for each plant. The system performs daily and allows us to forecast three months into the future. It helps us understand how to balance inventory across nearby plants."

Moving to Analytic Solver allowed White Martins' Brazil division to solve large decision models. The models grew and performed very well. With Analytic Solver, they were able to manage orders, product allocation, and distribution in one place.

✓ **Order Management**

Logging real-time demand factors into supply-chain decision models and optimization.

✓ **Product Allocation**

Supply allocation is responsive to demand and inventory across a network of plants.

✓ **Route Distribution**

Distribution is modeled for execution based on regional variables, vehicles, and drivers.

THE RESULTS

Linde's Logistics Are Now Optimized for Customer Satisfaction and Profitability

The logistics of running industrial gas plants are dynamic, with complex considerations for maintenance, wear and tear, and runtime. Analytic Solver enables Linde's engineers to better estimate the costs and risks.

With the models in place, they can share critical information with business executives to demonstrate the costs associated with running each plant and delivering products to customers. Risk calculations show vulnerabilities for plant breakages, and the entire team can optimize accordingly.

650
Vehicles
in Service

1,000
Drivers
Delivering Product

150,000
Tons of Product
Distributed Per Month

Thousands
of Customers
Serviced

Linde depends on Analytic Solver. Discover how you can solve challenging models faster to benefit your organization.

Learn more at **Solver.com** and **get started with your free trial.**

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