COMMISSION ON ENVIRONMENT AND NATURAL RESOURCES

THIRD MEETING

REPORT

DEVELOPMENT OF ALTERNATIVE ENERGY SOURCES IN MEMBER COUNTRIES

I. INTRODUCTION

1. During the Second Meeting of the Commission on Environment and Natural Resources held in Baku on 24 November 2016 it was proposed to take up subject “Development of alternative energy sources in member countries” for the Third Meeting as a main item of agenda. The meeting is dedicated to the EXPO-2017 to be held in Astana which is devoted to the development of renewable energy sources.

2. The increasing demand for energy resources, limited access to traditional energy resources and anthropogenic problems related to power production and its impact on the global climate has made it necessary to use alternative and renewable energy sources (hereinafter referred to as ARES) which are considered to be a vital component of a sustainable energy policy.

3. Contemporary world has entered into a new era, which is characterized with increased energy demand. These days world community is facing various environment-related challenges and, amongst them, the issue of alternative energy sources occupy particular place in the global agenda. Energy production and energy consumption are both crucial to the TurkPA member countries. All member countries have huge renewable potential, particularly from wind, solar and small hydropower stations.

4. On 10 November 2014, the TurkPA adopted Report and Recommendation on “Cooperation in developing the energy sector” in which the Parliamentary Assembly calls on the national parliaments and the governments of the member-states to support the further development of alternative energy sources (biomass, wind, solar, thermal, enhanced efficiency of existing hydropower) with a view to increasing their contribution to the global energy production.
5. The purpose of this report is to assess the alternative energy resources potential in the member countries and to work out priorities of regional cooperation on the issue. Report is based on the contributions received from the relevant ministries of Azerbaijan, Kazakhstan, Kyrgyzstan and Turkey, as well as data of relevant international institutions.

II. ALTERNATIVE ENERGY SOURCES

6. Every day the world produces industrial carbon dioxide that is released to the earth’s atmosphere and which will still be there in one hundred years’ time. This increased content of carbon dioxide increases the warmth of our planet and is the main cause of the so called “Global Warming Effect”. One answer to global warming is to replace and retrofit current technologies with alternatives that have comparable or better performance, but do not emit carbon dioxide. By 2050, one-third of the world's energy will need to come from solar, wind, and other renewable resources. Climate change, population growth, and fossil fuel depletion mean that renewables will need to play a bigger role in the future than they do today.

7. Alternative energy sources are renewable and are thought to be "free" energy sources. They all have lower carbon emissions, compared to conventional energy sources. These include Biomass Energy, Wind Energy, Solar Energy, Geothermal Energy, Hydroelectric Energy sources. Combined with the use of recycling, the use of clean alternative energies such as the home use of solar power systems will help ensure man's survival into the 21st century and beyond.

8. Although not within the alternative energy sources, energy efficiency and effective use of energy should also be considered as an important title and opportunity in the definition of “Sustainable Energy”.

III. USE OF ALTERNATIVE ENERGY IN MEMBER COUNTRIES

9. Alternative energy technologies are a crucial part of a portfolio of options that are needed for achieving a secure and sustainable energy mix, together with energy efficiency and other low carbon options. A diversified portfolio of renewable energy can provide member states of TurkPA with a number of social, economic and environmental benefits such as:
   - environmental impacts, including greenhouse gas emissions and local pollutants;
   - energy security;
   - strategic economic development, including rural development, the agricultural sector and industrial sector with its subsidiary industry and high-tech manufacturing;
   - employment;
   - energy access through distributed or off-grid solutions.

10. Against this backdrop, governments of the TurkPA member states have put in place supportive policies. As a result, renewable sources have been the driver of much of the growth in the clean energy sector in recent years.
11. According to the International Energy Agency the role of renewable sources in the global power mix continues to increase rapidly. On a percentage basis, renewables continue to be the fastest-growing power source. As global renewable electricity generation expands in absolute terms, it is expected to surpass that from natural gas and double that from nuclear power by 2016, becoming the second most important global electricity source, after coal. Globally, renewable generation is estimated to rise to 25% of gross power generation in 2018, up from 20% in 2011 as deployment spreads out globally.

12. The above-mentioned arguments clearly demonstrate that renewable electricity generation in TurkPA member countries can be further expanded. Thus, the following analysis will demonstrate the unlocked potential of renewable energy that exists in member countries of TurkPA.

AZERBAIJAN

13. As a result of targeted policy of the Republic of Azerbaijan tangible results has been achieved and has paved the way for dynamic development of the field.

14. Azerbaijan’s energy production is currently largely reliant on the exploitation of the country’s hydrocarbon reserves and while the development of renewable energy is one of the government’s strategic priorities, the legal and institutional environment are not yet attractive for potential investors. However, as potential of this sphere is to be unlocked, initial steps have already been taken by the Government of Azerbaijan by establishing the State Agency on Alternative and Renewable Energy Sources (SAARES). Furthermore, Azerbaijan is recognized as being a country rich in renewable and alternative energy potential. SAARES plans to provide guidance in turning much of this potential into reality and aims to bring the share of renewable and alternative energy sources in total energy production to 20 percent by 2020.

15. In the Nationally Determined Contributions of Azerbaijan to the Paris Agreement on Climate Change it is planned to reduce greenhouse gas emissions up to 35% compared to the basic level by 2030, as well as up to 39% in the energy sector, 25% of which comes from alternative and renewable energy sources.

16. In spring 2011, SAARES in cooperation with UNDP launched a new project on ‘Promoting Development of Sustainable Energy in Azerbaijan’. This project was implemented with the financial support of €500,000 provided by the European Commission and $790,000 contributed by the Government of Norway. This project aims to assist the Government of Azerbaijan to overcome those barriers by reviewing and amending existing legal and institutional frameworks. The implementation of this project will be a significant step in contributing to achievement of the Millennium Development Goals in the country.

17. Since the establishment State Agency, in cooperation with other government structures, international organisations and companies, organized a number of events related alternative energy sources. These are Ministry of Foreign Affairs of Norway, Ministry of Energy of Islamic Republic of Iran, State Department of China for Energy, United Nations, E5P Fund, “Turcas

18. In addition, negotiations held and prospects of cooperation with AFD Agency and GDF Suez company of France, GRUPPO ZETA company of Italy, “Huadian” corporation of People’s Republic of China were discussed by the State Agency.

19. In 2015, 1,816,000 kWh of electricity and 6315.3 kcal of thermal power were generated in the country thanks to all renewable energy sources. It is estimated that in addition to 464,700,000 cubic meter of natural gas savings, it prevents 827,200 tons of carbon dioxide (CO2) emissions into the atmosphere (estimated in accordance with “Methods of calculation of amount of gas resulted in thermal effect in atmosphere” approved by Ministry of Ecology and Natural Resources on 18.01.2006)

20. Important projects related to use of alternative and renewable energy sources were carried out in Nakhchivan Autonomous Republic as well. Thus, new solar power plant located near to Khal-Khal village of Babak region, which construction started this year, put into use. Construction of solar power plant with total 20 MW capacities was executed on the basis of agreement signed between the State Energy Agency of Nakhchivan Autonomous Republic and “Soltech” company of Belgium.

21. The State Agency regularly has conducted tenders/contests and performed in mass media for promotion of application of alternative and renewable energy sources in country. TV channels in the country enabled the Agency experts to deliver speeches; special attention was paid to the explanation of renewable energy policy of the state and public awareness.

KAZAKHSTAN

22. The development of the renewable energy in Kazakhstan took impetus through the adoption of Law on “Supporting the use of renewable energy sources” in 2009 (Hereinafter - the Law).

23. Renewable energy sector is one of the sectors of the "green" economy in Kazakhstan. Since 2013 the state support system of the development of renewable energy sources is implemented through the system of fixed tariffs (fixed tariffs are approved by the Decree № 645 of the Government of the Republic of Kazakhstan by June 12, 2014) which provides the investors with guaranteed purchase of the total volume of electricity from renewable energy sources at fixed preferential tariffs.

24. This mechanism allowed the quick launch of RES market and implement the realization of the following types of renewable energy: wind, solar, small hydropower (plants less than 35 MW) and the use of biomass for the production of electricity and heat.

25. Concept of transition of the Republic of Kazakhstan to the "green economy" and the documents of state planning system of the Republic of Kazakhstan provides target indicators in the field of RES: the achievement of the share of RES in total electricity production to 3% by 2020 and to 10% by 2030. It requires implementation of projects in the field of RES utilization to achieve these goals.
26. By the end of 2020, it is planned to introduce about 52 RES facilities with installed capacity of 2 GW in Kazakhstan (22 wind power plants - 957 MW, 18 solar power plants - 750 MW and 13 hydroelectric power plants - 268 MW).

27. According to the results of monitoring in 2015, the volume of renewable energy generated electricity amounted to 0.704 billion kWh, while the share of the production of electrical energy from the energy producing organizations using RES in total electricity production in the Republic of Kazakhstan - 0.77%.

28. Today, there are 50 companies in the country using RES with total capacity of 295.7 MW (HPP - 139.8; WPP - 98.2; SPP - 57.3; biogas plant - 0.35). During the first 9 months of 2016, the volume of electricity produced by RES amounted to 0.721 billion kWh.

KYRGYZSTAN

29. The Kyrgyz Republic has vast reserves of renewable energy, mostly hydropower. Additionally, energy resources can be increased through the use of solar, wind, biomass energy and etc.

30. The Regulation in the field of alternative energy in the Kyrgyz Republic started with adoption of the Law №283 on "Renewable Energy Sources" of the Kyrgyz Republic on 31 December, 2008. Given law establishes the legal, organizational, economic and financial basis, the mechanisms regulating relations between the state, producers, suppliers and consumers of renewable energy sources. According to the Law, producers using renewable energy sources received a number of important advantages creating favourable conditions for attracting investments.

31. Currently, legal and regulatory, as well as legislative framework was established in the field of development of renewable energy sources in the Kyrgyz Republic:
   - Law on "Renewable Energy Sources" of the Kyrgyz Republic;
   - Program № 3694-V (Section 8.1) on transition of the Kyrgyz Republic to Sustainable Development for 2013-2017, approved by the Resolution of Jogorku Kenesh of the Kyrgyz Republic by December 18, 2013;
   - National Sustainable Development Strategy of the Kyrgyz Republic for the period of 2012-2017 (Presidential Decree № 11 of the Kyrgyz Republic by January 21, 2013);
   - "The concept of small hydropower development of the Kyrgyz Republic until 2017" № 507, approved by the Resolution of the Government of the Kyrgyz Republic by July 20, 2015;
   - Regulation on the procedure of construction, acceptance and technological connection of small hydropower plants to power grid was approved by the Resolution №476 of the Government of the Kyrgyz Republic by July 28, 2009. This Regulation regulates the order and procedure of documentation of the rights for construction, technological connection of small hydropower plants to power grid, as well as the procedure of acceptance the completed construction of small hydropower plants for use;
   - In order to form a common approach in the calculation of tariffs for electricity supplied by the stations that generate electricity using renewable energy sources, "Calculation method of tariffs for electricity supplied by the stations that generate electricity using renewable energy sources" was approved by the Decree №1 of the State agency on Fuel and Energy Complex (FEC) Regulation under the Government of the Kyrgyz Republic by August 6, 2015.
32. The Kyrgyz Republic can become a regional centre for the export of clean electricity and make a significant contribution to tackling climate change problems. Scientific projects and researches on the use of the potential of small and medium-sized waterways are the most scientifically explored and technologically prepared for a wide practical use.

33. *Hydropower resources* of the Kyrgyz Republic consist of 268 rivers, 97 major canals and 18 water reservoirs, with the potential of approximately 143 billion kWh annual electricity production. Currently, only about 10% of the capacity is used, i.e. annual electricity production is about 14 billion kWh on average. The hydropower potential of small rivers and streams is about 5-8 billion KWh annually, of which the Republic is using less than 1%.

34. The Kyrgyz Republic has great potential of *solar energy*, which is currently insufficiently studied. Solar energy potential in the territory of the republic is 4.64 billion MWh or 23.45 kWh / m2 annually. The average annual duration of sunshine is 2100-2900 hours. According to expert estimates, the potential of solar energy can provide consumers with hot water by 90% within 8-9 months and for the purposes of heating up to 50% during the heating season (5 - 6 months), as well as electricity to consumers located in the decentralized areas (foresters, shepherds, beekeepers) and create backup power supply for 30% rural population to save conventional fuel (electricity, coal, wood).

35. Research of *wind energy* potential shows that the country has the potential of wind energy with wind speeds of 4 to 5 m/s (Shamaldysai, Alai plateau, Balykchy region). It was determined that the preliminary wind potential of the Kyrgyz Republic amounted to 49.2 • 105 TEC (tonne of equivalent coal), besides, gross annual energy potential of wind flows of the country can reach about 2 billion KWh. These data also require further refinement using modern techniques at a height of 120-140 meters.

36. *Geothermal resources* of the republic are also insufficiently studied. The issue of using the potential of geothermal heat for electricity production has not been considered, with the exception of a single case in Naryn and Issyk-Kul regions. A promising direction is the use of thermal mass of the earth for heating / air conditioning through modern heat pumps. Currently, the potential of geothermal resources (hot water) is mainly used for medical purposes and partially, heating of resorts in Jalal-Abad, Issyk-Kul and Chui regions. The use of geothermal energy is possible with the use of heat pumps, implementation of which requires further analysis and research.

**TURKEY**

37. Renewable energy has been one of the most crucial topics of Turkey’s energy agenda in recent years. Significant progress has been achieved in the field of renewable energy since 2005 following the enactment of the Law on Utilization of Renewable Energy Resources for the Purpose of Generating Electrical Energy (Renewable Energy Law, REL).
38. The main legal documents are: Electricity Market Law No: 6446 and Law on Utilization of Renewable Energy Sources for the Purpose of Generating Electrical Energy Law No: 5346.

39. The National Climate Change Strategy aims to increase the share of renewable energy in the total production of electrical energy in Turkey by the year 2023 to 30%. Turkey should benefit from its various energy resources, particularly coal, hydroelectric, wind, geothermal and solar energy at the maximum level in line with energy supply security and climate change objectives:
   - Increase the share of clean energy in energy production
   - Ensure technological development by 2020 for energy production from renewable energy resources
   - Increase the average cycle efficiencies of existing coal-fired thermal power plants until 2023
   - Reduce losses and illicit use in electricity distribution and nationwide electricity distribution losses to 8% by 2023
   - Establish heat insulation and energy-efficient systems meeting standards in commercial and public buildings with usable areas larger than 10 thousand square meters and in at least 1 million residential buildings by 2023
   - Decrease annual energy consumption in the buildings and premises of public institutions by 10% until 2015 and by 20% until 2023
   - Reduce greenhouse gas emissions in new settlements by at least 10% per settlement in comparison to existing settlements (which are selected as pilot and the greenhouse gas emissions of which are identified until 2015) until 2023
   - Making legal arrangements for energy efficiency and limitation of greenhouse gas emissions
   - Decrease the co2 equivalent intensity per GDP produced in the industrial sector until 2023
   - Develop and use new technologies for limitation of GHG in the industry sector until 2023

40. Turkey as an energy importing country needs to use its renewable sources. In this regard, wind and geothermal power are very attractive choices, since they represent economic, sustainable and environmental friendly options for Turkey. Due to Turkey’s geographical position, solar and wind energy are abundant and also Turkey has remarkable amount of hydro energy potential. It is aimed to increase the renewable (except hydro energy) installed capacity to 27 GW till 2023. For this purpose, Turkey’s policy encourages alternative solutions based on indigenous and renewable sources to remove the challenges towards sustainable energy modelling and reducing import dependency. Furthermore, some support mechanisms such as purchase guarantee and feed-in tariffs have been put into force. Recently, with the aim of more efficient and effective utilization of renewable energy resources, Turkey has adopted a new business model which is Renewable Energy Resources Zone (YEKA). With this model, it will be possible to facilitate large-scale renewable energy plants on public and private lands in line with the Turkey’s 2023 energy vision. It will also contribute to the manufacturing renewable energy equipment of cutting-edge technology in Turkey and increase the utilization of locally-manufactured components in renewable energy plants.

COOPERATION OF THE TURKPA MEMBER COUNTRIES AND CONCLUSIONS

41. According to the International Renewable Energy Agency (IRENA) sources, at the end of 2016, global renewable generation capacity amounted to 2,006 GW. Hydro accounted for the largest
share of the global total, with an installed capacity of 1,122 GW. Three-quarters of this was in largescale plants of over 10 MW. Wind and solar energy accounted for most of the remainder, with capacities of 467 GW and 296 GW respectively. Other renewables included 110 GW of bioenergy, 13 GW of geothermal energy and about 500 MW of marine energy (tide, wave and ocean).

42. Renewable generation capacity at the regional level: Asia accounted for 58% of new capacity in 2016, resulting in a total of 812 GW (41% of global capacity). Asia was also the fastest growing region, with a +13.1% increase in renewable capacity. North America overtook Europe in capacity expansion, with an increase of 24 GW (+7.8%) compared to an increase of 21 GW (+4.4%) in Europe. Renewable capacity growth in Europe remains subdued, with more than half of European countries reporting little or no expansion in 2016. The other notable development was the installation of 4.1 GW of new renewable capacity in Africa (twice as much as last year), giving it second place in capacity growth in 2016.

43. In the Nakhchivan Agreement of 2009, promotion effective regional and bilateral cooperation in energy among other areas is stated as one of the main purposes and tasks of the Turkic Council. Moreover, at the First Summit of the Turkic Council in Almaty (2011), Parties expressed their intention to enhance cooperation in areas including alternative energy.

44. Turkic Council attaches particular importance to the development of alternative energy resources in member countries. In this regard, Turkic Council regularly organizes joint meetings of relevant ministries or agencies of member countries. The first meeting of the Working Group on Alternative Energy of the Turkic Council was convened on 22 April 2016 in Istanbul at the Secretariat of the Turkic Council. During the meeting, parties shared information on the current policy and situation in their respective governments regarding the development of the alternative energy sources. It was noted that creation of favourable investment climate in the Member States for renewable energy becomes a crucial aspect for development of renewable energy sources (RES). It was agreed that the Turkic Council should establish contacts with the UN Development Program, Islamic Development Bank and other similar organizations concerning the ways of attracting possible investment to the RES of Member States.

45. At the United Nations Sustainable Development Summit held on 25 September 2015, world leaders adopted the 2030 Agenda for Sustainable Development, which includes a set of 17 Sustainable Development Goals (SDGs) to end poverty, fight inequality and injustice, tackle climate change and ensure access to affordable, reliable, sustainable and modern energy for all by 2030.

46. In recent years specific cooperation on alternative energy has been significantly strengthened across a range of different frameworks. Because, during a year many events are being organized on alternative energy by the UN, as well as other organizations. Cooperation of Turkic speaking states within the United Nations Development Programme, Islamic Development Bank and other similar organizations concerning the ways of attracting possible investment to the RES of Member States could contribute to the efforts of the TurkPA member countries to develop effective approach for alternative energy.

47. Delegations of member countries need to take active part in Expo 2017 to be held in Astana and dedicated to the renewable and alternative energy sources. The purpose in holding the “EXPO-
2017” includes the demonstration of the achievements of Kazakhstan and representation to the world community of its capabilities. Green energy is a set of promising methods for obtaining, transfer and use of energy, which are not as widespread as traditional methods. However, their long-term prospects are unquestionable. “Astana EXPO-2017” sets the task to gather the best developments in these fields in order to demonstrate not only the future energy, but also the problematic issues of developing countries, connected with the need in it, in the local territory within 93 days. The leading world experts, who will meet in Astana, will discuss the ways to make “green energy”, its availability, sustainability and economy the main development trend for further decades.

48. TurkPA needs to give every assistance to undertakings of the Turkic Council and facilitate relevant legislation to achieve set goals in this field for the benefit of the peoples of the member-states.