

Global Oil Market in Constrained Energy Transition Scenarios

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Overview

Oil-producing countries are transforming and diversifying their economies. During the transition period, however, they will still rely on oil revenues to boost investments in the non-oil sectors.

This study aims to explore how, under various world energy transition scenarios, the evolution of the global economy will impact the international oil market equilibrium.

Methods

We update and expand the equilibrium model developed by Rioux et al. (2022). It includes supply and demand fundamentals and potential global megatrends (such as international shifts in funds allocation). World oil demand is represented as a function of world GDP and oil prices. Further, we assume that the GDP growth depends on oil prices. On the supply side, alternative market structures can be designed. The model production decisions are based on short- and long-term piecewise linear supply curves. These supply curves are constructed using Rystad Energy Ucube dataset, which includes over 21,000 oil-producing assets. The model is calibrated to demand curves obtained from the International Energy Agency's (IEA) World Energy Outlook (WEO 2021). This model can be used to simulate the evolution of the global oil market in a world economy constrained by climate targets.

We will consider the Announced Pledges and Net Zero Emissions by 2050 Scenarios, which the International Energy Agency (IEA) introduced in its latest World Energy Outlook (WEO 2021), along with the Stated Policies Scenario to assess the impacts of various global climate and economic growth scenarios on global oil market fundamentals. More specifically, implications for oil-producing countries under each scenario will be analyzed. We will also be able to run alternative long-term simulations (up to 2050). The developed model will also enable us to study different international oil market structures (competition versus cooperation of suppliers).

Results

The model being currently developed will enable us to address the following questions:

- How would the global oil market respond to global climate targets?
- What could be the implications for oil-producing countries?
- Which hypothetical market structure would be beneficial for oil producers?

Conclusions

The results of this study will provide policymakers with valuable insights regarding future oil market conditions and the implications on their national economies. Potential production strategies in the face of different world climate policy scenarios and international circumstances can be examined. Addressing those questions will provide insightful information regarding oil producers' position in a transitioning world economy. The insights derived from the model will help oil-producing countries plan their long-term economic development.

References

Rioux, Bertrand, Abdullah Al Jarboua, Fatih Karanfil, Axel Pierru, Shahd Al Rashed, and Colin Ward. 2022. "Cooperate or Compete? Insights from Simulating a Global Oil Market with No Residual Supplier." *The Energy Journal* 43, no. 2.