AVAILABILITY OF GAS IN THE EUROPEAN UNION IN A DYNAMIC GEO-POLITICAL AND COMMERCIAL CONTEXT

Alexandru Maxim: Alexandru Ioan Cuza University of Iaşi, CERNESIM Environmental Research Center, General Berthelot Street 16, 700483, Iaşi, Romania
alexandrumaxim@outlook.com

Overview

The last decade has changed the outlook for the energy sector, creating a complex geo-political and commercial environment that is difficult to fully assess and forecast, especially with regard to natural gas. Demand for natural gas across Europe has been significantly lower than expected (e.g. some forecasts for 2030 consumption have been revised by -26% since 2011), while production and consumption are surpassing initial forecasts for North America. Energy efficiency and environmental targets, the rapid emergence of shale gas, the financial crisis, the Fukushima incident and the political instability in North Africa and along the Eastern borders of the European Union are all factors which contribute to a shift in the *status quo* of the energy sector. The aim of this paper is to gauge the vulnerability of the EU as a whole and that of its member states with regard to natural gas flows. This will be achieved both by analyzing historical data and by exploring the potential impact of some medium/long term scenarios on the availability of natural gas.

Methods

The availability of gas, based on the framework proposed by Sovacool and Mukherjee (2011), represents only one component of energy security, but it takes into consideration several aspects, such as security of supply and production, dependency and diversification – all of which are touched upon throughout the current study.

The analysis provides two kinds of perspectives: a historical overview and a scenario based forecast. The historical overview seeks to assess how the availability of gas has evolved across EU states over the last two decades. Measurements are made based on consumption, production and trade data available on Eurostat. The share of the largest supplier country is indicated for each state across the 1990-2014 timespan and a Herfindahl–Hirschman Index (HHI) is used to assess the concentration of the suppliers. The net import dependency is calculated, along with the share of natural gas in the total gross energy consumption. An additional original contribution of the study is the proposal of a supply risk indicator, which seeks to gauge how the availability of natural gas has evolved over the last two decades and how it may change in the future.

The forecasting analysis is based on a dynamic energy balance, which provides an estimate of natural gas production, consumption (by main end-user categories), imports (by country of origin), exports and residuals (stock changes, distribution losses, statistical differences etc.). The dataset is used to generate a scenario based forecast of natural gas availability at the level of each EU member state and the European Union as a whole. The proposed scenarios vary from a ‘base case’ by modifying several factors (these adjustments take into consideration the trends indicated by several international energy agencies and companies). The ‘base case’ forecast is constructed using the estimations provided in the newly released EIA International Energy Outlook (2016 edition). Some of the likely changes which are considered in the long term are: increased energy efficiency of industry and households in Western and Eastern Europe, significant increase in gas trade between the EU and Caspian, North American and/or North African partners, development of non-conventional gas production in Europe, increased demand for natural gas in the transportation sector, as well as the commissioning of new pipeline infrastructure connecting the European Union with Russia.

Results

The historical overview demonstrates that the EU’s continued diversification of suppliers over the last years has had a continued impact on improving the availability of natural gas at the aggregate EU-28 level. The import of gas has shifted from a highly concentrated market structure to a moderate level of concentration. However, the situation has not improved in several EU countries, most of which are in Eastern Europe, where gas continues to be imported from a single supplier. In addition, there are signs that the diversification of imports is deteriorating in some of the larger EU economies. Net import dependence has also increased throughout the EU at an accelerated rate. Preliminary results from the forecasting analysis suggest an uncertain outlook for the availability of natural gas in Europe. The security of supply can be significantly improved or worsened in several of the proposed scenarios. Particularly high fluctuations in availability are expected in Eastern Europe, given the observed values of the proposed supply risk indicator.

Conclusions

Natural gas will continue to play a major role in fueling economies across the World (even when considering the significant progress taking place in the area of renewable energy). Energy security concerns related to natural

gas have gained mainstream attention in the European Union given the dynamic geo-political, technological and commercial environment. This study provides an assessment of some existing vulnerabilities as well as a possible outlook for the availability of natural gas in the EU and its member states. Continued risk mitigation, diversification of supply and the development of interconnection infrastructure are more than encouraged in order to limit the vulnerability of member states in the long term.

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