Problem Statement

The optimization of the ABSA Oil Distribution Network presents a number of challenges. The problem statement is as follows:  
  
Within the context of its global distribution network, ABSA Oil is confronted with a difficult optimization task. In order to achieve the goal of maximizing overall profit while maintaining a balance between various important factors:  
  
The process of strategic purchasing of crude oil requires us to ascertain the best quantities of crude oil to acquire from a variety of providers (BP, Chevron, and others) at prices that are subject to fluctuation in the market.  
Optimization of production planning is required for the four European refineries (Greece, Poland, Spain, and the United Kingdom) in order to achieve efficiency in refining. We need to determine the optimal production levels for each of the six petroleum products (three gasolines, jet fuel, diesel fuel, and heating oil), taking into account the constraints imposed by the refinery's capacity and aiming to maximize profit margins through this process.  
Cost-Effective Transportation: It is essential to ensure that oil products that are produced are transported to regional demands in an efficient manner. We need to find the most cost-effective method of allocating and delivering products while simultaneously reducing the amount of money spent on transportation.

Datasets Overviews –

A table with numbers and text

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Product Name: There are name of the crude oil product, such as Poseidon Streams, Azeri BTC, and so on.  
API Gravity: This is a way to measure how dense the crude oil is. In general, a higher API gravity means that the crude oil is lighter, which is more desired and costs more.   
Sulfur Content: This shows what amount of sulfur is in the crude oil. A lower sulfur level is usually better because it lowers the cost of refining and the damage that burning fuel does to the environment.  
Operating Company: This is the name of the company, like BP, Chevron, etc., that sends crude oil to ABSA.  
Location of Field: This tells you where in the world the crude oil is collected, such as in Azerbaijan, Venezuela, or another place.  
When crude oil is sold or brought to ABSA, it is going to be refined further. This is called the "port of sale."

A screenshot of a quote

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This is the name of the different kinds of crude oil blends that ABSA gets from its sources. The list in this case has Azeri BTC, Poseidon Streams, Laguna, and Snøhvit Condensate on it.  
Price per Barrel: This shows how much each mix of crude oils costs per barrel. All of these prices are given in US dollars per barrel, and they change for each blend. The most expensive oil is Snøhvit Condensate, which costs $71 per barrel. Azerbaijani BTC costs $57 per barrel.  
Monthly Supply Quota (barrels): This tells ABSA how much of each type of crude oil it can get in a month. It shows the limits that are set by things like contracts with suppliers, work limits, or storage space. As an example, ABSA can only buy up to 645,000 barrels of both Azeri BTC and Snøhvit Condensate this month.  
  
This knowledge is very important for ABSA's planning and decision-making, especially when they are trying to figure out which blend will save them the most money while still meeting their quotas.