

EUROPEAN ENERGY SECURITY IN THE CONTEXT OF THE U.S. EXTERNAL ENERGY POLICY*

TIGRAN SARGSYAN

The article discusses the main aspects of European energy security and the U.S. perspectives (engagement and interests). Therefore, the brief theoretical framework of energy policy and energy security is presented in the beginning through summarizing and generalizing a number of theoretical definitions. Afterwards, on the base of relevant statistical data analysis and summarizing the main contemporary issues towards ensuring European Union's (EU) energy security are referred to: lack of own fuel and energy resources (particularly in the face of growing demand), predominance of imported energy in the overall structure of energy consumption (external energy dependence), the large share of a limited number of external energy suppliers. In the context of the above mentioned issues and challenges, the main priorities and ways of U.S. involvement and contribution to European energy security are revealed, grouped and analyzed in a systemized manner: supporting the further regional diversification of the EU's energy import, legislative, institutional and financial support, providing with direct energy alternatives (particularly, liquefied natural gas), etc.

Keywords: *energy security, European energy security, energy policy, energy dependency, European Union (EU), U.S.*

Introduction

The purpose of this paper is to reveal, generalize and discuss the main issues and aspects of European energy security in the context of the U.S. external energy policy directions and priorities.

Accordingly, the following main objectives were distinguished:

1. To discuss and summarize the main theoretical provisions of energy security and energy policy;
2. To analyze the key patterns of the EU energy sector focusing on energy security issues;
3. To reveal and summarize the main instruments of the U.S. external energy policy and to discuss their application in the context supporting European energy security.

For achieving the aforementioned aim and objectives various relevant sources were analyzed (statistical database, research reports and in-depth analysis, articles, etc.).

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Սույն հոդվածը ֆինանսավորվել է ԱՄՆ պետքարտուղարության դրամաշնորհի շրջանակում: Այստեղ արտահայտված են հեղինակ(ներ)ի դիրքորոշումները, որոնց համընկնումը ԱՄՆ պետքարտուղարության դիրքորոշումներին պարտադիր չէ:

Because of a broad content, energy policy (especially, in connection with energy security issues) is a multidisciplinary study area including the following directions or aspects: economic, political, historical, environmental (including sustainable and eco-friendly energy development), geopolitical (including energy geopolitics), regional-geographical, etc. The content scope of the given paper refers to regional, political and geopolitical aspects mostly.

Ensuring energy security is one of the key priorities of domestic and foreign policies of the European Union: the commonwealth of 27 member states with a total population of around 450 million people. In particular, the following points should be taken into account:

- Growing domestic demand and relatively limited capabilities of energy production;
- The need to ensure uninterrupted energy import;
- In case of particular energy resources: a high external dependence and impossibility of replacement with relevant alternatives in the near future (as in case of Russian natural gas);
- The current situation in Ukraine and active involvement of Russia, the largest EU energy supplier. In this context, the sanctions established by the U.S. and the EU, the statements of particular EU member states on their intention to reduce and/or skip Russian fuels import should be taken into account.

Thus, ensuring EU's energy security is an urgent issue from economic, political, geopolitical and security aspects, gaining wider coverage rather than being purely regional. In this context, it is no coincidence that it is among the priority directions of the U.S. foreign policy.

The main literature sources referring to the topic and content of the article can be broken into 3 main groups: 1) Theoretical aspects of energy security; 2) The EU energy security, development and statistics; 3) The U.S. involvement toolkit (policymaking instruments).

A range of theoretical aspects of energy security and adjacent concepts have been discussed by Bohi and Toman (1996), Yergin (2006), Kruyt, van Vuuren and de Vries (2009), Cherp and Jewell (2011), Matthew (2013), etc. Besides, a number of publications devoted to the meaning and framework of energy security were prepared by USAID, the European Commission and International Energy Agency (IEA).

The EU energy security issues, as well as energy sector development and statistics are presented in relevant publications (reports, in-depth analysis, databases, etc.) of European Parliamentary Research Service, Eurostat (the statistical office of the EU), World Bank, U.S. Energy Information Administration, etc.

American perspectives of European energy security and the ways and directions of the U.S. contribution are discussed in publications of Congressional Research Service (2013; 2020), Department of State, Department of Energy, U.S. Energy Information Administration, and USAID. The main directions and priorities of the U.S. external energy policy aimed to ensuring international allies energy security (including the EU) were discussed by Geri and McNabb (2011) in detail.

The most recent initiatives (like REPowerEU project, EU-U.S. joint task

force, increasing liquefied natural gas import, etc.) have been illustrated in the publications of the European Commission and the White House.

A brief overview of the main theoretical provisions of energy policy and energy security

For better understanding of the main theoretical ideas of energy policy and energy security, it is necessary to get to know with several adjacent and closely related concepts, such as *primary energy resources, energy mix and energy dependence*.

Primary sources include the nuclear energy, fossil fuels (oil and petroleum, natural gas and coal) and alternative or renewable energy (solar, wind, geothermal and tidal energy capacities). Primary energy sources are being used for producing secondary energy (for direct consumption, like electricity).

Energy-mix is the combination of different types of aforementioned primary energy resources and their usage share ratio (%).

Energy dependence (measured with dependence rate) is one of the most important energy security-related concepts. Energy dependence rate is the share (%) of imported energy in the structure of the total energy consumption of the country. According to the World Bank, the countries with the highest rates of energy dependence (90-100%) are Singapore, Japan, Jordan, Lebanon, Malta, Luxembourg and Cyprus (Energy imports, net, The World Bank).

For energy importing countries import dependence has been defined as a situation where it does not possess the capacity to produce 100 per cent of its own needs. For energy producing countries it is a situation where there are not domestic customers with the capacity of consuming 100% of the produced energy. Accordingly, most countries depend on imports of a whole range of commodities, and on exports of fewer commodities to pay for the imports (Austvik, 2018:26).

More generally, *energy policy* can be defined as a set of activities and measures that are planned and implemented by the state and aimed at achieving the goals and priorities in the sphere of energy sector development: in particular, referring to energy import and export, security and independence, efficiency, production, distribution and consumption, sustainability (promoting green and renewable energy), etc.

It is possible to distinguish two spatial levels of energy policy development and implementation: domestic (internal) and external (foreign, international). External energy policy has a key significance in the system of countries' foreign policy and international relations in general.

Energy security is one of the crucial ideas of energy policy and energy sector development in general. It should be considered as the most comprehensive outcome of energy policy in political, economic, environmental and other perspectives.

According to Daniel Yergin's definition, energy security is the availability of sufficient supplies at affordable prices (Yergin, 2006). The European Commission has determined energy security as uninterrupted physical availability on the market of energy products at a price which is affordable for all consumers (European Commission, 2000). The International Energy Agency (IEA) has suggested the following meaning of energy security: a reliable and affordable

access to all fuels and energy sources (Energy security, IEA).

Aleh Cherp and Jessica Jewell have worked out 3 main perspectives of energy security: robustness (protection from disruptions caused by predictable natural, technical, and economic factors), sovereignty or independence (protection from intentional disruptions of various actors) and resilience (protection from disruptions caused by less predictable factors: political instability, extreme weather events, etc.) (Cherp et al, 2012:330).

As it was already mentioned, the study of the broad field of energy security and policy issues requires an integrated, interdisciplinary and comprehensive approach. A good example of such kind of integration is energy geopolitics.

Prof. Ole Gunnar Austvik has suggested the key points of energy geopolitics of a region or a country: the size, location, control, availability and cost of natural energy resources, alternative transportation routes, regional and global market balance, market mechanisms and regulations, political decisions, prices, etc. (Austvik, 2018:25).

Finally, it can be concluded that the following activities for ensuring energy security can be suggested within the framework of energy policy: reducing countries' external energy dependence, increased local energy production and comprehensive use of own energy capacities, storage and creating security reserves, spatial diversification of energy imports and reduction of dependence on a limited number of suppliers, ensuring permanent access to energy resources, reducing the possible negative impact of various supply disruptions, relevant pricing policy and subsidies, etc.

The key patterns of the EU energy sector and current energy security challenges

In this section a general overview of the EU energy sector and energy security issues will be shaped through a comparative analysis and generalization of the aforementioned energy parameters: energy mix and use, production and dependence.

As of in 2020, the general structure of primary energy resource use in the EU (shares in the energy mix) is as follows: oil and petroleum products - 36.4%, natural gas - 22.4%, renewable energy sources - 15.3%, nuclear energy - 13.1%, solid fuels (mainly coal) - 12.6%, other sources - 0.2%. The largest shares of particular resources by certain member states are: 87-90% (oil products, Malta and Cyprus, 37-39% (natural gas, Netherlands and Italy), 43-60% (solid fuels, Poland and Estonia), 31- 41% (nuclear energy, Sweden and France), 37-41% (renewable energy, Latvia and Sweden) (Shedding light on the energy in the EU, 2021:11).

At the same time the main patterns of energy production in the EU should be paid attention to. The overall structure of energy production in the EU is dominated by renewable and nuclear energy (respectively, 37% and 32% of the total energy production), followed by solid fuels (19%), natural gas (8%) and oil (4%) (Shedding light on the energy in the EU, 2021:6).

As of in 2020, the EU's total energy dependence on imports from foreign markets is about 61%, producing only 39% of the total energy used locally (En-

ergy Security in the EU's External Policy, 2020). As it was mentioned in the previous section, 3 of the EU member states (Malta, Luxembourg and Cyprus) are among the world's top energy importing countries' list (90-100% dependence rate).

In terms of particular energy resources, dependence rate was 97.0 % for crude oil, 83.6% for natural gas and 35.8% for solid fossil fuels (Eurostat, 2020).

In order to reveal the patterns of connections and correlations between the aforementioned 3 parameters, the Spearman's rank correlation coefficient (SRCC) was used by particular types of energy resources: oil and petroleum products, natural gas, renewable energy, nuclear energy and solid fuels. The coefficient was calculated by the following equation:

$$SRCC=1-\frac{6\sum d^2}{n(n^2-1)},$$

where d is the difference between the ranks of 2 observed (correlated) parameters and n is the number of correlated (observed) pairs (in our case n equals to 5, according to the number of primary energy resources).

Table 1. The results of calculation of Spearman's rank correlation coefficient for the EU based on 3 parameters and 5 types of energy resources

Correlated parameters	Coefficient value	Correlation type	Description
Use and production	-0.6	Negative, moderate	The most used energy is produced the less (by types of sources).
Use and dependence	+0.6	Positive, moderate	The most dependence on the most used energy sources.
Dependence and production	-1	Negative, strong	The most dependence on the less produced energy (by sources) and the less dependence on the most produced energy (by sources).

However, the total energy dependence is just one aspect of the problem. In general, the significant dependence on a limited number of external energy suppliers is always undesirable in terms of energy security. It is highly increasing the risk of energy supply disruptions under a variety of reasons and circumstances. This is a crucial challenge towards the EU's energy security because of an indisputable dependence on imports from 1 external supplier-Russian Federation.

As of 2021, Russia is ensuring 24.8% of oil and petroleum imports and 39.2% of natural gas imports of the EU (Eurostat, 2021). According to 2020 data, Russia has a share of 49.1% (1st place) in the EU's coal import (Eurostat, 2020).

In case of natural gas, member states' dependence on Russian market is increasing from the west to the east of Europe. The highest shares (%) of Russian natural gas supply have the following European countries (both EU and non-EU members): North Macedonia, Bosnia and Herzegovina and Moldova (100%), Finland (94%), Latvia (93%), Bulgaria (77%), Poland, Italy and Germany (40-50%) (European Union Agency for the Cooperation of Energy Regulators, 2020).



Fig. 1. The main external natural gas import pipelines of the EU (source: *Energy security in the EU's external policy, 2020*)

As it's shown in Fig. 1, there are several gas transportation systems from Russia (mainly, from West Siberia gas fields) to the EU via Belarus and Ukraine. Besides, the underwater gas transportation is essential as well. The Nord Stream pipeline from Russia to Germany under the Baltic Sea started operating in 2011-12. The construction of Nord Stream 2 was completed in 2021 (not operating).

A general introduction to the U.S. external energy policy framework and European energy security perspectives

For better understanding the U.S. perspectives of European energy security the main framework and priority directions of the U.S. energy policy should be discussed in brief.

As it was already mentioned, there are 2 main implementation levels of energy policy: domestic and external (foreign, international). At the level of domestic energy policy the Department of Energy (DOE) is the pivotal specialized governmental agency responsible for the country's energy sector development.

The main external level energy policymakers are the Department of State (including the Bureau of Energy Resources), the Department of Energy (including the Office of Fossil Energy), and the U.S. Agency for International Development (USAID). In the context of external energy legislative regulations the U.S. Congress has a primary role and importance.

Analyzing a variety of publications of the Department of Energy, the Department of State, Congressional Research Service (CRS) and USAID the following main directions or spheres of U.S. external energy policy can be distinguished:

1. Ensuring the own energy security and contributing to energy security of international allies and partners;
2. International assistance;

3. Promoting environmentally friendly and sustainable energy development (“green energy”).

It goes without saying that the EU is one of the key economic and political partners of the U.S. Because of the issues and challenges described in the previous section of the paper (particularly, the dominating role and influence of Russia in European energy import structure, as well as the ongoing situation in Ukraine and Russian involvement), energy security of the EU has been among the priorities of the U.S. foreign energy policy. At different times, different Presidential Administrations and Congresses have always considered European energy security issues alongside the main strategic priorities of the own foreign policy.

As it was mentioned in the introductory section, energy security and energy policy studies require an interdisciplinary approach (geopolitical, economic, regional, etc.). The emergence of energy geopolitics devoted to various regional and global aspects of energy resource control, availability and transportation is a good example of aforementioned approach.

The current state and developments over energy security in the EU, as well the U.S. and Russian involvements can be referred to strategic location and significance of Europe (especially, East Europe) in geo-economic, geopolitical and historical perspectives.

Particular, Sir Halford Mackinder in his paper “The Geographical Pivot of History” (1904) has proposed the idea of “Heartland” (the huge landmass from Himalaya mountains to Arctic regions, and from River Volga to River Yangtze). In 1919 Mackinder emphasized the strategic importance of East Europe for of establishing a control over “Heartland” and the world (M. Jones, R. Jones et al, 2015:192). In this context it should be noted once again that the dependence on Russian energy resources (particularly, on gas import) is particularly high in Eastern Europe.

Besides, the growing geo-economic impact and interests of China should be taken into consideration as well. The Chinese government adopted the Belt and Road Initiative (BRI) in 2013, as a global platform for infrastructure development.

In March 2022, 146 countries of the world (including 18 of 27 EU members) have already joined BRI by signing a Memoranda of Understanding (Countries of the Belt and Road Initiative, 2022). Thus, the closer cooperation between the U.S. and the EU in the sphere of energy sector and infrastructures development could become an alternative to BRI in future.

Surely, Transatlantic cooperation could be considered as a relevant platform and framework for comprehensive multi-vector U.S.-EU cooperation and coordination, including the variety of aspects of ensuring energy security.

European energy security and the U.S.: engagement vectors and policies

The great diversity of the U.S. direct and indirect activities for the EU energy security support can be merged into the following main groups:

1. Direct regulatory actions at the state level;
2. Promoting external energy import diversification;
3. Providing with direct energy alternatives.

1. Direct regulatory actions at the state level include Congressional (legislative) solutions, as well as the engagement of the Department of State, institutional assistance and financial support.

At Congressional level the following examples of U.S. engagement in maintaining European energy security should be mentioned:

- Protecting Europe's Energy Security Act (2019, 116th Congress), establishing sanctions related to the construction of the Nord Stream 2 and Turk Stream gas transportation pipelines (under Baltic and Black Seas respectively);
- European Energy Security and Diversification Act (2020), aiming to promote the diversification of Central and East European energy supply routes (European Energy Security: Options for EU Natural Gas Diversification. 2020:4).

Good examples of institutional assistance are the launching of the U.S.-EU Energy Council in 2009 and co-chaired by the U.S. Secretary of State, as well as the Partnership for Transatlantic Energy and Climate Cooperation (P-TECC).

Among the examples of the State Department active involvement in Transatlantic energy security framework the followings should be mentioned:

- Engagement on Nord Stream 2 pipeline related issues;
- Supporting the development of LNG terminals in Croatia;
- Supporting and the completion of the Southern Gas Corridor (Morningstar et al, 2019:16).

Financial support and investments are directed to capacity building in energy sector and infrastructure development, provided mostly by USAID and U.S. International Development Finance Corporation, USDFC (focusing on credits and investments).

2. Promoting external energy import diversification (particularly, regional segmentation of natural gas supply and promoting the development of alternatives routes of energy import to the EU) has been a priority direction of the U.S. energy policy in Europe during the last years.

Nowadays the main perspective routes of further import diversification include:

- North Africa (particularly, Algeria), with a possible use of Nigerian fossil fuel supplies through Trans-Saharan pipeline in future;
- East Mediterranean;
- Norway;
- Southern Gas Corridor (Caspian Sea and Central Asia, etc.). Through 3 sections (South Caucasus, Trans Anatolian and Trans Adriatic pipelines) the natural gas of the Caspian Sea is being transported to Italy. The possible extension of the Southern Gas Corridor to the east (Trans Caspian pipeline, to Turkmenistan) in future is also being considered.

3. Providing with direct energy alternatives basically means the further increase of LNG (liquefied natural gas) import. Thus, the REPowerEU project was launched and the EU-U.S. joint task force was announced in March 2022.

The main EU importers of American LNG are Spain, France, Netherlands,

Italy, Greece, Poland, Portugal and Lithuania. Besides, the U.S. is the 2nd biggest solid fuel (mainly, coal) supplier of the EU: around 17% of the total import (Eurostat, 2020).

According to the European Commission's data, the U.S. LNG exports to the EU reached around 22 billion cubic meters (bcm) in 2021. It is planned to achieve the goal of 50 bcm of annual LNG import by 2030. Meanwhile, the volume of natural gas imported from Russia during the same period was 155 bcm (about 7 times exceeding LNG imports) (REPowerEU, 2022; EU-U.S. LNG Trade, 2022).

Here are the main directions of planned activities within the REPowerEU:

1. Diversifying gas supplies via LNG and pipeline imports from non-Russian suppliers;
2. Promoting renewable energy development;
3. Reducing the use of fossil fuels. Particularly, reducing annual gas consumption gradually by 30% by 2030 will be equal to 100 bcm annually. It is planned to remove around 155 bcm of fossil gas use: the volume of imported Russian natural gas in 2021 (REPowerEU, 2022).

Even a rough arithmetic calculation shows that the natural gas balance will still be slightly negative:

$50 \text{ bcm (LNG)} + 100 \text{ bcm (reduced consumption)} - 155 \text{ bcm (Russian natural gas import)} = 5 \text{ bcm}$

Meanwhile, it should be mentioned that the capacities of increased import via Southern Gas Corridor and from Norway and North Africa and renewable energy development, as well as possible necessity of seasonal consumption increase because of weather conditions in winters are not considered in the balance equation.

Conclusions

As it was discussed, the U.S. is conducting a comprehensive energy policy at both domestic and foreign levels. It particularly focuses on an overall assistance and contribution to energy security of international allies including the EU: a key economic and political partner of the U.S. with crucial energy security-related challenges.

Based on correlation coefficient calculation, the following main problems or “weak points” of the EU energy security can be distinguished: the most used energy is produced the less (in terms of use of relevant energy resources), the most dependence on the most used energy sources and the most dependence on the energy with the less capacities of local production.

There are 2 main aspects or dimensions of the problem of European energy security: the significant rate of total (general) external energy dependence (around 60%) and the high dependence on 1 particular external energy supplier by all types of fossil fuels (Russia).

The ongoing situation in Ukraine and Russian involvement have sharpened the urgency of further diversification of energy import and practicing affordable and efficient alternatives. Several EU member states (Baltic States, Finland, Poland and Bulgaria) have already cancelled the import of fossil fuels and electricity from Russia.

Taking into account the aforementioned, European energy security has got a special significance in the context of the U.S. external policy in general (not only energy policy). Based on grouping and systemization of the variety of policymaking activities initiated and accomplished by the U.S. to support European energy security, the following main directions of involvement can be suggested:

- a) State regulatory activities (including legislative, institutional and financial assistance, capacity building, etc.);
- b) Regional diversification of European energy supply (focusing on several target areas like the Caspian Sea basin, Eastern Mediterranean, North Africa, etc.);
- c) Intensification of LNG export to the EU and developing relevant infrastructure and terminals.

However, the possible positive impacts of LNG import increase and fossil fuel consumption decrease will not be achieved immediately, but gradually by 2030. Besides, the impossibility of nonstop and continuous pipeline transportation in order to meet the energy needs of at least 27 countries with a total population of around 450 million people is an essential point as well.

Therefore, a smooth transition and replacement is required to avoid negative consequences or even turbulences in the spheres of energy pricing, industrial production, transportation, etc.

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ՏԻԳՐԱՆ ՍԱՐԳՍՅԱՆ – Եվրոպական էներգետիկ անվտանգությունը ԱՄՆ արտաքին էներգետիկ քաղաքականության համատեքստում – Հոդվածում քննարկվում են եվրոպական էներգետիկ անվտանգության հիմնական ապակետները և ԱՄՆ ներգրավվածությունն ու հետաքրքրությունները: Ըստ այդմ, նախ ներկայացվում է էներգետիկ քաղաքականության և էներգետիկ անվտանգության համառոտ տեսական բնութագիրը՝ մի շարք սահմանումների ամփոփման և ընդհանրացման հիման վրա: Այնուհետև համապատասխան վիճակագրական տվյալների վերլուծությամբ տրվում են Եվրամիության էներգետիկ անվտանգության ապահովման հիմնական խնդիրները. վառելիքի և էներգիայի սեփական պաշարների բացակայությունը (հատկապես ածուղ պահանջարկի պայմաններում), ներմուծվող էներգետիկ ռեսուրսների գերակշռությունը սպառվող էներգիայի ընդհանուր կառուցվածքում (արտաքին էներգետիկ կախվածություն), սահմանափակ թվով արտաքին մատակարարողների բարձր տեսակարար կշիռը: Վերոնշյալ խնդիրների և մարտահրավերների համատեքստում բացահայտվում, խմբավորվում և վերլուծվում են Եվրոպայի էներգետիկ անվտանգության ապահովմանն ԱՄՆ-ի մասնակցության հիմնական առաջնահերթությունները և ուղիները՝ աջակցություն ԵՄ էներգետիկ ռեսուրսների ներկրման տարածաշրջանային շարունակական դիվերսիֆիկացմանը, այն է՝ օրենսդրական, ինստիտուցիոնալ և ֆինանսական աջակցություն, էներգետիկ այլընտրանքների տրամադրում (մասնավորապես՝ հեղուկացված բնական գազ) և այլն:

Բանալի բառեր – էներգետիկ անվտանգություն, եվրոպական էներգետիկ անվտանգություն, էներգետիկ քաղաքականություն, էներգետիկ կախվածություն, Եվրամիություն, ԱՄՆ

ТИГРАН САРГСЯН – Европейская энергетическая безопасность в контексте внешней энергетической политики США. – В статье рассматриваются основные аспекты европейской энергетической безопасности и участие и интересы США. Поэтому краткая теоретическая характеристика энергетической политики и энергетической безопасности представлена вначале путем суммирования и обобщения ряда теоретических определений. Далее на основе анализа соответствующих статистических данных и обобщения представлены основные проблемы

обеспечения энергетической безопасности Европейского Союза (ЕС): нехватка собственных топливно-энергетических ресурсов (особенно в условиях растущего спроса), преобладание импортных энергоресурсов. в общей структуре энергопотребления (внешняя энергозависимость) большая доля ограниченного числа внешних поставщиков энергии. В контексте вышеперечисленных проблем и вызовов выявляются, группируются и анализируются основные приоритеты и пути участия и вклада США в энергетическую безопасность Европы: поддержка дальнейшей региональной диверсификации энергетического импорта ЕС, законодательная, институциональная и финансовая поддержка, предоставление прямых альтернатив (в частности, сжиженного природного газа) и др.

Ключевые слова: *энергетическая безопасность, европейская энергетическая безопасность, энергетическая политика, энергозависимость, Европейский Союз (ЕС), США*