ENERGY POLICY OF THE BLACK SEA BASIN COUNTRIES – A FACTOR INFLUENCING THE EXCHANGE OF ELECTRICITY

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I. ENTSO-E - European Network of Transmission System Operators for Electricity

ENTSO-E for Electricity is responsible for managing the electrical grid system and for allowing the trade and supply of electricity across EU borders. The European Network of Electricity Transmission System Operators represents 43 transmission system operators from 36 countries in Europe. ENTSO-E was established and given legal mandates by the Third EU Legislative Package for the Internal Energy Market in 2009.

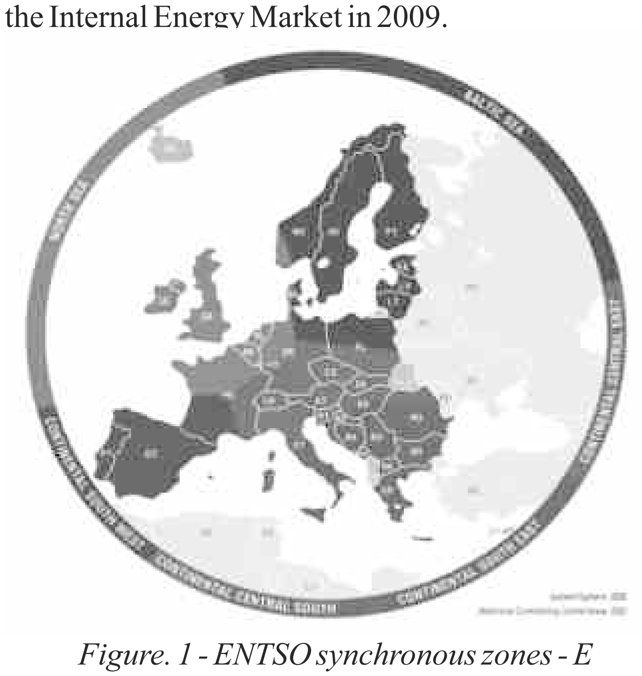

Figure. 1 - ENTSO synchronous zones - E

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With joining the European Union, according to DIRECTIVE (EU) 2019/944 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 5 June 2019, Member States ensure that their national law does not unduly hinder cross-border trade in electricity, user participation, including through optimization of consumption, investments, in particular in variable and flexible energy production, energy storage, the development of electromobility or the introduction of new interconnectors between Member States, and ensure that electricity prices reflect actual supply and demand.

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When developing new interconnections, Member States shall take into account the electricity interconnection objectives set out in Article 4(d)(1) of Regulation (EU) 2018/1999. Member States shall ensure that there are no unjustified obstacles within the internal electricity market in terms of entering, operating and exiting the market, without prejudice to the competence that Member States retain in relation to third countries.

Member States shall ensure the existence of a level playing field where electricity undertakings are subject to transparent, proportionate and non-discriminatory rules, fees and treatment, in particular in the area of the balancing obligation, access to wholesale markets, access to data, procedures for switching and invoicing modes, and when applicable - also in licensing.

Member States shall ensure that a third-country market participants when operating within the internal electricity market shall comply with the requirements of applicable Union and national law, including legislation related to environmental and safety policy.

Member States shall ensure that all customers are free to buy their electricity from the supplier of their choice and shall ensure that all customers are free to enter into more than one electricity supply contract at the same time, provided that the required connection and metering points are established. Suppliers are free to determine the price at which they provide electricity to their customers.

Member States shall take appropriate action to ensure effective competition between suppliers. Fulfilling the rules laid down in this directive and observing the normal market logic, as well as the European legislative framework, the Bulgarian electricity system operator can limit the exchange of electricity with neighbouring countries only in exceptional cases. Moreover, Bulgaria has made commitments to develop the cross-border infrastructure, with the aim of facilitating the exchange between the member states within the framework of the liberalized European electricity market [1,2,3,4].

II. Intersystem connectivity

European countries have been interconnected for decades and transmission system operators have been operating in regions since the 1950s. Managing someone's network means coordinating actions with neighbours.

Interconnections are increasing along with greater volatility of energy flows. The regional coordination of transmission system operators is growing with the European energy transition. In the future, more coordination will take place, in particular to accompany the 4th Industrial Revolution around digitisation [5,6,7,8].

Over the past 10 years, the connectivity of transmission systems has begun to develop not only between European countries but also with countries outside the European Union. Until a few years ago, the ties between these countries were single and bilateral without systematic coordination [9,10,11,12].

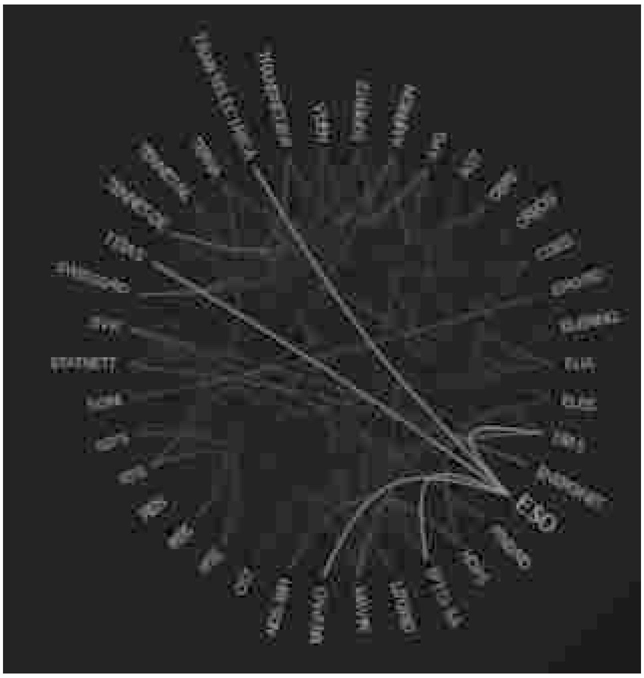

Figure 2 – Interconnection Bulgaria within ENTSO – E

In recent years, the number of these interconnectors, coordinated by the European Network of Transmission System Operators for Electricity, has increased. This development makes it possible to meet the need to increase transit exchanges of electricity according to the development of the country's industries [13,14].

III. Analysis of electricity exchanges

The subject of research in this report is the tendency to change the import and export of electricity between Romania, Bulgaria, Turkey, Georgia, Russia and Ukraine.

Interestingly, some of these countries are EU member states and another part is not yet. Despite the different energy policy in each country, the need for electricity exchange is driven by the technological development of their industry. Schematically, these processes are presented in Fig. 3

Figure 3 – Electricity exchange flows between black sea basin countries

In Fig. 4 in graphic form are presented the studied results of the interconnectors exchange between Bulgaria and Romania.

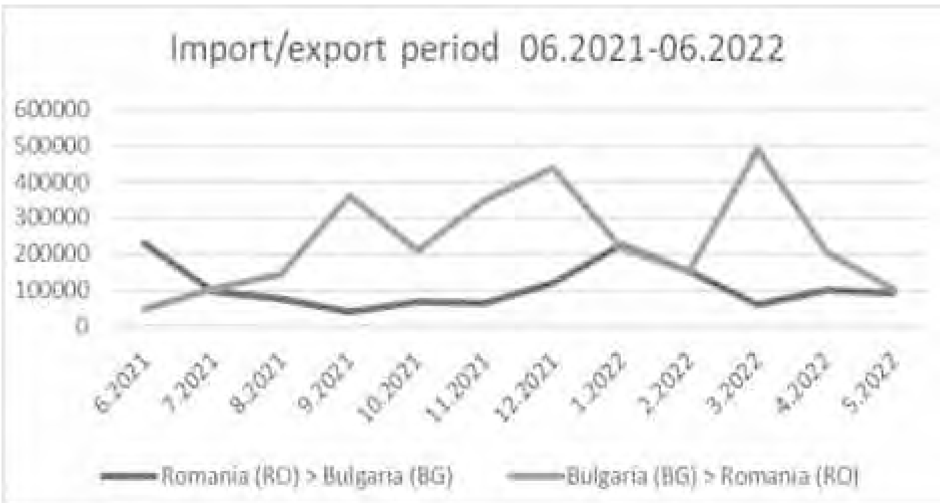

Figure 4 – Exchange of electricity between Bulgaria and Romania in MWh.

On Fig. 5 in graphic form are presented the studied results of the interconnectors exchange between Bulgaria and Türkiye**.**

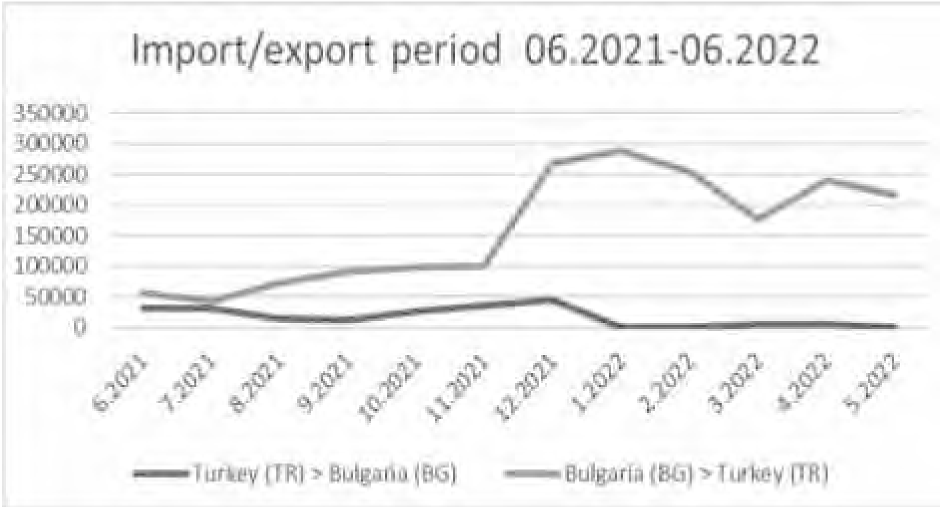

Fig. 5 – Exchange of electricity between Bulgaria and Türkiye in MWh

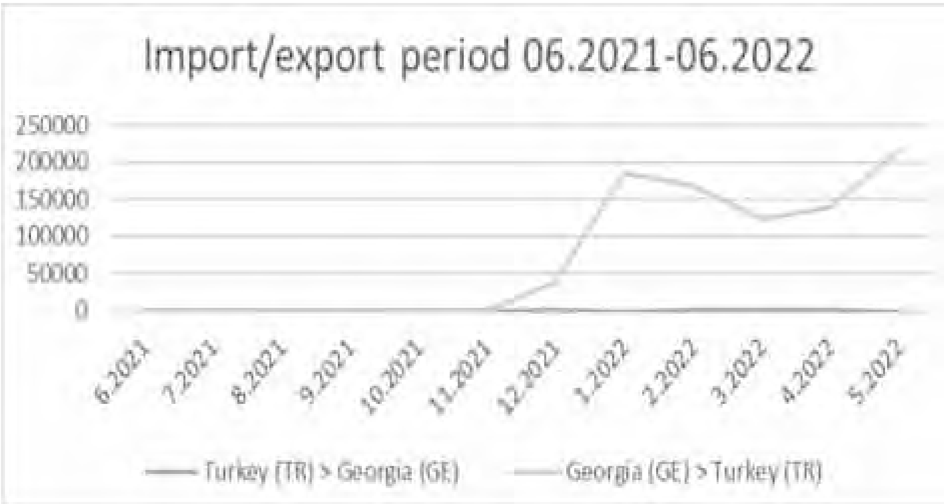

Figure 6 – Exchange of electricity between Türkiye *and Georgia in MWh*

On Fig. 6 in graphic form, the test results of the interconnectors exchange between Turkey and Georgia are presented. It was established that the first official data for this exchange were recorded on 21.12.2021 - 21:00 - 22:00.

On Fig. 7 in graphic form are presented the test results of the interconnectors exchange between Russia and Georgia.

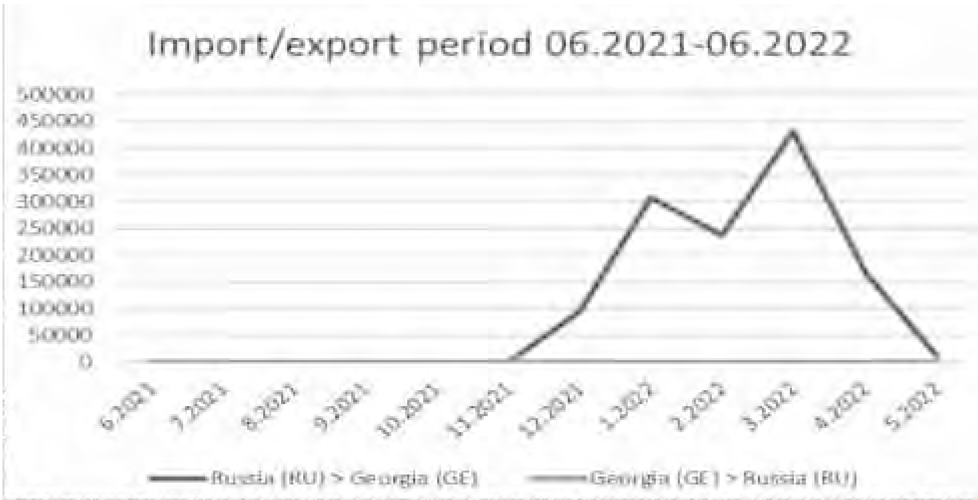

Figure 7 – Exchange of electricity between Russia and Georgia in MWh

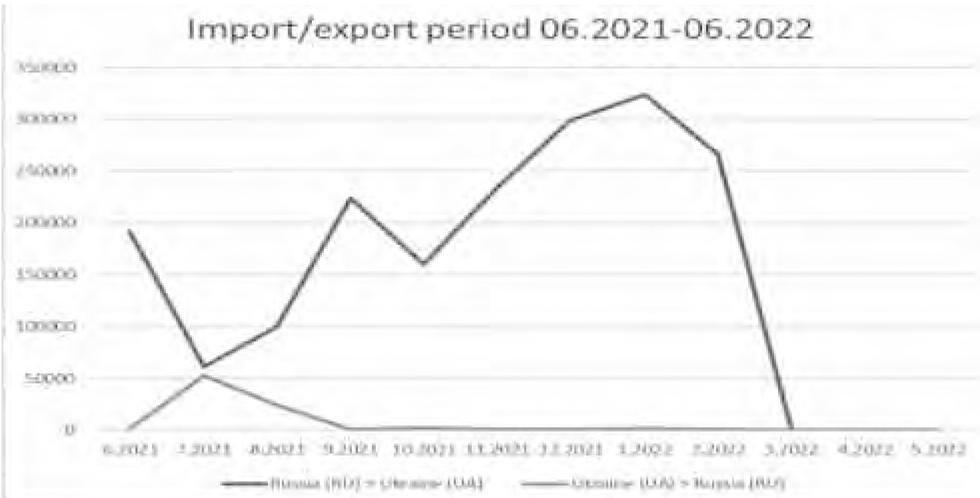

Figure 8 – Exchange of electricity between Russia and Ukraine in MWh

On Fig. 8 in graphic form, the test results of the interconnectors exchange between Russia and Georgia are presented. It was found that the last import of electricity from Russia to Ukraine was registered on 23.02.2022 - 18:00 - 19:00, also Last import from Ukraine to Russia was registered on 24.02.2022 - 22:00 - 23:00.

On Fig. 9 in graphic form are presented the studied results of the interconnectors exchange between Romania and Ukraine.

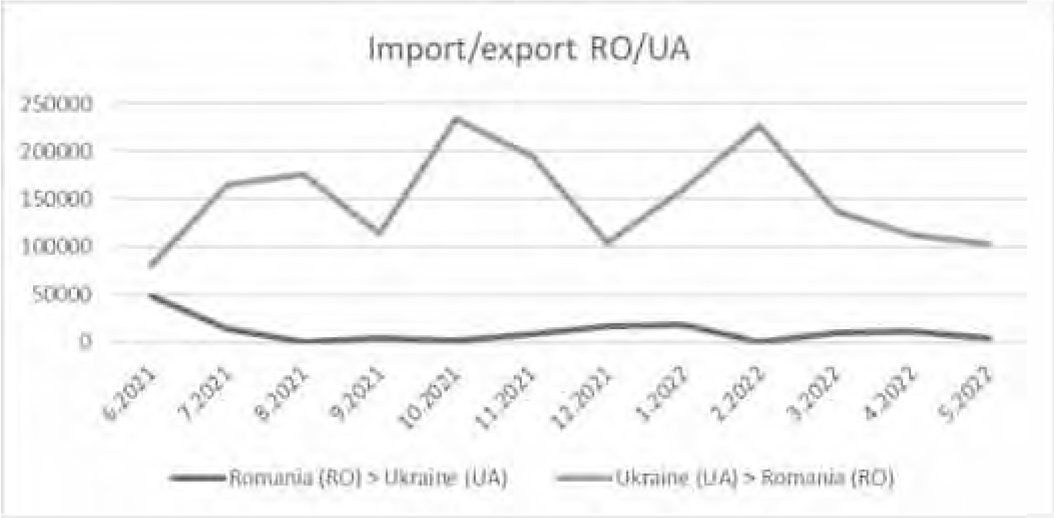

Figure. 9 – Exchange of electricity between Romania and Ukraine в MWh

IV. Conclusion.

The research and analysis carried out shows that over the past 2 years the connectivityof the electricity systems of the Countries of the Black Sea Basin has increased.

Despite the political differences in the different countries bordering the Black Sea, an increasing proportion of transmission infrastructure is connected to the European transmission system. A vivid example in this regard is Russia, which was not part of ENTSO-E a few years ago, and has been intensively joining a selected part of its transmission infrastructure to the European transmission system in the last 2 years.

Logically, as a result of the military operation, some of these energy flows are directed to countries outside the Black Sea basin.

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