

Multi-Objective Optimization for Contract Areas Delineation and Sequential Leasing of Lebanon's Offshore Hydrocarbon Assets

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Abstract

The reliance on oil and gas supplies has greatly permeated most sectors of economies worldwide.

Advances in exploration and production technologies continue to enable the discovery of new fields in frontier provinces. As the world's energy consumptions are increasing, oil and gas will continue to be the leading energy sources and to play an important role in the world's energy in the 21st century.

Our earlier research efforts (the research was supported by the Masri Institute and by LNCSR) have focused on assisting the Lebanese government in structuring production sharing contracts (PSCs) with foreign oil companies (Yassine et al., 2011). This proposal is a natural extension to our earlier work for providing guidance to the Lebanese government in determining the optimal contract areas to offer for development in the frontier petroleum province of the Levant basin. In particular, the three core research questions we address in this proposal are:

- a. How to determine the various contract areas to offer for development?**
- b. What is the optimal sequence of offering contract areas for Development in sequential bidding (leasing) rounds?**
- c. What are the various factors that play a critical role in shaping the government hydrocarbon strategy?**

Multi-objective optimization methods will be used to formulate and solve the first two questions, while scenario building analysis will be used for addressing the third question. This research will try to identify the different effects of selecting varying contract areas and will take Lebanon as a case study, simulating the various possible scenarios and identifying the ones that yield optimal benefits. In doing so, the various interdependencies among hydrocarbon assets will be studied and modeled for analysis which should reveal more about the way these links affect the development process as a whole.