
Designing and optimizing an LNG supply chain using LocalSolver

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Abstract

This talk deals with the optimization of the sizing and configuration of a Liquefied Natural Gas (LNG) supply chain. This problem is encountered at ENGIE, a French multinational electric utility company which operates in the fields of electricity generation and distribution, natural gas and renewable energy.

Some clients need to be supplied in LNG from sources. The consumption at each client is known for each time step. Different kind of transportation resources, vessels or trucks, are available to supply LNG from sources to clients, possibly using intermediate hubs. Each is characterized by its storage capacity and its costs, and the list of sites that it can visit. A tour is a distribution travel starting from a source with full capacity and visiting a certain number of site, unloading a fraction of the capacity at each site, and finally getting back the starting source. A planning is a set of tours over the horizon. The cost of the planning is composed of fixed costs and operating costs. The objective is to minimize this cost over a long-term horizon, typically 20 years.

Having described the problem and its stakes, we show how to model and solve it efficiently using LocalSolver set-based modeling features. The resulting software is now used by ENGIE.

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