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Problems of the Armenian NPP Functioning: Historical and Geopolitical Analysis

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The article indicates the prerequisites for the development of Armenia's nuclear power industry drawing upon the study of archival materials. It shows the significance of Armenia's energy complex in the development of the united electric power networks of the South Caucasus from the 1960s to the collapse of the USSR. The article analyzes the role of the nuclear power plant (NPP) in the establishment of Armenia as an energy surplus state. It further provides the reasons for energy crisis of the Republic of Armenia in the early 1990s, focusing, in particular, on the reasons for the closure and restart of the station. The main geopolitical problems of the Armenian NPP operation are revealed through studying the electric power market of the South Caucasus and indentifying the export opportunities of Armenia. The article also examines the main problems of nuclear fuel supplies to the Armenian NPP concluding by the recommendations regarding the long-term development of nuclear energy in Armenia.

Keywords

Armenian nuclear power station, geopolitical problems, electricity export, South Caucasus, nuclear fuel

Introduction

Since the mid-20th century, nuclear power has been one of the key and meanwhile ambiguously evaluated branches of world energy due to its direct impact on international relations and geopolitical processes. The essence of "atomic geopolitics" can be briefly described as such: the existence of developing nuclear energy in a country indicates its energy self-sufficiency and a high level of energy security, while its absence or gradual freezing is typical to countries with a low level of "energy sovereignty" dependent on external supplies of energy resources and

electricity. This also applies to countries with a developed energy system that choose to conserve nuclear power plants. For instance, Germany refused nuclear power after the accident at the Fukushima-1 NPP in 2011. This was followed by a sharp increase in consumption of traditional energy resources - gas and coal, which, in its turn, determines the desire to continue a stable cooperation with the Russian "Gazprom" - the main supplier of natural gas to Germany. The availability of nuclear energy also indicates the export capabilities of the country. The export of energy resources or electricity is an important prerequisite for the geopolitical positioning of the state. Moreover, the presence of an atomic complex increases the strategic importance of the country and provides additional security mechanisms to cope with external threats. Thus, in terms of the development level of the nuclear power industry, states can be conditionally classified into three major groups:

1. "nuclear protectionism" (or absolutism);
2. "nuclear liberalism"
3. "nuclear discrimination"[1]

Nuclear power is a priority for the countries of the first group, and for its development the states take all the necessary legislative, political, financial, and economic measures. One of the characteristics of protectionism is that the state prevents the access of the private capital (especially foreign) into the nuclear sector, treating it as a zone of state's strategic interests. Moreover, the state controls not only the operation of nuclear power plants and the supply of electricity, but also the production of the equipment for the operation of the stations. This mostly stems from security considerations. Special taxation is often applied to the industry of this group of countries, or taxes are not applied at all. Russia and China can be included in the group of nuclear protectionists' countries. In such countries, not only the production of the necessary equipment, but also the process of NPP construction is carried out by companies with a predominant share of state capital.

For the countries of the liberal group almost identical conditions are created for the development of all spheres of energy. The role of the state in the industry is limited only to the functions of control and in

[1] **Doyle Th.,** Liberal Democracy and Nuclear Despotism: Two Ethical Foreign Policy Dilemmas, *Ethics and Global Politics*, 2013, **6,** 3, 155-174.

matters related to security: certification, monitoring, licensing, etc. The development of the industry depends on objective conditions, and the main actor is private capital, which excludes a state monopoly. However, this does not mean that the state remains on the sidelines of nuclear energy. The only specificity is that within the framework of this model the state is inferior to the private sector in terms of participation including financial one. The nuclear industry is open to foreign investment, which is often fixed at the legislative level. As for equipment, there is also competition between foreign and domestic suppliers. The countries of this group are, among others, the United States, Canada, Finland, etc.

The third group includes countries that openly impede the development of the nuclear industry for a number of reasons. Most of those reasons are reduced to environmental ones. However, interests of companies involved in hydrocarbon energy and, in fact, forming an international anti-nuclear lobby should not be excluded. The main feature of this group is not only the lack of state support, but also the creation of discriminatory conditions for the functioning of the industry. This is manifested in the additional taxation of companies operating nuclear power plants, the artificial creation of an unfavorable investment climate in the industry, the support of hydrocarbon or renewable energy, etc. This group includes Germany, Switzerland, Belgium, Taiwan, Austria, among others.

None of the presented models is absolute for a single country. Often the boundary between them is very vague. This is explained by the change in the economic and geo-economic situation. For instance, China, with a predominantly protectionist model, is actively looking for foreign markets to supply Chinese-made equipment, while the US (during Trump's presidency), being in the liberal category, does not hide its skepticism about the export of the American nuclear technologies. There are also countries that strongly develop nuclear power applying the basic principles of both a protectionist and a liberal model. A clear example is India, which created favorable conditions for the implementation and further operation of its main nuclear project – Kudankulam NPP, meanwhile inviting foreign companies ('Rosatom' from Russia) to participate in the construction of the facility.

Nuclear power is proclaimed a state monopoly in Armenia fitting mostly in a protectionist model. Today, the nuclear power plant is not only one of the main electricity producers in the country, but also an important guarantor of its energy independence and energy security. According to the Law on Energy of RA (Chapter 2, Article 6), "nuclear power is a state monopoly. The state bodies authorized by the Government of the Republic of Armenia control the activities of forming the organizational, legal and technical systems of nuclear and radiation safety. The issues of nuclear energy, as well as its impact on the environment and security are regulated in accordance with international treaties and the legislation of the Republic of Armenia"[2].

According to the "Energy Security Concept of the Republic of Armenia", "energy security is a complex of political, economic, legal, organizational, methodological and other measures ensuring high-quality and reliable energy supply at economically reasonable prices to meet the state's needs on an everyday basis, as well as in emergency situations and during the war[3]. When addressing the main risks and threats that could potentially impede the full functioning of the country's energy security system, the concept focuses on the exploitation of the Armenian NPP. In particular, the emergence of obstacles in the process of building a new nuclear block instead of acting one is considered as a key threat capable of violating the logic of the country's energy development.

The Armenian nuclear power plant, being a guarantor of country's energy security, is considered to be one of the leading factors for increasing the economic and, thus, political competitiveness of Armenia in the region. Under the Soviet regime, the RA energy system was designed as an energy surplus, covering part of the region's needs. Due to this, today Armenia is able to ensure the uninterrupted export of electricity to neighboring countries. The Republic of Armenia has all the necessary resources to become a key player in the regional electric power market in case a power deficit occurs in countries such as Georgia, Azerbaijan, Turkey, Iran and Iraq. However, there are serious problems regarding the bilateral relations with its two neighbors and geopolitical

[2] "Law on Energy of the Republic of Armenia", 2001.03.22 / 10 (142), 01.04.2001.
[3]The concept of ensuring the energy security of the Republic of Armenia, Government of the Republic of Armenia, Decision N50 of December 22, 2011.

developments, which resulted in the exclusion of Armenia from a number of transport and energy (mainly pipeline) regional projects in the 1990s.

Under the Soviet regime, Armenia was the leader among the electricity producers of Transcaucasia. Since the mid-1970s, it has become its permanent exporter to neighboring countries, which was largely due to the launch of the Armenian NPP. Today, country faces a set of problems, the main of which are reduced to the search for funds for the construction of a new unit and the development of an optimal scenario for the future of the Armenian nuclear energy. In this context, of particular importance is Armenia's interaction with the key geopolitical actors of the region, in particular, with Russia, as well as the formation of effective methods of participation in diplomatic and media battles initiated with regard to the operation of the Armenian NPP mostly by Turkey and Azerbaijan. To identify the main geopolitical problems of the Armenian NPP operation, the article regards below the historical prerequisites for its construction.

Energy system of Armenia as part of the United Power Grids (UPG) of the Transcaucasia

The energy system of the Soviet Armenia until 1960's was based on the use of hydro resources, since the early 1960's. - the development of thermal power. The generation of electric power at thermal power plants (TPPs) in 1970's accounted for 73% of total consumption in the republic, 15% - for hydroelectric power stations (HPPs) and 12% - for flows from the Transcaucasian republics. The restructuring of the energy base contributed to a certain loss of the pace of energy development, which led to the country's lagging behind the average for the USSR norms for the specific consumption of electricity per capita[4]. The construction of a nuclear power plant was a central task in the new model of the country's energy development designed not only to cover the domestic demand, but also to form a power system capable of exporting electricity to all the countries of Transcaucasia, as well as beyond the region.

[4] The National Archives of Armenia (NAA), f. 1599, inv. 1, c. 727, p. 9.

During 1959-1965, the scheme of electricity supply of the Caucasus was adopted for the implementation, according to which the construction of the main stations was concentrated in the Georgian and Azerbaijani power systems. This scheme was based on an unjustified assumption of a large hydroelectric power station Inguri (introduced in 1968) and on an erroneous position that the transfer of electricity to the places of consumption was cheaper than the transfer of high-calorific fuel. Based on this assumption, the project of the construction of the Sevan power plant in Armenian was rejected. At the same time, coverage of a significant share of electricity consumption (up to 35%) in the republic was planned to be implemented through the systematic transfer of electricity from Azerbaijan through the transmission lines, the capacity of which was estimated at 360 MW. The error was partially corrected by the installation of two condensation units at the Yerevan Thermal Power Plant (CHP) (2 x 150 MW), which resulted in the flow of electricity instead of the planned 2.6 billion kW.h decreased in 1965 to 1.3 billion kW.h, in 1966 it amounted to 1.16 billion kW. h, and in 1967 - 0.663 billion kW. h. The early commissioning of two units of the Hrazdan TPP also contributed to the reduction of overflows[5]. Thus, in the specified period, an attempt was made to form such an energy system of the Armenian SSR, the logic of which predetermined the republic's maximum dependence on external supplies. The Transcaucasian power systems were connected by single power lines (one from each republic), connected at the Akstafa switch point. In addition to this basic interconnection, there were also a number of lower voltage links that played a secondary role. The only exception was the Ararat-Nakhchivan-Julfa single line, which is the only source of energy supply for the Nakhichevan Autonomous Soviet Socialist Republic.

In general, the power consumption in Transcaucasia during the mentioned period demonstrated steady growth (Table 1).

[5] NAA, f. 1599, inv. 1, c. 467, pp. 50-51.

Table 1

	1965	**1966**
Azerbaijani SSR	1275	1385
Georgian SSR	998	1154
Armenian SSR	690	751

The effect of the unification of power systems in 1965-1966 was estimated at 1.9%, which made it possible to take the isolated work of the Armenian SSR as a basis for considering the development of the Armenian energy system for the future. At the same time, it was realized that the implementation of such a model would inevitably lead to an overestimation of reserve capacity in comparison with that needed for the Armenian energy system. Bearing in mind that deficiency was predicted for the other two power systems of Transcaucasia (especially for the Azerbaijan SSR), it is natural to assume that the main power reserve should be concentrated in the Armenian SSR. It should be emphasized that the role of the association of power systems was mainly identified in emergency situations that occurred in separate systems of all three republics, allowing to effectively use the total reserve capacity of the three systems[6]. Mutual assistance of the republics allowed to significantly reduce the consequences of major accidents, including the simultaneous failure of two and then three 150 MW turbine generators at the Tbilisi condensing power plant (CPP) in 1965-1966. In the perspective, integration with the power system of the North Caucasus was also considered. For the development of a unified system, the construction of high-voltage lines Kirovakan 2-TbilCPP, as well as Agdam-Shinoir, was also considered as a necessity. Its construction, however, was based on the position of "Azglavenergo", which considered the project to be unreasonable, in spite of the fact that the mentioned line was supposed to provide reliable electricity supply to a number of areas of the Azerbaijan SSR, including Nagorno - Karabakh and Nakhichevan[7].

In the early 1970s, it became obvious that electricity generation in Armenia should be carried out at four types of power plants - HPPs,

[6] NAA, f. 1599, inv. 1, c. 467, pp. 54-55.
[7] NAA, f. 1599, inv. 1, c. 467, p. 56.

TPPs, CPPs and NPPs. With the launch of the NPP in the Armenian SSR, there was already an excess of electricity. Moreover, in view of a slowdown in the commissioning of new capacities in the Transcaucasia, the Armenian energy system began to be positioned as a backbone for the whole region.

The preconditions for the development of the project of the Armenian NPP

The first block of the Armenian nuclear power plant was put into operation in 1976, the second one - in 1980. Two WWPR-440 water-water power reactors were installed at the station with the capacities of 240 and 400 MW. Initially, it was assumed that the calculations should be carried out to the level of 1975 when the plant's capacity would be 800 MW with two 400 MW reactors. Similar calculations were made based on the fact that for 20 post-war years (from 1945 to 1965), electricity consumption in the Armenian SSR increased by 9.5 times, which corresponded to an average annual increase of 12%[8]. Moreover, when designing the start-up scenario of nuclear power plant, electric power consumption in the Nakhichevan ASSR was also taken into account. This was generally carried out from the "Armglavenergo" network and was estimated at 65 MW, 30 MW of which should have been covered by the nuclear power plant. At the same time, the introduction of the Karmir-Vanek hydropower station on the Araks River, jointly built by the USSR and Iran, was also taken into account in 1970. It was assumed that the mentioned HPP would produce 25 MW in summer and 14 MW in winter to the Nakhchivan ASSR. The adoption of a maximum of 65 MW as a whole corresponds to a power consumption of 285 million kW. At the same time, according to the "Scheme for the Development of the Azerbaijan Power System for 1966-1970," electric power consumption in the Nakhchivan ASSR should have amounted to 400 million kW. h. Such a high growth in consumption (in 1965 it was only 57 million), is apparently due to intentions to put into operation a plant for the

[8] NAA, f. 1599, inv. 1, c. 460, pp. 6-8.

production of soda, scheduled in Negrom (near Nakhichevan)[9]. In general, the level of electricity consumption in the Armenian SSR with the Nakhchivan ASSR is determined in the following amounts (Table 2, billion kWh)[10].

Table 2

	1970	**1975**	**1980**
Armenian SSR	7,1	11,0	17,0
Nakhchivan ASSR	0,1	0,19	0,30

In 1968 it was planned to construct nuclear power plants on the basis of longer-term prospects. While earlier the project was limited to calculations only till 1975, in the mentioned period the prospective loads till 1980 were considered. The calculations showed that in that period the increase in the energy consumption of the country would be covered by increasing the capacity of nuclear power plants above 1800 MW, and consequently, the energy of the Armenian SSR would be deficit-free[11]. It was planned that the annual increase in power consumption would amount to 800 million kW. h in 1975 to 1300 million kW. h in 1980[12]. The design was carried out taking into account the fact that by the time the first units of the NPP were put into operation, the construction of the Hrazdan CPP had already been completed, and Hrazdan TPP had been expanded from 100 to 300 MW. Thus, the state would fully ensure the generation of the electricity needed. At the same time, the project was based on an important provision, according to which the bulk of electricity before and after the launch of nuclear power plant would be generated at thermal power plants[13]. It is noteworthy that this principle is still a system-forming factor in the Armenian energy industry. Thus, The predictions showed that until 1980 the Armenian SSR energy sector would be based entirely on its own generating sources and would not receive foreign subsidies. For the first time in 20 years, the state's energy

[9] NAA, f. 1599, inv. 1, c. 460, pp. 9-10.
[10] NAA, f. 1599, inv. 1, c. 467, p. 142.
[11] NAA, f. 1599, inv. 1, c. 467, p. 19.
[12] NAA, f. 1599, inv. 1, c. 467, p. 97.
[13] NAA, f. 1599, inv. 1, c. 467, p. 107.

industry should not have to limit its economy. The prerequisites for this were more than enough. Up to the beginning of 1971, in addition to the existing stations, two units of 100 MW were commissioned at Hrazdan TPP and three units with a total capacity of 15 MW at Tatev HPP. In general, for the period from 1971 to 1980, it was planned to put into operation the Shamba and Spandaryan HPP of the Vorotan cascade, the Lori-Berd HPP of the Debit cascade, as well as the Hrazdan power plant (3 x 200 MW) and, accordingly, the first and second nuclear power plants. During the period from 1974 to 1980 the generation of electricity in the Armenian power system for country's needs amounted to 95 billion kW. h, and more than 26 billion were generated at the nuclear power plant (i.e. 27.8%). According to the forecasts, within some years of the mentioned period, some excess capacity (about 400 MW) would be available at country's power plants, which could be transmitted to the UPG of the Transcaucasia[14].

After making a decision on the construction of the Armenian NPP, it was found out that the station would be built on a high seismic area. Earlier, in 1966, in connection with the refusal to locate an NPP in the Vedi area, dictated by the high cost of the territory, four basic scenarios of construction have been considered:

- Arazdayan,
- Karmrashen,
- Akhuryan,
- Amasiya[15].

Each of the scenarios considered had both advantages and disadvantages. For instance, with the location of nuclear power plant in the Amasiya area, the station was the most remote from the largest consumer - the Yerevan junction. Therefore, unlike the other three options, the main consumers of nuclear power were to be the Leninakan (currently Gyumri), Kirovakan (currently Vanadzor) and Alaverdi. This scenario assumed that one of the largest facilities of the Armenian power system, the Hrazdan CPP, would have to issue the main part of its

[14] NAA, f. 1599, inv. 1, c. 467, pp. 143-144.
[15] NAA, f. 1599, inv. 1, c. 460, p. 10.

capacity in the direction of Zangezur (currently Syunik) and Yerevan[16]. The Akhuryan scenario also included similar disadvantages, which presupposes the construction of a nuclear power plant on the territory bordering Georgia. The Arazdayan variant (currently Yeraskh) also removed nuclear power plant from the main energy consumption centers, but this distance of 30 km did not significantly change the previously designed configuration[17]. From the perspective of capital costs over the network, this option was considered to be the most economical, but considering the reliability of the network and the proximity to the main consumption centers, it was considered appropriate to build the plant in Karmrashen (village in Aragatsotn)[18].

After studying and analyzing the materials for the location of NPP, an area was chosen in the western part of the Ararat valley, 16 km from the border with Turkey, 10 km northeast of the district center - the city of Hoktemberyan (currently Armavir), 28 km west of the city of Yerevan. The complex of conducted discerning and research confirmed that the seismic conditions of this area are characterized by a level corresponding to 8 points on the MSK-64 scale[19]. Since its launch, the Armenian nuclear power plant has become a backbone for the energy system of the Armenian SSR and is currently the main guarantor of its security.

The beginning of energy crisis

After the devastating earthquake in Spitak in 1988, the requirements for the closure of the Armenian NPP were strengthened. As to the decision of the Council of Ministers of the USSR of January 6, 1989, "On stopping power units of the Armenian SSR and measures for providing power supply to the republics of Transcaucasia ", "…considering the general seismic situation resulted from the earthquake in the territory of the Armenian SSR, the first unit of NPP should be stopped in February 25,

[16] NAA, f. 1599, inv. 1, c. 460, p. 18.
[17] NAA, f. 1599, inv. 1, c. 460, p. 14.
[18] NAA, f. 1599, inv. 1, c. 460, p. 23.
[19] **Minasyan S., Gevorkyan A.,** Atomic Energy in Armenia, Bulletin of the Engineering Academy of Armenia, 2004, 1, 1, p. 36.

1989, while the second unit - on March 18, 1989"[20]. Following the decision, the Ministry of Energy and Electrification of the USSR, as well as the Council of Ministers of Georgia, Azerbaijan and Armenia were instructed to develop measures to balance the production and consumption of electricity within a 10-day period. The key task was to increase the use of the installed capacity of the Transcaucasian power plants by 330,000 kW in 1989 and 230,000 kW in 1990. At the same time, the re-equipment of nuclear power plants in TPPs, as well as the commissioning of two power units of Rostov NPP until 1991 to cover the deficit were discussed. According to the decree, a number of other systemic measures have been envisaged, among which the measures for the development and approval of project documentation for the construction of a 330 kV power line in the southern regions of the Azerbaijani SSR and the Armenian SSR, as well as instructions for the completion of the repair of the N4 power unit with a capacity of 200 thousand kW on Hrazdan CPP with commissioning in 1989[21]. It was also planned to implement the accelerated construction and commissioning of the Akstaf-Armenia power line and the "Armenia" substation[22].

As part of the development of a new model of the power system functioning under the conditions of the NPP shutdown, much attention was paid to the gas transportation and hydropower component. In particular, the Ministry of the Gas Industry of the USSR was commissioned to carry out pre-project work on expanding gas transmission systems that transport gas to the North Caucasus and the Transcaucasia, taking into account the provision of gas to power plants[23]. On the other hand, great attention was paid to the development of a new schedule of water launches from the lake Sevan to cover the peaks of electric load and for irrigation.

As the Ministry of Foreign Economic Relations of the USSR was commissioned to purchase two air-condensation units with the amount of 31 million rubles in Hungary with delivery to the Hrazdan CPP, it was planned to provide extra-scheduled exports of electricity to Hungary

[20] NAA, f. 113, inv. 161, c. 21, p. 5.
[21] HAA, f. 113, inv. 161, c. 21, p. 7-8.
[22] HAA, f. 113, inv. 161, c. 21, p. 12.
[23] NAA, f. 113, inv. 161, c. 21, p. 9.

during 1992-1995 to compensate the costs of the equipment. According to the resolution, it was entrusted to build and commission energy capacities and electric grid facilities in the republics of Transcaucasia (Table 3, thousand kW)[24].

Table 3

Objects	**1989**	**1990**	**1991**	**1992**	**1993**
Hrazdan CPP	-	300	300	300	300
Tbilisi CPP	300	300	300	-	300
Azerbaijan CPP	600	300	300	-	
Henikend HPP	37,5	37,5	37,5	-	

Obviously, in view of the collapse of the USSR, these programs were not destined to be realized. This, in fact, was the beginning of a deep energy crisis in the newly independent Republic of Armenia in the early 1990s, as it will be discussed below.

The requirements of a number of political and public institutions to stop nuclear power plant were caused, first of all, by a devastating earthquake in Spitak. In 1983, the Armenian SSR initiated the construction of the third and fourth units of the nuclear power plant, but after the Chernobyl nuclear power plant accident in 1986, the project was stopped. At the same time, it should be highlighted that seismic resistance was originally a basic principle of the construction and further operation of the Armenian NPP. In accordance with the decision of the Central Committee of the CPSU and the Council of Ministers of the USSR (21.01.1982, Yerevan), a research department on seismology and seismic construction of nuclear power plants of the "Atomenergoproekt" Institute was launched[25]. The works aimed at increasing the seismic resistance of the Armenian NPP, in fact, become an example of carrying out relevant work on the other objects. In November 1990, a year after the NPP was shut down, the Director of the Institute F. Arakelyan in his letter to the Chairman of the Council of Ministers of the Republic of Armenia V.M. Manukyan and Chairman of the Commission for the Promotion of the

[24] NAA, f. 113, inv. 161, c. 21, p. 7.
[25] NAA, f. 1519, оп. 1, с. 22, p. 1.

Renaissance of Armenia, Academician of the Russian Academy of Sciences A.G. Aganbekyan suggested that: "... on the basis of the large accumulated experience in testing and ensuring the seismic stability of nuclear power plant, it is necessary to conduct a complex of surveys and activities, primarily at chemical industry enterprises, major accidents with respect to their consequences will be commensurate with accidents at nuclear power plants such as the Chernobyl tragedy. Such work is urgently needed at the Hrazdan CPP, which does not correspond to the requirements of seismic resistance with the established level of possible earthquakes"[26].

During the operation of the power units of the Armenian NPP before decommissioning, 44,231 billion kWh of electricity were generated[27]. The collapse of the Soviet Union, as well as political events in 1991-1994, led to the blockade of Armenia and, thus, to the energy crisis in the republic.

The lack of own hydrocarbon reserves, the dependence on the supplied energy resources, which reached 96% by 1991, the maximum blockade of railway and pipeline communications, the closure of nuclear power plant, the lack of electricity imports, the sharp fluctuations in food prices and geopolitical tensions in the region exacerbated the energy crisis in the country.

The generalization of analytical data on the state of the fuel and energy complex in Armenia shows that since 1989, there was a reduction in energy consumption. In 1991, country's resource provision was 60%, in 1992 - 40%, in 1993 this indicator reached 25%. Thus, compared to 1988, the electricity consumption index in the mentioned years indicated 90%, 74% and 51%. The heat supply system provided only 5% of the total demand and 8% of the demand in the municipal utilities sector in 1993. Providing comparatively positive indicators of the functioning of the electric power system became possible only due to the super planned consumption of its own hydro resources and, above all, the unprecedented super-intense operation of the hydroelectric power stations of Sevan-Hrazdan cascade.

[26] NAA, f. 1519, оп. 1, c. 22, p. 15.
[27] **Minasyan S., Gevorkyan A.,** Op. cit.

The consumption indicators of the main types of fuel and energy resources in the Armenian SSR in 1988 were 3,620 kg of equivalent fuel per capita, which roughly corresponded to the level of Poland or France in the 1960s. In 1991, this indicator was sharply lowered and amounted to 2780, and in 1993 - about 1200 kg of fuel equivalent per person. According to the World Bank, in 1990 GNP per capita was $ 2,400, and its energy intensity was 1000 kg of oil / thousand of GNP. According to these indicators, Armenia has bypassed such countries as Czechoslovakia, Romania, Poland, Bulgaria and Georgia. However, in 1992, the specific GNP decreased 1.7 times, and the energy intensity index increased 1.4 times. As a result, Armenia was the last country in the list of the mentioned ones. This negative tendency continued after the freezing of the Karabakh conflict in 1994, when electricity consumption in everyday life, rural economy, industry, agriculture and transport, was carried out with significant losses and inefficiently. The main problem was, first of all, in the physical and moral deterioration of power equipment and the unsatisfactory level of implementation of energy saving measures[28].

Within the framework of the target complex program "Energy", adopted by the Government of the Republic of Armenia in 1995, an attempt was made to single out the stages of country's socio-economic development from 1993 to 2010 (see Table 4)[29].

[28] NAA, f. 113, inv. 175, c. 80, p. 6.
[29] Ibid.

Table 4

Stages	Social aims	Economic aims	Basic measures
1993	Survival of the population during the transition period	Ensurance of the social environment with electricity at minimum fuel costs	Implementation of emergency crisis management measures
1993 - 1997	Overcoming of the crisis and stabilization of the living standard	Overcoming of the electricity deficit for primary consumers	Establishment of market relations, stabilization of the economy
1998 - 2010	Natural development of living conditions	Acceleration of the pace of economic development, a significant increase in production	Scientific and technical progress, re-equipment, growth of profitability

The launch of the Armenian NPP under new geopolitical conditions

After the collapse of the USSR, the countries of the South Caucasus, previously located in a single geopolitical space, found themselves in a state of deep disintegration, which was also significantly facilitated by regional armed conflicts. This caused the disintegration of energy systems, as a result of which the countries of the region began to develop separate models for ensuring their energy security while trying to extract dividends from the growing Russian-American competition for domination in the region. This competition continues to influence the geopolitical and geo-economic orientation of the recognized states of the region - Armenia, Georgia and Azerbaijan, predetermining the logic of their relationship.

Under the circumstances, the issue of the resumption of the exploitation of the NPP has acquired a special urgency. Facing the

difficult situation regarding the energy system of the Republic, on December 28, 1994 the Government of Armenia established a state commission to organize work on the launch of the 2nd unit of the Armenian Nuclear Power Plant. The commission also included representatives from Russia (JSC "Gidropress", "Atomenergoproekt", "Kurchatov Institute", "Atomprom", "Atompromresurs", etc.)[30]. On April 28, 1995, the Government of the country began the necessary preparatory work for the launch of the 1st unit of the NPP[31], which was subsequently suspended due to the technical inexpediency of launching the unit. The second unit was restarted, when the country was in a state of great energy crisis and electricity was supplied only for several hours a day. Without electricity, the country weakened by the recent war would not be able to restore the economy, create normal conditions for the livelihoods of its citizens and reduce the threatening rate of emigration.

In April 1995, the Government of the Republic of Armenia adopted Resolution on "the re-launching of the Armenian Nuclear Power Plant". The following documents were prepared and approved at the governmental level that determined the procedure for resuming operation of the plant after a long shutdown:

- "The concept of renewal of the power units operation of the Armenian NPP";
- "List of measures to improve the safety of the second unit of the Armenian NPP"[32].

The launch of the 2nd unit was made possible due to the assistance of such countries as Russia, France, Germany, with the assistance of the European Union (EU) and the IAEA. Since 1995, the share of the Armenian nuclear power plant in the development of country's electricity has steadily increased. The need for plant operation is especially high in winter, when the country's electricity consumption rises sharply due to the provision of heat to residential, public, industrial and commercial buildings.

[30] NAA, f. 113, inv. 171, c. 583, pp. 3-4.
[31] NAA, f 113, inv. 175, c. 236, p. 1.
[32] **Yeghiazaryan L.,** 100 years of energy in Armenia, Yerevan, Publishing house "Media Model", 2003, p. 105.

The re-launching of the Armenian NPP lead to a number of statements and comments of a very different level, having political connotations with ecological coloring. After the re-launch of the 2nd power unit of the Armenian NPP in 1995, the Turkish authorities made statements about the station's non-compliance with environmental safety requirements. In particular, Turkey accentuated the close location of the nuclear power plant to the Turkish border. The Turkish media repeatedly published articles on the threat posed by the Armenian nuclear power plant for the health of the residents of Igdir, located 16 km from the nuclear power plant. The articles also addressed the increase in the number of cancer diseases, as well as that in the number of newborns with obvious anomalies[33]. Such publications of speculative nature are undoubtedly not uncommon for the Turkish media and Turkish political leaders [34], as well as for the Azerbaijani authorities[35]. The official Yerevan has repeatedly stated that the Armenian NPP complies with all international safety standards. As for the position of the main supranational regulatory body of the industry, the IAEA, in July 2005 the delegation visited Armenia. During his visit, the Director General Mohammad El Baradei acquainted himself with the main directions of the development of Armenia's energy industry highlighting not the danger of the Armenian NPP but the fact that replacing the existing nuclear unit with a new generation of nuclear power unit is the preferred option for the development of country's energy system[36].

The European Commission continues to insist on the conservation of the station given the fact that the NPP has developed its own resources. In 2000, following the meeting of the joint working group, the European Commission and the Republic of Armenia, a decision was made to provide financial assistance to the Armenian side within the

[33] Armenia's Nuclear Program: A Regional Security Threat with Global Consequences, https://ankasam.org/en/armenias-nuclear-program-regional-security-threat-global-consequences/

[34] Armenian Nuclear Power Plant should be shut down, says Turkish minister, http://www.hurriyetdailynews.com/armenian-nuclear-plant-should-be-shut-down-says-turkish-minister.aspx?pageID=238&nID=104311&NewsCatID=348

[35] Azerbaijani Presidentmeets with the IAEA Genereal Director, http://lib.aliyev-heritage.org/ru/12727945.html.

[36] IAEA will assist Armenia in the construction of a new nuclear power plant, http://www.panarmenian.net/rus/economy/news/14327/.

framework of the TACIS program for the purpose of conservation of the Armenian nuclear power plant. The financial aid assumed:

1) erection of new HPPs and modernization of existing HPPs in RA during 2000-2003 - 34 mln euro;
2) restoration and construction of the gas transportation infrastructure of the RA with the aim of connecting with Iran within the framework of the INOGATE program (the Program of international cooperation in the energy sphere between the EU, the Black Sea and Caspian states and neighboring countries) in 2000-2004 - 16 mln euro;
3) implementation of the Intergovernmental Program of Action for Nuclear Safety in 2000-2004. - 50 mln euro (10 mln per year);
4) Euroatom's loan of 138 mln euro for the decommissioning of two nuclear power units [37].

This amount was obviously insufficient to resolve the complex problem of the Armenian NPP functioning, which implies not only the decommissioning of the blocks through the development of alternative capacities, but also the extension of the term of their work with a parallel search for funds for the construction of a new generation unit. At present, a feasibility study has been prepared for the construction of a new nuclear power plant. According to preliminary estimates, it will cost $ 5.2-7.2 billion[38].

In September 2003, the Ministry of Energy of Armenia and the Russian companies “RAO UES of Russia” and “Inter RAO UES” signed an agreement on the transfer of the Armenian nuclear power plant under the trust of “Inter RAO UES” for a period of five years. In accordance with the agreement, the Government of Armenia remained the owner of 100% of the shares, and “Inter RAO UES” committed to ensure the uninterrupted and safe operation of the Armenian Nuclear Power Plant and to import annually nuclear fuel for the station[39]. Within the framework of this agreement, the Government of Armenia received 75%

[37] The EU technical assistance program for the CIS countries (TACIS) for 2000-2006), NAA, f. 1691, inv. 2, c. 8, p. 3.
[38] Construction of a new power unit is among the priorities of Armenia http://www.armworld.am/detail.php?paperid=4795&pageid=147525&lang=
[39]Decision of the Government of the Republic of Armenia on transfer of the rights of CJSC "Armenian Nuclear Power Plant" to the trust management of shares / September 17, 2003, N 1211-A (in Armenian).

of the profit from the activities of the Armenian NPP, and "Inter RAO" - 25%. Under the contract, the Russian company was to pay back the debt accumulated by the nuclear power plant in the amount of $40 million to nuclear fuel suppliers.

According to the agreement concluded in December 2008 between the RA Ministry of Energy and Natural Resources and the Russian company "Inter RAO UES", the Russian side's management of financial flow at the Armenian NPP was extended for another five years. In 2013, "Inter RAO UES" refused to extend the agreement with the Government of Armenia on further trust management of the nuclear power plant, commenting that it fully fulfilled its obligations to the Armenian side.

The interest of Russia to participate in the development of the nuclear sector of Armenia is evidenced by the fact that even on December 24, 2010 the Armenian government approved the agreement and the charter of the joint Armenian-Russian company - CJSC "Metsamorenergoatom", which assumed the obligation to build a new nuclear power unit. Thus, by this decision, the government agreed to establish a joint venture with the Russian side (Rosatom) on a parity basis. The authorized capital of the company was $60 million, while the Armenian share of the authorized capital was $30 million and was provided at the expense of the profits of the energy companies of Armenia[40]. The decision to build a new power unit by Russia directly affected the containment of tariff growth for natural gas supplied to Armenia.

Thus, the problem of conservation directly rests on the decision to build a new unit, as well as to determine the timing of the termination of operation of the nuclear power plant. In early 2015, the Ministry of Energy and Natural Resources of Armenia announced that the new power unit of the Armenian NPP would be launched in 2026, preceded by Russia's decision to grant Armenia a loan of $270 mln (and $30 mln as a grant) aimed at extending the life of the Armenian NPP.

[40] The construction of nuclear power plants in Armenia will be both Russian and Armenian enterprises, http://www.kavkaz-uzel.ru/articles/165168/.

Fuel supplies for the Armenian NPP

One of the basic problems regarding the operation of the nuclear power plants is the search for fuel suppliers. This is directly related to a number of geopolitical problems, since nuclear fuel trade is carried out not only within the framework of commercial logic, but also that of long-term political interests between states. In this respective, the establishment of stable relations between the supplier countries and the ones that import nuclear fuel is a prerequisite for the full operation of nuclear power plants. On the other hand, the creation of a supply chain, as well as the storage of nuclear fuel, is important in the context of non-proliferation of nuclear weapons. According to the "Treaty on the Non-Proliferation of Nuclear Weapons", given the "devastating consequences that a nuclear war would have for all mankind", one of the main non-proliferation actors is the International Atomic Energy Agency (IAEA), whose goal is to create "guarantees for a peaceful nuclear activities"[41]. To provide such guarantees, the IAEA initiated the creation of the so-called "fuel banks" designed to create supply mechanisms accessible to all countries that fulfill the requirements of non-proliferation of nuclear weapons, deliveries to which are stopped not for technical or commercial reasons, but for political ones. Currently, under the auspices of the IAEA, the International Uranium Enrichment Center (IUEC) operates in Angarsk (Russia), which functions as a "fuel bank". The main purpose of creating the IUEC is to ensure guaranteed supplies of uranium products to countries that participate in the Center as an alternative to creating their own enrichment facilities. Armenia is a full member of the IUEC on a par with Russia, Kazakhstan and Ukraine. These countries are building their policy in the field of nuclear energy in strict accordance with the principles prescribed in the Vienna Convention on Civil Liability for Nuclear Damage (1997), as well as the Joint Convention on the Safety of Circulation with Spent Fuel and Radioactive Waste Management Safety (1997). According to the intergovernmental agreement on the establishment of the IUEC, the main conditions for membership in the Center are:

[41] Treaty on the Non-Proliferation of Nuclear Weapons, Approved by Resolution 2373 (XXII) of the UN General Assembly on June 12, 1968.

- Compliance with the country's obligations under the international regime for the non-proliferation of nuclear weapons (Agreement, Preamble, Charter of JSC IUEC, Article 1.1).
- Country's intention to develop nuclear energy, the availability today or in the future of its own reactor needs, whose needs will be met by the products of the IUEC.
- Cooperation of the Member State of the IUEC with the IAEA (Agreement, Article 8).
- Use of enriched uranium produced by the IUEC and exported from the Russian Federation for the manufacture of fuel (powders, tablets, fuel assemblies) for the needs of nuclear energy (Agreement, Article 5).
- Access to uranium enrichment facilities mainly but not exclusively to IUEC member organizations that do not develop uranium enrichment facilities on their territory[42].

The participation in the IUEC is, first of all, a political issue. The entry begins with an interstate political process, organized by foreign departments of countries interested in integration with the IUEC.

In this context, we should dwell on a strategically important Armenian-Russian project in the field of nuclear energy, namely the establishment of the CJSC "Armenian-Russian Mining Company" (July 2008) for geological prospecting, mining and processing of uranium in Armenia. The creation of a joint Russian-Armenian company is of great importance both for Armenia and for Russia. The company immediately started field work, and in 2009 drilling operations started in the Sisian district of Syunik region. According to forecasts, uranium reserves in Armenia fluctuate from 10 to 60 thousand tons, with the development of which it is possible to significantly increase the level of Armenia's energy security, using available reserves both for operation of the Armenian NPP and exporting them in the framework of cooperation with the IUEC. Starting from 2011, the price of uranium in the world shows a drop, and in 2016, it reached its lowest price - $18 per pound of nitrous oxide. However, taking into account the constant growth of energy consumption

[42] Agreement between the Government of the Russian Federation and the Government of the Republic of Kazakhstan on the establishment of the IUEC of May 10, 2007, http://www.iuec.ru/files/Agreement_rf_kz_rus.pdf.

around the world (approximately 2% per year), it is also possible to forecast an increase in demand for nuclear power.

Armenian NPP and the problems of electricity export

The development of nuclear energy and technology is directly related to geopolitical factors. According to Blasio and Nephew, nuclear energy can play a constructive role in covering energy needs of the 21st century in both developed and emerging markets. At the same time, for a fully-fledged and safe development of the industry, it is necessary to purposefully support state institutions that stimulate and coordinate the investment activity of the private sector[43].

The future of the Armenian NPP is largely determined by the export activity[44]. In this sense, the search for electricity sales markets in the region is a strategic task for Armenia, which, in general, also corresponds to the philosophy of the European Energy Charter, the country is a member of[45].

As a guarantor of Armenia's energy security, the Armenian NPP is also considered as one of the leading factors for increasing the economic and, thus, geopolitical competitiveness of Armenia in the region. The lack of own hydrocarbon reserves, dependence on supplied energy resources, the blockade of railway and pipeline communications, limited electricity export opportunities and geopolitical tensions in the region dictate the need to find funds for the construction of a new unit of the Armenian NPP capable of bringing Armenia to a new level of energy independence. As already mentioned, under the Soviet regime, the Armenian energy system was designed as an energy surplus, covering part of the region's needs. As a result, today the country is able to ensure uninterrupted export of electricity to neighboring countries. If there is a

[43] **Blasio N., Nephew R.,** The Geopolitics of Nuclear Power and Technology, Center on Global Energy Policy, Columbia University, March 2017, pp. 6-7.
[44] **Ghvinadze N., Linderman L.,** Cross-Border Electricity Exchanges: Bolstering Economic Growth in the South Caucasus and Turkey, Atlantic Council, Dinu Patriciu Eurasia Center, October 2013, p. 6.
[45] **Aslanidze A.**, The Role of the Energy Charter in Promoting Electricity Cooperation in the South Caucasus, Energy Charter Secretariat Knowledge Center, 2016, p. 7.

shortage of electricity in the countries of the region, the Republic of Armenia obviously has all the chances to declare itself a key player in the regional electric power market.

Given the possible annual electricity production volumes, the forecasts for electricity necessary for Armenia's domestic consumption, as well as the capacity of inter-system transmission lines with neighboring countries, the total volumes of electricity supplied from the Armenian energy system to the energy systems of Georgia, Turkey and Iran (which will become possible while ensuring the joint operation of the energy systems of these countries) may amount to approximately 6 billion kW/h per year[46].

However, a number of geopolitical factors, such as closed borders, the absence of diplomatic and, therefore, economic ties with two neighboring states, the unsettledness of the Karabakh conflict, etc., hamper the full-fledged positioning of Armenia in the given context. The protracted process of solving the above-mentioned problems negatively affects the full-fledged use of export potential, built up in the USSR.

Prospects for electricity exports

Turning to the prospects of export in the Georgian direction, it should be noted that in 2000-2007 about 15% of the consumed electricity was exported from Armenia to this country with current energy consumption of 8.5 billion kWh. Now this indicator decreases from year to year. The Georgian authorities are currently pursuing an active policy aimed at liberalizing the energy market, as well as international positioning of Georgia as a low-cost electricity exporting country, which became particularly relevant in with the launch of the Azerbaijan-Georgia-Turkey energy bridge capable of exporting electricity to Turkey up to 700 MW. Export of electricity from Armenia to Georgia is carried out only on a seasonal basis, as well as during interruptions in the Georgian energy system.

[46]**Karapetyan K.,** The Role of Armenia in Ensuring the Energy Security of the South Caucasus, *21st Century*, 2009, **2**, 10, p. 23.

As for Turkey, for the period of 1995-2007, the demand for electricity had been increasing by 6.6% per year. In 2015-2016 years the increase amounted to 8.5%. It is expected that the electricity consumption in Turkey, which reached its peak level of 170 billion kW. h in 2006, will increase approximately threefold to 2020, reaching 499 billion kW. h. To ensure this level of consumption in Turkey, it is necessary to triple the installed capacity of power plants: from 38,500 to 96,000 MW in 2020 [47].

Currently, the export of Armenian electricity to the Turkish market is directly linked to the opening of the Armenian-Turkish border. The protracted process of ratification of the Zurich protocols (and later its suspension) had a definite effect on a number of accords of a purely economic character that existed between Armenia and Turkey after September 2008, when Turkish President Abdullah Gul paid an official visit to Yerevan. Within the framework of the meeting, the issue of electricity export from Armenia to Turkey was discussed. Initially, it was assumed that Armenia would begin direct electricity supplies to Turkey in the spring of 2009. A corresponding agreement was concluded during the visit of the Turkish President to Armenia between the Ministry of Energy and Natural Resources of Armenia, CJSC "High Voltage Electric Networks" and the Belgian company "UNIT" engaged in import and distribution high voltage electricity in Turkey. Currently, Turkey is actively developing its own capacities, and is also implementing a project to build a nuclear power plant “Akkuyu” with a capacity of 4800 MW[48]. Today, along with the construction of the Turkish Stream gas pipeline, the “Akkuyu” nuclear power plant is the locomotive of Russian-Turkish economic relations. In parallel, the construction of the “Akkuyu” NPP is carried out under very favorable conditions for Turkey. For example, there are no obligations of the Turkish side for the construction of power lines and substations. It is not entirely clear whether there will be demand for electricity generated at nuclear power plants, since the latter is located near Antalya resort, which does not have large industrial enterprises; the price of electricity is fixed for 25 years without taking into account the inflation of the dollar and the growth of world prices for electricity; in the

[47] Ibid

[48] **Telli A.,** Akkuyu Nuclear Power Plant from the Perspective of Energy Security: A Solution or a Deadlock?, *Caucasus International*, 2016, **6**, 2, 151-166.

agreement there is no article on force majeure circumstances, and there is also no ban on the nationalization of the nuclear power plant. All these aspects, identified by the Institute of Energy Problems (RF), ultimately make the project not entirely appropriate for Russia[49]. Nevertheless, "Akkuyu" repeated the fate of the Turkish Stream: after the shot down of the Russian SU-24 fighter, the future of the nuclear power plant was in question, but already in August 2016, Presidents Putin and Erdogan agreed to resume the project, and in May 2017 the official Kremlin announced the investment of $22 billion in the construction of nuclear power plant[50].

As for Iran, there is a lack of 2,500 MW in energy capacity and it is growing from year to year. The authorities of Iran are also consistent in solving problems related to energy supply to the population and the economy, as evidenced by the construction of the nuclear power plant in Bushehr with the participation of Russia[51]. At the same time, the energy security of the Islamic Republic (especially its northern provinces) is partly attributed to the supply of 3.2 kWh of electricity from Armenia, instead of 1 cubic meter of natural gas supplied via the Iran-Armenia gas pipeline, according to the barter formula. The energy dialogue between Armenia and Iran can be particularly active in connection with the lifting of sanctions against the Islamic Republic, which, first of all, can be reflected in the implementation of the project of the Meghri hydro power plant.

The implementation of the North-South electricity corridor could significantly change the situation in the future. In April 2016, the energy ministers of Russia, Armenia and Iran signed a road map for the energy corridor. Within the framework of the program, the construction of overhead power lines between Armenia and Iran with the financing of Iran, as well as the construction of a high-voltage transmission line between Armenia and Georgia for KfW bank loans. The construction of 400-kilovolt power lines Iran-Armenia and Armenia-Georgia will allow

[49] All risks of the Akkuyu project. Brief information, http://www.proatom.ru/modules.php?name=News&file=article&sid=3715.

[50] Putin called the amount of investment in the construction of the Turkish nuclear power plant Akkuyu, https://ria.ru/atomtec/20170503/1493600158.html.

[51] Koyama K., Iran's Bushehr Nuclear Power Plant to Launch Operations with Russian Help. *IEEJ*, January 2011, https://eneken.ieej.or.jp/data/3572.pdf.

expanding communication between the energy systems of the countries. Today, the power grids of Iran and Armenia, as well as Georgia and Russia operate in synchronous mode. The signing of the agreement will allow the energy networks of all four countries to work in synchronous mode with a capacity of overflows of up to 1200 MW[52].

Thus, we can conclude that the breakthrough of the energy blockade is the main challenge for the Armenian economy. In this regard, it is necessary not only to pursue an active policy aimed at building new infrastructures, but also to apply market mechanisms to ensure a low cost of electricity produced. In particular, the talk is about lowering the cost of electricity produced in Armenia, which will allow it to be more competitive in foreign markets, while currently generated electricity in Armenia is inferior in its pricing of electricity produced by Georgian hydroelectric power plants. It is obvious that with the continuation of the tendency to increase the cost of production, Armenian electricity will be less attractive for the Georgian market. At the same time, it is important to note that the formation of such a trend, on the one hand, is due to the limited sales market, on the other hand, it is directly related to multimillion-dollar loans that are periodically attracted to the Armenian energy system, affecting tariff formation. This issue should also be considered in the context of Armenia's integration into the common electric power market of the Eurasian Economic Union (EEU) with the possibility of delivering along the "North-South" corridor to Russia and further to Kazakhstan and Kyrgyzstan - countries with a power deficit.

French geopolitician Jacques Attali proposes to consider economic development as the basis of civilizational development in general. Based on this thesis, he suggests replacing the notion of "geopolitics" with "geo-economics", which he considers to better reflect the essence of world politics. In fact, this is a concept that reduces the civilizational process not to geography, culture or religion, but directly to the economic reality. According to Attali, it is the economic power and the possibility of its spread that shapes the civilizational image of the state / region and determines its place in the world. In this sense, along

[52] Armenia, Russia, Georgia and Iran signed the "road map" of the energy corridor "North-South", http://newsarmenia.am/news/armenia/armeniya-rf-gruziya-i-iran-podpisali-dorozhnuyu-kartu-energokoridora-sever-yug/

with the development of financial institutions, the build-up of productive power and trade is viewed as the basis for the geo-economic advancement of the state[53]. It is obvious that the continuous development of such a strategic production direction as nuclear power, as well as the establishment of stable export communications can significantly enhance the international status of Armenia and create serious guarantors of national security.

Conclusion

1. After the collapse of the USSR, the countries of the South Caucasus, previously located in a single geopolitical space, found themselves in a state of deep disintegration in particular with regard to energy system. Due to this, the countries of the region developed separate models for ensuring their energy security while trying to extract dividends from the growing Russian-American competition for the domination in the region. This competition has and to present continues to have an impact on the geopolitical and geo-economic orientation of the regional states - Armenia, Georgia and Azerbaijan, predetermining the logic of their mutual relations. Under the circumstances, the policy of "nuclear protectionism" aimed at raising the level of Armenia's energy security is a necessity.
2. The geopolitical significance of the Armenian nuclear power plant creates additional security mechanisms to ensure the security of the country regarding the external threats. The lack of hydrocarbon reserves, dependence on supplied energy resources, blockade of railway and pipeline communications, limited opportunities of electricity export and the geopolitical tensions in the region dictate the necessity of finding funds for the construction of a new unit of the Armenian NPP.
3. As a guarantor of Armenia's energy security, the Armenian NPP should be considered as one of the leading factors for increasing the economic and political competitiveness of Armenia in the region. Under the Soviet regime, the Armenian power system was designed as an energy surplus, covering part of the region's needs. Due to this, today

[53] **Attali J.,** A Brief History of the Future, Arcade Publishing, New York, 2011, p. 279.

Armenia has capacities capable of ensuring the uninterrupted export of electricity to neighboring countries. This issue should also be considered in the context of Armenia's integration into the common electric power market of the EEU with the possibility of deliveries along the North-South corridor to Russia and to other EEU member countries. Armenia has the resources of becoming a key player in the regional electric power market, which is especially important in connection with the exclusion of the country from a number of transport and energy (mainly pipeline) projects at the regional level. Such positioning is impossible without the development of nuclear energy, traditionally considered as the basis of Armenia's energy policy.

4. As a member of the International Uranium Enrichment Center, Armenia is building its nuclear energy policy in strict accordance with the principles set out in the Vienna Convention on Civil Liability for Nuclear Damage (1997), as well as the Joint Convention on the Safety of the Treatment of Spent Fuel and Radioactive Waste Management (1997). According to the forecasts, uranium stocks in Armenia fluctuate from 10 to 60 thousand tons, and with their development it is possible to significantly increase the level of energy security of Armenia using available reserves both for the operation of the Armenian NPP and exporting them in the framework of cooperation with the IUEC.

5. In the context of the problems regarding the functioning of the Armenian NPP, a number of threats to Armenia's energy security are emerging, among which the lack of the necessary funds for the construction of a new unit of the Armenian NPP; failures in extending the life of the current block; regional political confrontations, accompanied by subversive and terrorist actions against the objects of the fuel and energy system; market fluctuations and a sharp change (increase) in prices in the fuel and energy resources market, as well as obstacles arising from the transit of energy resources and electricity in transit countries due to political instability.