



# GAMS

**OPERATING  
COST SAVINGS  
OF 5% TO 9%**



## OPTIMIZING THE DISTRIBUTION OF REFINED PETROLEUM PRODUCTS BY TANKERS

A GAMS APPLICATION IN THE PETROLEUM INDUSTRY



Empresa Nacional del Petroleo (ENAP) is the state-owned petroleum company in Chile. Its main business is transforming crude oil into refined petroleum products to be distributed and sold to large retail companies of the Chilean industry. The annual volume of sales is around 66 million barrels.

One of the toughest tasks at the Logistics Department is the maritime distribution of refined petroleum products. The combinatorial nature of the decisions that must be made can be modeled using MIP techniques. The Operations Research group at ENAP formulated and implemented the model in GAMS/CPLEX, resulting in a large scale model.

Given a monthly demand, the decisions that the GAMS optimization model makes include the schedule, the stowage configuration, the volume of each product to be loaded at the starting

point and the volume of each product to be unloaded in each demand port for each trip of each tanker. This model minimizes the total cost and satisfies all the operational constraints.

### IMPACT AT ENAP

This approach is saving between 5 % to 9 % of the operational cost for the maritime distribution system at the company. In addition, ENAP sees an interesting potential in linking this tool with other simulation and optimization models in GAMS that are being used in the company. For instance, in parallel with this research project a model for optimizing the distribution of refined petroleum products by pipelines at ENAP was developed. A model that integrates the maritime and pipeline distribution system could be a natural extension of this work.

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