

and methods” [6]. In brief, we mean an improvement of the legal and regulatory framework, the creation of a system of state bodies for tackling the issues of de-occupation and reintegration, creation of training centers for educational, scientific, administrative and other needs in the Crimean direction.

In addition, a comprehensive program for encouraging the citizens of Ukraine in the temporarily occupied territories to maintain constant contact with the homeland should be developed. It is necessary for Ukraine to create effective mechanisms for protection of the comprehensive interests of Ukrainians living in temporarily occupied territories (from obtaining documents – to the possibility of gaining education or medical assistance, etc.).

Of course, all this would make no sense if Ukraine did not acquire an economic and military power sufficient to deal with the problem of de-occupation within a reasonable period of time.

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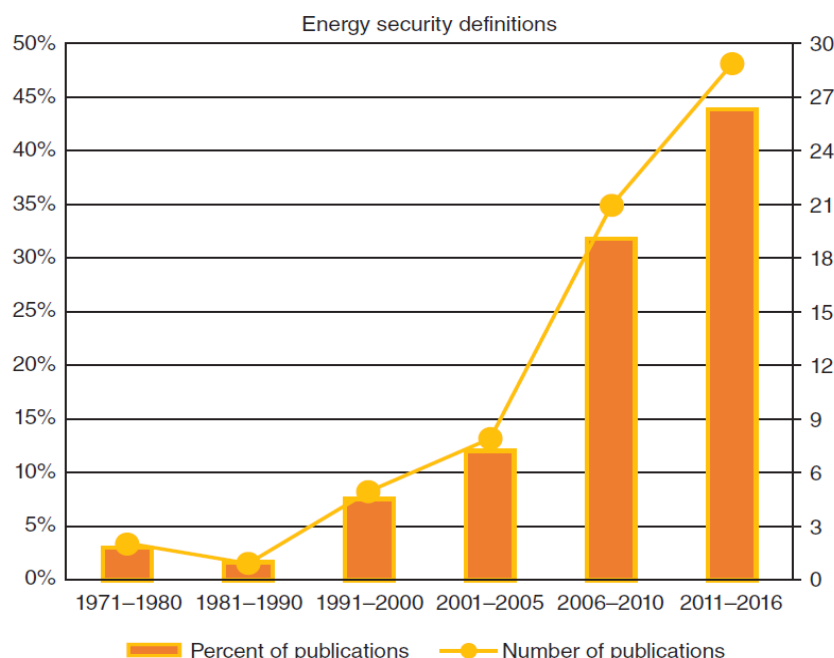
INTERNATIONAL ENERGY SECURITY DEFINITIONS AND DIMENSIONS

Introduction. Energy security has an urgent priority as it can shape countries' policies and behavior. Consequently, the common understanding, concept and definition of energy security is very important in order to facilitate cooperation between states in this area. Increasing energy prices, the growing dependence of industrialized economies on energy, climate change, energy demand and competition, globalization, political and military conflicts and other factors contribute to the fact that energy security is becoming a national security issue for countries. That is why not only researches, but states and their governments are interested in defining a clear concept of energy security as it has a practical goal. However, there is no clear common understanding neither of the term “energy security” (ES), nor of what methodologies should be used to conceptualize or generalize it.

Review of recent publications. The issue of definition of ES has been covered in many publications of such scientists as C. Winzer [1], A. Azzuni and C. Breyer [2][3], N.P. Stuchynska [5], B.V. Yanishen [8], L.S. Taraievska [9] and also in some reports of different international and national organizations, among which are International Energy Charter Secretariat [4], Financial and economic analysis office in the VRU [6].

Objectives of the paper. The study aims to analyze scientific works that are dedicated to the energy security issue, to characterize main differences in the definition of ES, by describing all possible dimensions of energy security.

Results of research.



1. History of the concept and definitions of energy security.

Fig. 1 The number of publications dedicated to energy security definition from the period between 1971-2-16; Source: created by the author based on [2].

Before 1970, the concept of ES was usually defined in the frame of physical availability of resources, especially oil, but after the oil crisis in 1973, authors started

to add to the concept a “price level” dimension and describe it in “affordable” or “fare” context.

First definitions were mostly focusing on economy, politics and supply. That is why a lot of researchers focused more on defining “security of supply” and quite often were equating it to the term “energy security” [1].

However, a simplification of the concept to the notion “security of supply” is a misleading procedure as security of supply is only one part of the ES and it excludes a lot of other dimensions of ES. In 1990s, following the Gulf War and the fall of Soviet Union, energy security definition was made by describing its opposite – loss of the energy welfare because of process changes (ex. changes in oil prices due to military and political conflicts).

At the end of the 20th century ecological dimension of ES became more widely discussed, especially after introducing the Kyoto Protocol¹ in 1997.

In the 21st century, research literature started to provide more precise definitions of ES, involving new dimensions of it. Consequently, the definition of ES started to become longer and longer as researches were trying to add as many different dimensions and notions as possible. Among newly introduced or extended notions were availability, environment and cost dimension, efficiency, military and sustainability.

However, after 2012 a new trend has started. Researches began to try simplifying the already existing definitions in the way that they can be used to all types of energy systems. The concept of energy security even today is usually considered as a part of economic or national security and rarely as an independent concept.

2. All dimensions of the energy security.

The definition and assessment of the components of energy security will help to provide a comparative assessment of the state of its changes under the influence of different factors. As a result, the understanding of every dimension of ES will facilitate work on ensuring of energy security of one state and the global ES.

The most frequently mentioned dimensions regarding the energy security are *affordability, sustainability, efficiency and availability*.

In the work “Definitions and dimensions of energy security: a literature review” authors A. Azzuni and C. Breyer [2] define *energy security as a feature (measure, situation or a status) in which a related system functions optimally and sustainably in all its dimensions, freely from any threats*. They also generalize and collect together all dimensions of ES that were introduced in different work during the period from 1970 till 2017.

¹ Kyoto Protocol – first international treaty that set binding obligations on.

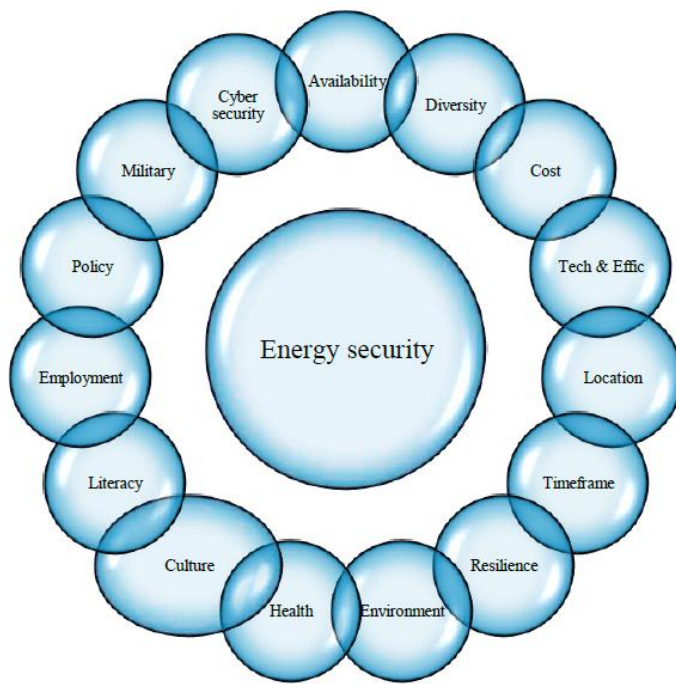


Fig. 1. Energy security dimensions

Fig. 2. Circle of all energy security dimensions; Source: created by the author based on [2].

The least analyzed energy security dimensions are “Timeframe”, “Health”, “Culture” and “Literacy”.

A Timeframe dimension is related to how energy security is seen in the scope of short and long-term tasks for ensuring ES. It is important to look backward to analyze how the current energy system was achieved and to look to the future to predict how energy system will look like. It is also connected to how sudden event can affect the energy system. In its turn the length of a struggle is connected to the influence of the specific event (ex. conflict) on the specific energy security system.

Regarding the health dimension of energy security, it is easy to connect these spheres: energy issues affects are “affected” by the health of people. Productivity of energy sector increases if its employees are healthy, but in the same way energy industries have a very bad impact on its workers health.

Another specific dimension of energy security is culture. In general, it shapes how people in different countries react and deal with specific problems. Energy access can change habits related to the consumption of the energy, the lack of it can produce conflicts within one society and engage in a responsible consumption behavior in another.

Literacy is also an important dimension of energy security. Awareness, knowledge, access to information contribute to the increase in the number of skilled workers involved in the energy sector, it gives homeowners more control over their own energy security and promotes responsible consumption attitude.

Although, all energy infrastructure nowadays depends on digital support, cyber security is the least discussed dimension of energy security in the scientific works. Digital programs of the critical energy infrastructure are an easy and a very attractive goal for the cyberattacks and that is confirmed by the fact that most system failures caused by virus attack and are not self-failures. That is why the more secure digital system is, the more secure is a whole energy system.

3. *Different countries – different definitions of energy security.*

Geographical location, political system, economic situation, access to the natural sources and other numerous factors can influence an understanding of energy security in different countries. In this situation, most researches usually divide countries on *exporters, importers and transit countries*. Moreover, almost always one state can be at the same time an exporter and importer, just to the different extent.

Importing countries are usually concerned about the energy security of supply, main goal of those countries is a diversification of energy sources and suppliers. Energy importers aim to reduce consumption and seek for energy independence (despite the fact, that total energy independence will be more a vulnerability than a benefit, as the energy system without any connections to other systems, even well-defended one, will be an attractive goal).

For *Exporting countries*, the main goal is a stability of demand. Exporting and consuming countries are trying to agree on term how this security of demand can be ensured, and the main issue of discussions is always a “fair price” for energy.

Both importers and exporters usually understand energy security by measuring security of supply and demand. Researches argue that to achieve a stable energy market, security of demand for producer and security of supply for consumers should be take in consideration. USA is a first energy importer in the world and a second energy producer. Nevertheless, even on the governmental level there is no clear definition of ES, and in general all official document refers to the terms made by UN and IEA.

Regarding *the transit countries* there are several global transportation routes. For example, the largest oil flow is from the Middle East; oil, coal and LNG flows form Southeast Asia and Australia to Northeast Asia; energy flow (mainly gas) from Russia to Europe and others involve transit countries, in case of the last they are Ukraine, Belarus, Moldova, Lithuania to some extent. Those countries haven't developed yet any common energy security concept and regarding their role also as importing countries they usually refer to the term “security of supply”.

Ukraine is situated between Russia and Europe, making it an important transit country for natural gas and crude oil flowing west from Russia. In the Energy Strategy of Ukraine for the period till 2035 energy security define as “an internal part of national security that provides achievement of a technically reliable, stable, cost-effective and environmentally safe provision of energy resources of the economy and the social sphere of the state” [10]. However, according to the Methodological recommendation for calculation of the level of economic security of Ukraine the definition of ES is different: energy security – is a state of the economy, that assist in effective usage of energy resources of the country, the presence of a sufficient number of producers and suppliers of energy on the energy market, and also in the availability, diversification and environmental friendliness of energy sources. There are other definitions provided by different Ukrainian Institutions, organizations and separate scholars.

We can make a conclusion, that there is no common definition of ES not only between different countries, but it is also hard to find a consensus on this term even within one state.

Conclusion. Even though, energy security is one of the main countries' concerns, the term is not clearly defined, which makes the cooperation between states harder in this sphere. Some researches refer to the origin of each word, but if term "security" is simple to define, "energy" by itself is multidimensional and evolving which complicates formulation of its notion.

In order to make energy system secure and ensure its optimal functioning, its dimensions and threats should be clearly defined. To find a specific law on energy security in any country is impossible. However, the vision of threats and mechanisms for overcoming them is outlined in a variety of strategic government documents.

Definitions of ES can be useful and effective only when they are adapted to reflect a unique situation to which they are applied.

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