CASPIAN - BLACK SEA - SE EUROPEAN GAS CORRIDORS AND THE LNG PARAMETER: A SCENARIO BUNDLES APPROACH

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Overview

In this paper, national energy strategy issues are of concern in relation to gas supply and the role of LNG (Liquefied Natural Gas). The decision makers are countries and governments rather than private investors. The analysis level is strategic, in the sense that it recognises the geopolitical dimensions of energy-related security issues. It is not intended to examine technical and cost details regarding existing or future gas routes, but instead we focus on more high-level and strategic parameters and concerns. Still, the present approach builds well defined realistic scenarios referring to a specific region and time and reaches practical conclusions for the involved players, and this is where it differs from purely policy level approaches. Our application refers to the Caspian - Black Sea - SE European Gas Corridors in the year 2015. The role of LNG is assessed in this context as a flexible gas supply source, influencing the strategies of the involved players.

Methods

The scenario bundle method is a semi-formal, rather than mathematical, game theoretic modelling approach. Scenario bundles are simple game structures and a systematic way of using qualitative judgments as a basis for the construction and evaluation of scenarios.

The scenario bundles are topical models as they relate to a specific region at a specific point in time. Scenario bundles indicate possible future developments. The method does not promise predictive reliability or moreover success, but it suggests that a systematic procedure for the integration of judgments may achieve better results than the unaided intuition of well-informed observers, market analysts or players.

A scenario bundle is broadly defined as B=(N,K,c,h) with N = {1,...,n} the player set; K the game tree; c the decision point function which assigns a player c(x) to every node of the tree; h = (h_i,...,h_n) a system of payoff functions for the players 1,...,n, which assigns ordinal utility indices representing preference rankings at the end-points.

The scenario bundle method allows strategy formulation by taking into account the commercial objectives of the involved players, and considering geopolitical interaction, regional conflicts and crisis situations, or other major uncertainties regarding energy prospects.

Results

It is stated that although the scenario bundles developed in this paper are inspired from potential future real-world interaction situations, they have not been developed with the purpose of providing readily applicable solutions to such actual interactions.

The strategic interplay comprises prospects of gas supply crises concerning the Caspian - Black Sea - SE European Gas Corridors in the year 2015, under which diverse interests may be in conflict, influencing the involved players optimal choices.

The equilibrium solution of the developed scenario bundle provides strategic insights regarding the value of future gas pipelines as base sources of gas, and moreover the determinant role of LNG supplies, as a marginal yet decisive gas source influencing the strategic choices of the involved actors.

Obviously, the optimal decisions that are found depend on the assumed payoff profiles of the involved players. Changes in these payoffs (or utility functions representing the preferences of the involved players) may lead to different outcomes and this is examined in sensitivity analyses, which demonstrate exactly how the equilibrium path could be altered under some additional assumptions regarding the preferences of the involved players.

Conclusions

The application of the scenario bundle method in the context of the security of gas supply demonstrates the potential usefulness of this tool in addressing national energy strategy questions. The LNG parameter is also stressed, as a source of diversification in gas supplies to promote security. LNG as a trade option is far more flexible in response e.g. to political and commercial changes or crises periods.

The scenario bundle approach helps in identifying critical parameters in a systematic way, as a result of concrete logical steps. This analysis gives confidence that even in complex scenarios, an analyst would reach useful conclusions of practical value, that might not be obvious by simple observation of the strategic interaction.

The “scenario bundle method” is proposed as a decision-making, planning, and analysis tool for use by ministries, national or regional (e.g. EU level) authorities, national or international companies, and think-tanks among other in anticipation of future developments and in response to crisis events related to gas supply.