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REGIONAL CHARACTERISTICS, PRINCIPLES AND PERSPECTIVES  
OF EUROPE'S EXTERNAL ENERGY SUPPLY

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In terms of content and direction perspectives, the paper is related to regional energy studies, which are interdisciplinary in nature, including geographical, geopolitical, economic, environmental and other directions.

In the theoretical part, the main substantive issues and features of regional energy studies, their role and significance in the context of energy security and energy policy were presented.

Based on statistical data analysis, the current state of external energy supply, problems, regional trends and features of European (including both EU and non-EU members) were presented and summarized. Taking into account the geopolitical aspects of ensuring Europe's energy security, the main directions of the U.S. and Russian involvement in this field and their regional features were also discussed. Special attention was paid to the spatial expansion of energy imports from foreign markets and continuous regional energy cooperation.

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**Keywords:** regional energy studies, Europe, external energy supply, regional peculiarities.

**Introduction.** Being an important type of thematic regional studies, regional energy studies (RES) have great scientific and practical role significance. This is largely due to the current developments in energy sector at the global, regional and country levels. In this regard, the example of Europe deserves a special attention. Since February 2022, due to geopolitical and military-political developments (particularly, in the context of the ongoing military operations in Ukraine), the regional diversification of energy imports, involvement of new suppliers and increasing the shares of the existing ones have got a crucial importance in the framework of the European Union's (EU) foreign policy agenda. At the same time, the volume of energy imports from the Russian Federation started to decrease significantly. In case of absence of relevant alternatives, this can lead to a number of

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negative socio-economic consequences. At the same time, serious challenges arise in terms of ensuring the energy security of the entire region and certain countries.

The purpose of the paper is to present the current state, problems and trends of Europe's energy supply from foreign markets, paying special attention to their regional features and perspectives, as well as the positions and implemented policies of the geopolitical "poles" in this context, the U.S. and the Russian Federation.

#### **The Main Outcomes of the Study.**

**A General Theoretical Overview.** The following main thematic (content) directions of RES can be distinguished:

- studies of energy potential and its use: existing energy resources and capacities, their distribution, reserves, availability, comprehensive and rational use, energy production and consumption issues;
- geopolitical and geo-economic studies: regional (international) energy cooperation, spatial diversification of import and export routes, energy as a geopolitical and influence factor, perspective trends and forecasts of energy sector development;
- security studies: energy security, ensuring uninterrupted and reliable supply from foreign markets, energy dependence and its reduction, the energy factor in the context of economic, political and security priorities of countries;
- studies in the field of sustainable development (renewable energy development, environmental impact of energy sector, climate change issues, etc.).

It can be noted that the main practical significance or function of RES is to contribute to the development and implementation of relevant energy policies (at both country and regional levels). The latter can be defined as a set of actions and measures aimed at ensuring the strategic goals and priorities of energy sector development (in terms of import and export, production, consumption, efficiency, security, sustainability and other aspects).

In turn, the main outcome and priority goal of energy policy is ensuring the energy security of countries and regions.

Energy security is one of the most comprehensive, multi-component and modern concepts of energy studies. According to Yergin's definition, it is the availability of sufficient energy resources at acceptable price conditions for all consumers [1].

Dealing with a wide range of issues, RES have an interdisciplinary nature, located between geographical, political and geopolitical, economic, environmental and other thematic studies.

In this regard, a good example of cross-disciplinary integration is energy geopolitics, which studies the size, distribution, access and control of energy resources of countries and regions, transportation routes, global and regional market settings, etc. [2]. As a scientific discipline, energy geopolitics was formed at the focal point of regional geography, geopolitics and the theory of international economic relations.

#### **Current Situation and Problems of External Energy Supply of Europe.**

It should be noted that because of the lack of relevant supplies of the own energy resources, external import has always been of key importance for the EU countries.

According to energy statistics of 2020, the energy dependence of the EU (the share of imported energy) was around 58% [3].

The negative correlations calculated for the production, consumption and import dependence of the EU by certain types of energy sources show that the most used energy types (natural gas and oil) are the least produced locally; therefore, external dependence is the greatest in case of the most used energy sources [4]. Surely, this causes additional difficulties and problems in terms of ensuring energy security.

At the same time, 2 groups of non-EU member states with completely different energy potential, capacities and development opportunities are clearly distinguished in Europe:

1. *The Most Energy-Secure Countries of Northern Europe*: Norway and Great Britain. They have significant reserves of natural gas and oil, and are among the EU's key external energy suppliers.

2. *Eastern European Countries*: Albania, Bosnia and Herzegovina, Serbia, North Macedonia, Moldova, etc. They are characterized by a high level of energy dependence (up to 80–90% of the share of imported energy).

Referring to energy supply from foreign markets, it should be noted that by the end of 2021 Russia was the main external energy supplier of Europe (including both EU and non-EU member states).

In particular, about 40% of natural gas, 27% of oil and 46% of coal imported by the EU were provided by Russia [5].

It is noteworthy that the dependence on Russian energy carriers was greater in case of eastern EU member states (Baltic countries, Bulgaria, Poland, Hungary, etc.). Besides, the EU's energy dependence was characterized by high dependence on a single or limited number of suppliers. This is particularly undesirable in terms of security priorities. In this case, the spatial diversification of energy imports allows mitigating the negative impact and possible risks of high dependence.

The beginning of 2022 brought significant geopolitical and geo-economic changes in energy sector development and policies in Eurasian and Transatlantic contexts. Particularly, after the military operations started in Ukraine, one of the priorities of the EU's foreign policy (including energy policy) became the gradual reduction and replacement of energy imports from Russia (in case of natural gas, presumably until 2030).

In parallel, the expansion of “geography of alternatives” began: spatial expansion of energy import routes, involvement of new foreign suppliers, as well as changes in the shares of already existing suppliers.

Thus, the analysis of energy statistical data shows that the following main changes took place in the EU energy import system in 2022 (compared to 2021):

- the shares of the U.S., Great Britain, Norway, Saudi Arabia, Nigeria, Iraq and Angola have increased in the oil import sector;
- the shares of the U.S., Great Britain, Libya and Azerbaijan have increased in the field of natural gas import;
- the share of Russia decreased by more than 8% in case of petroleum oil imports, and by about 17% in case of natural gas imports [6].

Thus, the main directions of the “geography of alternatives” are Transatlantic, Middle Eastern, North European and African.

At the same time, as a result of the mentioned developments the overall energy dependence of the EU has not reduced, just the shares of certain external suppliers have changed.

In the context of the own energy capacity development more attention is paid to the continuous development of renewables. In particular, the wind energy potential and its usage volumes are large in Sweden, France and in the coastal areas of the North Sea (Germany, the Netherlands and Belgium). Southern Europe is particularly favorable for solar energy development.

***Geopolitical Scenarios and Regional Alternatives.*** The roots of Europe’s modern energy geopolitics can be traced back to the ideas developed by Helford Mackinder in the beginning of 20<sup>th</sup> century. In particular, the control and influence over Europe (and, especially, Eastern Europe) was seen as a key precondition for spreading power in the entire Eurasian area and in the world. In this regard, it is also obvious that external energy dependence has turned into a significant factor of political and economic influence in the modern world.

Taking into account the current geopolitical and regional aspects and features of Europe’s energy security, the strategic priorities and involvement of Russia and the U.S. should be discussed.

Because of the developments presented in the previous section, significant changes are taking place in the context of the regional energy policy of Russia (targeting the so-called “Eastern direction”, increasing the energy exports from Siberia to China, developing the possible Central Asian gas union project jointly with Kazakhstan and Uzbekistan, etc.).

In terms of regional reorientation, the termination of operation of “North Stream” and “North Stream-2” underwater gas transportation systems (through the bottom of the Baltic Sea) as a result of September 2022 accidents was crucial as well. In particular, the “Northern Stream” (from the city of Vyborg, Russia to Germany) with a maximum annual capacity of 55 billion  $m^3$  provided about 1/3 of the total volume of natural gas exports from Russia to the EU.

It is noteworthy that even during the active phase of military operations the export of natural gas from Russia to Europe through the territory of Ukraine did not stop, recording up to 30–40 million  $m^3$  daily according to January 2023 data [7]. This means that despite the EU’s regional diversification of energy imports, the total replacement of Russian gas is still doesn’t seem to be realistic, at least for the next few years.

Meanwhile, the U.S. takes an active part in the search for alternatives to Russian energy for Europe and regional diversification of energy imports. This has been prioritized both at the legislative level (the U.S. Congress) and in relevant practical actions, projects and expert reports.

Accordingly, the following main directions of priority regional alternatives considered by the U.S. were distinguished: Northern Europe, Northern Africa, Eastern Mediterranean basin, Caspian Sea basin and the U.S.

*Northern Europe.* Compared to 2021, natural gas delivery from Norway and Great Britain to the EU increased in 2022. The main oil and gas reserves of these countries are concentrated in the basins of the North, Norwegian and Barents seas.

Moreover, Norway ranks 8<sup>th</sup> in the world by natural gas production, about 110 billion  $m^3$  annually [8].

The main natural gas export routes from Great Britain and Norway to the EU countries are Interconnector (from Great Britain to Belgium), Europipe II (from Norway to Germany) and Baltic Pipe (from Norway to Denmark and Poland) pipelines.

*North Africa.* In this region, Libya and Algeria are distinguished by their gas reserves (the latter is the 10<sup>th</sup> largest gas producer in the world, more than 85 billion  $m^3$  per year [8]). From here, through the territories of Morocco and Tunisia and the bottom of the Mediterranean Sea, a number of gas pipelines stretch to Spain and Italy.

*Eastern Mediterranean Basin.* Particularly, Egypt and Israel have become important gas producing and exporting countries thanks to the significant reserves of natural gas discovered in this region in recent years. There are also gas reserves in territorial waters of Cyprus.

According to the U.S. Geological Survey, natural gas reserves in Eastern Mediterranean Region and Nile Delta basin are around 3.5 trillion  $m^3$ . The largest deposits are Tamar and Leviathan (Israel), Aphrodite (Cyprus) and Zohr (Egypt) [9].

Pipeline delivery from Israel to Egypt and then to the EU as a liquefied natural gas via vessels is currently being considered. It is planned to complete the construction of Eastern Mediterranean pipeline (EastMed) by 2027, which will connect the gas fields of Israel and Cyprus to the island of Crete and the main territory of Greece.

Nevertheless, military-political tension has affected the region for decades crucially: the division of the island of Cyprus, Israeli-Palestinian conflict, the situation in Syria, etc. All these are creating serious challenges in terms of regular and uninterrupted production and export of energy.

*Caspian Basin.* Azerbaijan is considered as the main exporter of natural gas through the Southern Gas Corridor. The latter is a pipeline system consisting of 3 sections. South Caucasian (from Azerbaijan through Georgia to the east of Turkey), Trans-Anatolian (through the territory of Turkey) and Trans-Adriatic (from the Western part of Turkey to Albania and Italy).

However, the possibilities of the Southern Gas Corridor are limited. The total volume of natural gas transported in 2022 was only 10.5–11.0 billion  $m^3$  [10]. This is around 2.5% of the total annual volume of the natural gas being consumed in the EU.

*The United States of America.* Due to the large spatial distance, it is practically impossible to build a U.S.–Europe transatlantic gas pipeline. However, the U.S. plays an important role in the gas supply system of the EU countries, thanks to liquefied natural gas export through transoceanic vessels.

The main reserves of natural gas in the U.S. are concentrated in the South of the country (Texas and Louisiana), as well as in offshore waters of the Gulf of Mexico. From here the export of liquefied natural gas is carried out.

If the total volume of the export of liquefied natural gas from the U.S. to the EU was about 22 billion  $m^3$  in 2021, in the first 7–8 months of 2022 it already reached 40 billion  $m^3$  [11].

In contrast to vessels, pipeline transportation has a number of advantages. It allows to ensure a large volume of continuous supply over long distances, being more accessible and technically convenient, doesn't depend on natural and climatic factors and is more preferable in terms of possible environmental risks and consequences.

**Conclusion.** Foreign energy dependence and import is not a new phenomenon for the most of European countries. However, it has acquired a special character and emphasis since 2022, due to a number of significant military-political, geopolitical and geo-economic changes at global and regional levels.

In this context, the current developments over European energy supply include the following directions:

- gradual reduction and replacement of energy imports from Russia;
- search for regional energy supply alternatives and import diversification.

Geographically, these include the following priority target directions: Southern and Eastern Mediterranean (Maghreb, Arabian West and Levant, Eastern Mediterranean), Northern Europe and the Caspian Basin;

- development of Transatlantic energy cooperation: increasing American liquefied gas imports and expanding relevant energy infrastructures;
- regional reorganization of Russian energy exports and reevaluation of priorities: in particular, focusing on Asian direction.

The situation over Europe's external energy supply proves the need for spatially diversified energy import and reduction of significant dependence on a limited number of suppliers once again, as well as the need for the development and comprehensive use of the own energy capacities. This will allow reducing the risks and disruptions caused by external factors in the sphere of energy import, their possible negative consequences and will contribute to ensuring energy security.

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Տ. Ա. ՍԱՐԳՍՅԱՆ

ԵՎՐՈՊԱՅԻ ԱՐՏԱՔԻՆ ԷՆԵՐԳԱՍԱՏԱԿԱՐԱՐՄԱՆ  
ՏԱՐԱԾԱՇՐՋԱՆԱՅԻՆ ԱՌԱՆՁՆԱՀԱՏԿՈՒԹՅՈՒՆՆԵՐԸ,  
ՀԻՄՆԱԽՆԴԻՐՆԵՐԸ ԵՎ ՀԵՌԱՆԿԱՐՆԵՐԸ

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Իր բովանդակությամբ և ուղղվածությամբ աշխատանքն առնչվում է տարածաշրջանային էներգետիկ ուսումնասիրություններին, որոնք իրենց բնույթով միջնյուղային են՝ ներառելով աշխարհագրական, աշխարհաքաղաքական, տնտեսագիտական, բնապահպանական և այլ ուղղություններին:

Տեսական հատվածում ներկայացվել են տարածաշրջանային էներգետիկ ուսումնասիրությունների հիմնական բովանդակային հարցերն ու առանձնահատկությունները, դրանց դերն ու նշանակությունն էներգետիկ անվտանգության և էներգետիկ քաղաքականության համատեքստում:

Վիճակագրական տվյալների վերլուծության հիման վրա ներկայացվել և ամփոփվել են Եվրոպայի երկրների (ներառյալ ԵՄ անդամ չհանդիսացողների) արտաքին էներգամատակարարման արդի վիճակը, հիմնախնդիրները, տարածաշրջանային միտումներն ու առանձնահատկությունները: Հաշվի առնելով Եվրոպայի էներգետիկ անվտանգության ապահովման աշխարհաքաղաքական ասպեկտները՝ քննարկվել են նաև այս ոլորտում ԱՄՆ-ի և ՌԴ-ի ներգրավվածության հիմնական ուղղություններն ու դրանց տարածաշրջանային առանձնահատկությունները: Առանձնակի ուշադրություն է դարձվել արտաքին շուկաներից էներգետիկ ներկրման տարածական ընդլայնմանն ու շարունակական տարածաշրջանային համագործակցությանը:

Т. А. САРГСЯН

**РЕГИОНАЛЬНЫЕ ОСОБЕННОСТИ, ПРИНЦИПЫ И ПЕРСПЕКТИВЫ  
ВНЕШНЕГО ЭНЕРГОСНАБЖЕНИЯ ЕВРОПЫ****Резюме**

По содержанию и направлению статья относится к региональным энергетическим исследованиям, которые носят междисциплинарный характер, включая географическое, геополитическое, экономическое, экологическое и другие направления.

В теоретическом разделе были представлены основные содержательные вопросы и особенности региональных энергетических исследований, их роль и значение в контексте энергетической безопасности и энергетической политики.

На основе анализа статистических данных были представлены и обобщены текущее состояние внешнего энергоснабжения Европы (включая как членов ЕС, так и страны не являющиеся таковыми), его проблемы, региональные тенденции и особенности. С учетом геополитических аспектов обеспечения энергетической безопасности Европы также были обсуждены основные направления участия США и России в этой сфере и их региональные особенности. Особое внимание было уделено пространственному расширению импорта энергоносителей с внешних рынков и постоянному региональному энергетическому сотрудничеству.