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**ECONOMIC, COMMERCIAL, TECHNOLOGICAL AND  
ENVIRONMENTAL AFFAIRS COMMITTEE**

**REPORT\***

**“Development of New and Renewable Sources of Energy in the  
BSEC Member States”**

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\* *The text was considered and adopted at the Forty-Eighth Meeting of the Economic, Commercial, Technological and Environmental Affairs Committee in Tbilisi on 11 April 2017 and approved at the Forty-Ninth General Assembly in Istanbul on 5 July 2017*

## **I. INTRODUCTION**

1. The Economic, Commercial, Technological and Environmental Affairs Committee at its Forty-Seventh Meeting in Antalya on 5 October 2016 decided to discuss “Development of new and renewable energy sources in the BSEC member states” as the main issue on the agenda of the Forty-Eighth Meeting.
2. The Black Sea region is one of the main suppliers of energy to the world markets. Therefore, energy plays an important role in the economic development of this region. The development of infrastructure aimed at increasing oil and gas transportation and transit routes confirms the strategic importance of the Black Sea region in the field of energy and also as a link connecting Europe and Asia. The Black Sea region is an integral part of the global energy market and is of strategic importance in the future development of energy relations.
3. In the Document “The BSEC Economic Agenda - Towards an Enhanced BSEC Partnership”, which was adopted in Istanbul on 26 June 2012 it is stressed that developing a competitive regional energy market, by means of investments in the energy infrastructure, with the view to increase energy security, interconnectivity and further diversify energy sources and routes is the priority task for the BSEC. Towards this end it is necessary to take gradual steps to materialize the vision of transforming the BSEC region into a model for clean energy by the year 2050 and to encourage cooperation among the Member States to define a Green Energy Strategy with the view to promoting renewable energy sources, clean technologies and energy efficiency.
4. The BSEC region includes Black Sea, Mediterranean, Aegean and Caspian seas, where the nature gave a lot of sunshine, wind and forests. Hence, using these natural conditions it is very important for the Black Sea as well for the world community to strengthen the development of new and renewable sources of energy (RES), as more and more countries understand the need to implement concrete actions to introduce technologies that use renewable energy sources for future energy production. Therefore, the creation of an energy system, ensuring the safe and uninterrupted supply of energy, and strengthening of environmental safety, are the priorities for the countries in the BSEC region.
5. The Report uses information provided by the national delegations of Armenia, Azerbaijan, Georgia, Greece, Moldova, Romania, Russia, Turkey and Ukraine. In addition, the reference material has been obtained by the PABSEC International Secretariat from the relevant Internet sources.

## **II. NEW AND RENEWABLE ENERGY SOURCES: TRANSFORMATION OF ENERGY**

6. At the present stage of development of society the role of renewable non-traditional energy resources (solar energy, wind energy, geothermal energy, energy of sea tides, waves, etc.) is increasing. This is because the technological progress has caused accelerated pace of energy consumption and promoted the search for renewable and more environmentally friendly types of energy resources.

7. Natural, climatic and geographic conditions in the BSEC region, as well as the existing potential of fuel and energy resources of the countries in the region, including the available resources of fossil fuels and renewable energy sources, outline the priorities in the development and utilisation of various types of new and renewable energy sources.
8. The Declaration on the Development Green Energy Initiative in the Black Sea Region, adopted by the Ministers of Energy of the BSEC Member States in Nafpion, Greece, on 12 October 2010 states the importance “to explore ways to promote Green Energy investments with an emphasis on energy efficiency, renewable energy sources and environmentally friendly energy technologies”. The meeting also discussed further measures to promote the development of sustainable energy in the Black Sea region on the basis of the “green growth” concept, which will increase the energy security of the wider Black Sea region, and protect its unique natural resources and environment and to manage them.
9. Global trends in energy sector indicate that the BSEC region plays an important role in the formation of a new energy map on the Eurasian continent, which in the future will reflect such aspects as diversification of oil and gas supplies, new routes for transporting energy resources to European markets and ensuring safety of these projects.
10. In the relations between the BSEC Member States and the EU, the issues of energy supply and transportation play a decisive role. The EU is one of the priority directions for the export of energy resources of Russia and Azerbaijan, and the pipelines that pass through the territory of Georgia and Ukraine are of great importance for the EU energy supply. About 20 percent of the EU gas supplies pass through Ukraine, while Georgia provides transit passage for oil and gas from Azerbaijan via the Baku-Tbilisi-Ceyhan and Baku-Tbilisi-Erzurum pipelines.
11. With the exception of Russia and Azerbaijan, which are major producers of oil and gas in BSEC region, the other BSEC member states import most of their energy resources. Armenia, Moldova and Georgia import almost all of the consumed gas and oil. Most of the projects in which the BSEC countries are engaged are related to the projects of oil and gas production in Russia and Azerbaijan and their transportation. The projects of constructing pipelines interconnecting the countries in the BSEC region and also with the rest of the world unlock the huge potential for cooperation in the energy sector.
12. The last decade was marked by the largest ever increase in energy consumption. At the same time the world community started to become concerned about climate change, environmental problems, energy security issues became even more topical, many countries shifted their strategies towards a low-carbon economy, sustainable development and “green” growth. New and renewable energy has regained importance, especially in the field of generation electric power.
13. In these circumstances, the EU has set ambitious goals in the field of energy and climate change for the period up to 2020: to reduce greenhouse gas emissions by 20 percent compared to 1990 level, to increase the share of renewable energy by 20 percent and to reduce primary energy consumption by 20 percent, compared to 2020 forecasts. The process of creating an integrated internal energy market is

underway and the energy infrastructure of Europe is being modernized. In order to achieve these goals and to reduce primary energy consumption by 20 percent, considerable effort and investments are needed to increase the energy efficiency of buildings, transport and industrial production. Significant investments are required to develop and promote renewable energy sources and cost-effective low-carbon technologies.

14. The BSEC Member States have similar problems in the areas of energy supply, infrastructure modernization, energy efficiency and renewable energy. They intend to build new and modernize old energy production facilities and transport infrastructure, develop new and renewable energy sources, and develop and use renewable energy sources. For this it is necessary to develop energy-efficient strategy, adapting energy legislation, developing energy efficiency standards and implementing a policy of energy tariffs that stimulates economy in energy expenses.
15. The practical use of non-traditional energy sources today is enhanced in many countries of the world. Their share in the global energy balance is projected to increase to 35% by 2050 and their growth rates in developed countries are so high that by 2050 they will be able to replace up to 70% of traditional energy supplies. An important advantage of RES is their ability to provide energy for humans for thousands of years. In this regard, almost all developed countries today are developing and implementing programs towards alternative energy. These resources are attractive because of their inexhaustibility, independence from price situation on the world energy markets, and environmental friendliness, which is not less important.
16. According to the assessments of the International Energy Agency (IEA) renewable energy production annually grows by 10-20% in the leading countries of the European Union. According to Eurostat (Statistical Office of the European Union), the share of the use of electricity from renewable energy sources in the European Union reached 16.0% in 2014 (in 2004 - 8.5%). In accordance with the decision of the European Parliament, the share of RES in the EU energy balance in 2020 has to be 20% and in 2040 - 40%.
17. The main advantages of renewable energy sources - inexhaustibility and environmental friendliness - are the reasons why the development of renewable energy is so rapid and why forecasts about its prospects in the coming decades are so optimistic.
18. RES are classified according to the following principles: solar energy, water (energy of tides, river energy), wind energy, biomass energy, biogas, geothermal energy. RES is also called "green energy". At present the renewable energy sources have attracted the attention of countries and international organizations. Thus, at meetings and summits global energy and environmental problems are regularly discussed and so are the international cooperation and elaboration of RES-based projects. Special documents have been written on regulating activities in the field of alternative energy sources. The main incentives for the development of non-traditional energy sources are: the fast growing population on the planet, uneven distribution of the world's energy resources, energy security of countries using imported energy resources, and reduced pollution.

19. In 2006 about 18% of the world's energy consumption was produced renewable energy sources, including 13% of traditional biomass, such as wood burning. In 2014 about 19.2% of the world's energy consumption was produced from renewable energy sources. The share of traditional biomass is gradually decreasing, while the share of modern renewable energy is growing.
20. At present many of measures are taken to promote renewable energy sources. Some of them have already proved to be effective and well known to market stakeholders (green certificates, reimbursement of the cost of technological connections, fixed energy tariffs, flowrate metering system).
21. Guided by the development goals for alternative energy, some BSEC countries have introduced a regulatory "green" tariff for RES, such as wind, sun, biomass, and energy produced by small hydropower stations. The "green" tariff (connection tariff) is an economic and political mechanism designed to attract investments in renewable energy technologies. This mechanism is based on three main factors: the guarantee of connection to the grid, the long-term contract for the purchase of all the produced renewable electricity, and the surcharge to the cost of produced electricity. The essence of the introduction of special tariffs for renewable energy sources is that the state or population buys energy from businessmen at a special, higher tariff.
22. If in 2010 investments in renewable energy in the world were 160 billion USD, in 2015 this figure reached 329 billion USD, despite the fall in oil prices. The growth of investments reflects an increase in the competitive advantage pricing in wind and solar energy.
23. In December 2015, the participants in the World Climate Summit in Paris adopted the new UN framework agreement defining the greenhouse gas emission standards after 2020 and measures to prevent climate change. Reducing emissions that affect the heating of the Earth's surface, is planned to be implemented through the development of renewable sources.
24. Growth in consumption is growing for all types of energy, while new forms of energy also play an important role. Renewable energy sources like shale gas, shale oil and other new sources of fuel will grow by 6.2% per year, which is 43% of energy production until 2035. Growth in consumption of new types of energy will be possible due to the development of new technologies and large-scale investments.
25. The combined share of fossil fuels in the energy balance will decrease, but, as before, they will continue to dominate in 2035 with a share of 81%, compared to 86% in 2012. Renewable energy sources (including biofuel) will increase their share in the market from 2% to 7% by 2035, while the share of hydro and nuclear energy will remain unchanged.
26. Non-carbon sources (renewable energy, hydro and nuclear energy) will increase the combined share in electricity production from 32% in 2012 to 37% in 2035. Renewable energy sources will outpace nuclear power in 2028, increasing its share from the current 5% to 13% in 2035. At the same time the RES will not show signs of increasing its market share.

27. The countries of the BSEC region have huge potential in this respect and it is necessary to develop national programs and projects for the development of new and renewable sources of energy more rapidly.
28. According to the Statistical Review of World Energy, the world's electricity production in 2014 was 23,127 TWh: out of which 1,234.3 TWh was based on renewable energy sources in 2011; the share of wind energy is 628.2 TWh, solar energy - 124.8 TWh, bioenergy and geothermal energy - 481.3 TWh.
29. According to the same estimates, renewable energy technologies replaced about 279.3 million tons of oil annually in 2013; out of which the share of wind energy is 142.2 million tons, solar energy - 28.2 million tons, bio- and geothermal energy - 108.9 million tons. According to the data the generation of electricity by wind power plants will amount to more than 700,000 MW by 2020.
30. Along with large wind power generation, small wind power also developed. Small wind energy accounts for 0.18% of the large wind power in various countries around the world. The prospect of developing wind energy in the countries of the BSEC region is connected to the new investments and the development of new sustainable programs and projects in this field.
31. According to the REmap 2030, in the case of implementation of current principles and national plans, the average carbon dioxide (CO) emissions will drop only to 498 g/kWh to 2030. This is not sufficient to maintain the CO content in the atmosphere below 450 ppm, which is expected to lead to serious climate change. An increase in the share of renewable energy sources by half could help mitigate the effects of climate change by reducing the global average CO emissions to 349 g / kWh, which is equivalent to a 40% decrease in its intensity compared to 1990.

### **III. INTERNATIONAL PRACTICE IN THE SPHERE OF RENEWABLE ENERGY**

32. International legal regulation of alternative energy is a new aspect of the development of modern international law. An important mechanism for such regulation is the institutional mechanism. International organizations in the energy sector started to emerge in the second half of the 20<sup>th</sup> century. Practically the international energy relations are regulated by the general and specialized organizations.
33. The International Renewable Energy Agency (IRENA) is the key organization in the field of alternative energy. It is a universal intergovernmental organization, the Charter of which was signed in 2009, and entered into force in 2010. Today it accounts 150 member countries (including all BSEC member states). 28 countries are in the process of accession.
34. The primary objective of IRENA is to accelerate the pace of broad and sustainable use of renewable energy sources around the world. Such a large scale task is embodied in a number of specific activities, in particular: improving the political framework for renewable energy sources through specific political consultations; development of technology and knowledge transfer in the field of renewable energy sources; promoting capacity building in renewable energy field.

35. At present, the development of new and renewable sources of energy is becoming a key factor for successful growth for a number of countries and regions. The global roadmap REmap 2030 developed by IRENA shows that renewable energy sources can not only meet the growing world demand, but also do this with much lower costs, helping to limit the global warming by 2 degrees Celsius, which is given in numerous sources as a critical point of climate change.

#### **IV. NEW AND RENEWABLE ENERGY SOURCES IN THE BSEC MEMBER STATES**

36. The development of alternative energy sources is a promising sector of electricity production in **Armenia**, given their great potential and relatively low cost of the produced electricity. The study on renewable energy sources is conducted in Armenia in a number of directions, the most promising of which are hydropower, wind, geothermal and solar energy.
37. The technically feasible hydropower potential of Armenia is estimated at 3,200 million kWh per year. The Ministry of Energy of Armenia developed a project “Small Hydropower Development Scheme”, which includes 325 small hydropower plants with total capacity of 257 MW and an average annual output of 770 million kWh.
38. Armenia has significant reserves of geothermal energy with the possibilities to generate electricity and heating. According to the expert opinion, electricity generation of 150-200 MW is considered quite real and its utilisation for heating is rather promising. The territory of Armenia has a significant potential for solar energy. Its annual average value per 1 m<sup>2</sup> of horizontal surface is 1720 kWh / m<sup>2</sup> (in Europe this figure is 1000 kWh / m<sup>2</sup>). 1/4 of the territory of the Republic has a solar energy reserve of 1850 kWh / m<sup>2</sup> per year.
39. In the **Republic of Azerbaijan** which is rich in hydrocarbon reserves, the energy policy is aimed at ensuring its sustainable development, and one of the main issues is to increase the export potential of oil and gas products by maximum saving of hydrocarbon reserves, environmental protection and utilisation of existing resources in order to meet the country’s energy needs. On 21 October 2004, by Decree No. 462 of the President of the Republic of Azerbaijan, the State Program on the Use of Alternative and Renewable Energy Sources was approved in the Republic of Azerbaijan and this marked a new era of development of this sphere in the country.
40. In 2016, with the utilisation of all energy sources, 23074 million kW / h of electricity was generated in the country, out of which the share of renewable energy was 2142 million kW / h or 9.3 percent. By 2020, the country’s energy balance foresees an increase in the non-traditional energy sources up to 20 percent level or, on average, up to 1600 MW. With the purpose of diversification of the energy portfolio, the Decree of the President of the Republic of Azerbaijan of 6 December 2016 approved the “Strategic Roadmap for the Development of Public Utilities (Electric and Thermal Energy, Water and Gas) of the Republic of Azerbaijan”, which envisages creation of new generating facilities based on the alternative energy resources for the production of 420 MW by 2020, including 350 MW from wind power, 50 MW from solar energy and 20 MW from biological energy.

41. The main priority of the policy of the Ministry of Energy of **Georgia** is to ensure the energy security of the country through acquiring the local renewable energy resources, which also promotes economic development of the country through the attraction of foreign investments. The New Energy Policy was approved by the Parliament of Georgia on 24 June 2015.
42. In recent years, legal environment supportive of the use of energy resources has significantly improved. The main goal of the Law on Electricity and Natural Gas is to promote the use of hydropower and other local alternative resources. The Order of the Ministry of Energy of Georgia of 10 April 2014 regulates the rules about the projects promoting the wind and other renewable energy resources among them hydropower projects which will be presented by investors.
43. With the aim to develop the renewable energy resources the Ministry of Energy of Georgia with local and international experts actively works on new regulations and standards of national network. As for public awareness, the work has been started with the help of the initiative of “Covenant of Mayors”. The Ministry of Energy of Georgia and the Ministry of Environment and Natural Resources Protection of Georgia are the national coordinators of the “Covenant of Mayors”. They are assisting parties in projects implementation process.
44. The National Action Plan of **Hellenic Republic** on Renewable Energy Sources was set out in the implementation framework of the European Energy Policy regarding the penetration of Renewable Energy Sources, Energy Saving and greenhouse gas emissions reduction. The Greek government has increased the national target for the share of Renewables in overall energy consumption to 20%.
45. The roadmap for the development of Renewable Energy technologies was set out using energy analysis models, which looked into various scenarios for the Greek energy system beyond 2020 and up to 2030, taking into consideration economic and technological growth parameters.
46. Achieving a 40% share by Renewables in the production of electricity by 2020 is possible only through the complimentary implementation of institutional, regulatory, economic and technological measures that aim to make use of the economic capabilities of major RES projects, the completion of the necessary works on extending and upgrading the electric grid and the progressive move towards decentralized energy production.
47. **The Republic of Moldova** is dependent upon imported energy sources, which cover 86% of the energy consumption. The weight of energy deriving from renewable energy sources accounts for about 14.2% in gross final consumption of energy resources (according to the Energy Balance for 2015).
48. Energy Strategy 2030 of the Republic of Moldova approved by Government Decision no. 102 of 05 February 2013. according to the mentioned document, in the area of new and renewable energy development, the following indicators were established: a) ensuring the weight of biofuels of 10% by 2020 in total fuels, with an intermediate target of 4%; b) increase the domestic production capacity for electricity up to 800 MW by 2020 (400MW being covered from renewable energy sources).

49. National Program for energy efficiency 2011-2020 was approved by the Government Decision No.833 of 10 November 2011. Main laws regulating the RES sector in the Republic of Moldova are: Law No.10 of 02.26.2016 on the promotion of the use of energy from renewable sources. The law transposes the provisions of Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources.
50. One of the priority tasks for **Romania** is evaluation and improvement of the administrative procedures for the development of renewable energy and the alignment of such procedures to the EU standards. In order to implement these tasks it is necessary to take following measures: the improvement of the system of mandatory quotas, combined with the trading of Green Certificates; the system of mandatory quotas, combined with the trading of Green Certificates, set up as a support mechanism for promoting the production of electricity from RES, by Law No 220/2008, amended and supplemented by Law No 139/2009.
51. This system set up by Law No 220/2008 was supplemented by the secondary regulations issued by the National Regulating Agency in the Field of Energy, in order to define the accreditation procedures, the procedures for issuing and trading Green Certificates, access to the grids and the priority treatment in taking over energy, establishing the obligations to procure Green Certificates, etc.
52. The programme is funded from the Environmental Fund, the management of the programme being ensured by the Environmental Fund Management. Funding is granted in the amount of up to 50% of the total eligible value of the project, for the entire territory of Romania, except for the case when the beneficiary has its registered office/place of operation in the Bucharest-Ilfov Region, where funding is granted in the amount of up to 40% of the total eligible value of the project. The maximum amount that can be granted is up to RON 30 million for each project.
53. The legal framework for the development of new and renewable sources of energy in **Russia** began to form quite recently. Amendments to the Federal Law “On Electric Power” (2003) made in 2007 laid down the framework for the development of renewable energy. This implies the use of a mechanism for selling the capacity of generating facilities operating on the basis of renewable energy sources under the contracts to supply energy to the wholesale market at a price and in the manner determined by the Government of the Russian Federation. The mechanism for supporting RES is to conduct competitive selection of investment projects for the construction of generating facilities operating on the basis of renewable energy sources and for the conclusion of selected projects of renewable energy sources.
54. In Russia, the portfolio of investment projects in the field of renewable energy sources in the beginning of 2015 amounted to more than 100 billion roubles. Until 2025, it is planned to invest up to 3.5 trillion roubles in this industry. The implemented subprogram has already yielded its results. Domestic business began to increase the volume of its investments in this area. Thus, the state atomic energy corporation Rosatom plans to build wind power stations until 2020 with a total capacity of 610 MW in energy-deficient regions of the country like the Republic of Adygea, the Krasnodar Territory, the Rostov Region, the Stavropol Territory. This will account for about 17% of the total capacity of wind power, planned for activating in the country until 2024.

55. **Turkey** has a rich experience in terms of the use of renewable energy sources and the diversification of sources of energy supplies. Thus, it adopted an innovative energy policy in which sustainable energy is attributed an important role. As of 2010, the renewable energy sector began to revive in comparison with 2005-2010. The priority task for the Turkish government is to increase the share of renewable resources within electricity power generation to 30% in 2023.
56. Turkey's policy and strategy in this area is based on the energy security, alternative energy sources, the diversity of resources, the utilisation of domestic resources in the economy, sustainability, liberalisation at energy markets and energy efficiency. Especially after the revision of the basic price guarantees, investments in the renewable energy sector attracted attention of both local and foreign investors.
57. In May 2009, the document "Electricity Market and Security of Strategic Supply" was adopted and has been put into force. In addition, after amending the Law on Renewable Energy Sources in December 2012, higher guarantees for fixed prices for certain resources are provided and various monetary and intangible incentives are provided.
58. In **Ukraine** the Law No. 514-VIII of 4 June 2015, which amends some laws on ensuring competitive conditions for the production of electricity from alternative energy sources, envisages the utilisation of: a single formula for calculating the "green" tariffs for all types of energy: from the calculation formula of "green" tariff for electricity produced from solar energy and micro, mini and small HPP, the peak load factor is excluded; the guarantee of purchase on the wholesale electricity market (by a guaranteed buyer) produced from alternative energy sources, extends to the productive supply of electricity (with the exception of the amount of electricity consumed for the needs of the electric power of the power industry facility where it is produced).
59. With the Law No. 1804-VIII of 22 December 2016 the amendments are introduced to the Law of Ukraine on Electric Power Industry regarding the level of "green" tariffs for electricity generated from solar energy by land-based power facilities put into operation before 30 June 2015 with an installed capacity of more than 10 MW (with the appropriate differentiation for the installed capacity - up to 10 MW including, and also more than 10 MW)

## V. CONCLUSIONS

60. In the world today, including also the countries in the BSEC region, energy consumption is sharply increasing. Every state has its own potential and own experience in the use of energy resources and develops programs and projects for the development of new and renewable sources of energy. The governments of the countries are taking steps to create an environment conducive to attracting investments in the energy sector based on the use renewable energy sources.
61. Based on the existing capacity and cost benefits of the development of new and renewable energy sources, it is necessary to ensure wider introduction and use of environmentally friendly, alternative energy sources to ensure energy security with a long-term perspective.

62. Today, when the global community is worried about the climate change and environmental pollution in the context of forecasted increase in energy consumption, countries starting to consider developing tools for elaboration of mutually beneficial strategies for transformation of the energy sector towards low emission, searching for new opportunities to balance the sources of energy, providing reliable, safe and effective energy supply. Every year the public at large and the participants in the energy market have been increasingly talking about the development of “green” energy.
63. Over recent years, the BSEC member states actively pursue the development of new energy policy that aims to ensure the energy security, the welfare and security of all citizens and the effective functioning and development of the economy, continued energy access at affordable prices with due account to the environmental challenges, and address the issues of sustainable development.
64. The countries of the Black Sea region are introducing new technologies and largely investing in the development of the alternative energy market. The challenges faced by the Black Sea region drive it towards the single comprehensive approach to the formation of regulatory and legislative support to the energy policy. The development of alternative energy in the region also contributes positively to regional economies and local energy security.
65. Thus, the development of new and renewable sources of energy is an important factor not only for energy and environmental security, but also is an important component of the social and economic development of states. In this regard, effective use of alternative energy sources, along with the traditional ones, should contribute to solving important problems of sustainable development of the countries and the region as a whole, based on enhanced energy policies of the states and expanding energy cooperation in the BSEC region.