

# **Intended nationally determined contribution of Turkmenistan in accordance with decision 1/CP. 20 UNFCCC**

Turkmenistan presents its Intended Nationally Determined Contribution (INDC) in accordance with decision 1/CP.20 UNFCCC "Lima call for action to address climate change", which calls Parties to communicate in advance their INDC to facilitate adoption of the new international agreement on climate change before the 21st Conference of Parties (COP 21), which will take place in Paris in December 2015.

INDC is not an obligation, but it reflects the intention of the country to make an appropriate contribution towards reducing or restraining increase of greenhouse gas emissions and prevent increase of global average temperature by more than 2 ° C and thereby prevent global climate change.

## **National development objectives and priorities on climate change**

Acknowledging the dynamic economic development as a primary objective, Turkmenistan pays particular attention to optimizing the structure of energy, protection and restoration of the environment and ecological systems. Turkmenistan actively participates in international efforts and international cooperation to address climate change and implement the provisions of UNFCCC and the Kyoto Protocol. Realizing the importance and assuming the responsibility, Turkmenistan intends to make its adequate contribution to international efforts in addressing climate change. Turkmenistan is committed to limiting greenhouse gas emissions and improving the country's capacity to respond to climate change. In designing low-carbon development policy, Turkmenistan takes into account the level of its economic and technological development and social consequences of emission reductions. The country should pass to the "zero-risk" development, that is, contribute to global efforts to mitigate climate change, which should lead to the country's economic growth and improving of living standards.

The indicator of **growth stabilization or beginning of reducing emissions by 2030 under favorable economic circumstances could be a long-term goal of low-carbon development, providing gradual reduction of GHG emissions in Turkmenistan** and compatible with global objective - not exceeding the 2-degree rise in temperature levels.

Turkmenistan is taking significant measures to address climate change. Primarily, this is carried out in the context of implementation of the National Strategy for socio-economic development up to 2030 and in conjunction with accelerated formation of resource-saving and environmentally friendly society and innovation-oriented economy and the National Strategy of Turkmenistan on Climate Change representing the national doctrine of transition to the low-carbon development.

Turkmenistan is one of the most vulnerable countries to climate change in Central Asia. Since the beginning of the 1950s, the average growth of the temperature in Turkmenistan was about 0.2°C for a decade. According to the forecast data, under unfavorable climate change the country may experience shortage of water resources, increased desertification and land degradation, drought and increase in number of hazards leading to instability of agricultural production and threatening food security and social well-being of the population. Considering the above, the section "Adaptation" has been included in INDC Turkmenistan coupled with the section "Mitigation".

## MITIGATION

**Base year:** 2000.

**The time frame/implementation period:** 2020-2030 years.

**The scale and coverage:**

The economy-wide; INDC includes GHG Inventory results in the following sectors:

- Energy;
- Industrial processes;
- Agriculture;
- Waste

### **Greenhouse gases (GHGs)**

INDC includes information on the following greenhouse gases:

- Carbon dioxide (CO<sub>2</sub>);
- Methane (CH<sub>4</sub>);
- Nitrous oxide (N<sub>2</sub>O);

### **Planning process and forecasts**

Turkmenistan has adopted the National Strategy on Climate Change. National Plans for Mitigation and Adaptation (NAPA and NAMA) are in the process of development. These documents reflect actions ensuring reduction of greenhouse gas emissions by 2030 on national scale and in some sectors corresponding to declared contribution in INDC Turkmenistan.

### **Methodological approaches**

Methodological approaches are based on using the following techniques:

1. Revised Guidelines for National Greenhouse Gas Inventories. // IPCC Workbook. V.2. 1996
  2. Revised Guidelines for National Greenhouse Gas Inventories. // The IPCC Reference Manual. V.3. 1996
  3. Guide to Good Practice and accounting factors of uncertainty in national greenhouse gas inventories. IPCC, 2000
  4. Good Practice Guidance for Land Use, Land-Use Change and Forestry. IPCC 2003
  5. The IPCC Guidelines for National Greenhouse Gas Inventories, 2006
- Global warming potentials (GWP) adopted by the UNFCCC will be applied.

### **Key sources**

Analysis of results of GHG inventory reveals that the main sources of greenhouse gas emissions in Turkmenistan are the enterprises of oil and gas, energy, agriculture and transport industries, as well as housing and communal services. The largest emissions are generated from fuel combustion, mining, transportation and storage of oil and gas. Increasing of greenhouse gas emissions depend first of all on growth of energy consumption. The intensive economic growth, accompanied by the growth of production and consumption of energy resources will inevitably lead to further increases in greenhouse gas emissions. In order to prevent the climate change Turkmenistan's National Strategy on Climate Change has identified the main directions of the

policy for consistent transition to the economy with minimal greenhouse gas emissions without prejudice to the socio-economic development. Energy efficiency and conservation, sustainable use of natural gas and petroleum products, increased use of alternative energy sources are the main priorities of the policy for limiting GHG emissions envisaged in the Strategy. In order to implement this policy, tools and measures limiting GHG emissions will be used in key sectors of the economy. These are industry, transport, housing and communal services, which are simultaneously able to maintain high rates of economic growth in general.

Turkmenistan considering all acceptable development options and submission of INDC and taking into account national interests and capabilities of the country, as well as analyzing developed by countries INDCs choose the contribution Type 3 (GHG goal/target), which uses a target indicator attached to per unit of GDP. Specific greenhouse gas emissions per unit of GDP are the indicator that can reflect the country's potential to reduce greenhouse gas emissions.

### **Current trends of energy consumption and GHG emissions**

Dynamic development of economic sectors of Turkmenistan, as well as improving the demographic indicators formed the tendency of growth of production and consumption of energy resources. Turkmenistan with its enormous reserves of oil and gas resources fully meets demands of the country for energy, which in 2012 amounted to 76.7 million toe (tone of oil equivalent). Thus, the GDP energy intensity of production was 0.69 toe/US \$ at PPP and compared to 2000 it was decreased by 65%. Despite the absolute increase in consumption of energy resources, the indicator of energy intensity of GDP at PPP on consumption was decreased by 57% in 2012 compared to 2000 and amounted to 0.32 toe/US \$ at PPP. This result was based on increased dynamics of growth of GDP at PPP - by 4.2 times.

Figure 1 shows the dynamics of actual and anticipated economic indicators and greenhouse gas emissions in Turkmenistan for the period of 2000-2030 in %. The level of 2000 is taken as 100%. The process of growth of energy consumption in the country was accompanied by natural increase in GHG emissions. Thus, due to the high economic growth there was a tendency of decreasing the carbon intensity indicator. Compared to 2000, the index carbon intensity was 0.47 in 2012 based on actual data, which is for 53% less than the level of 2000.

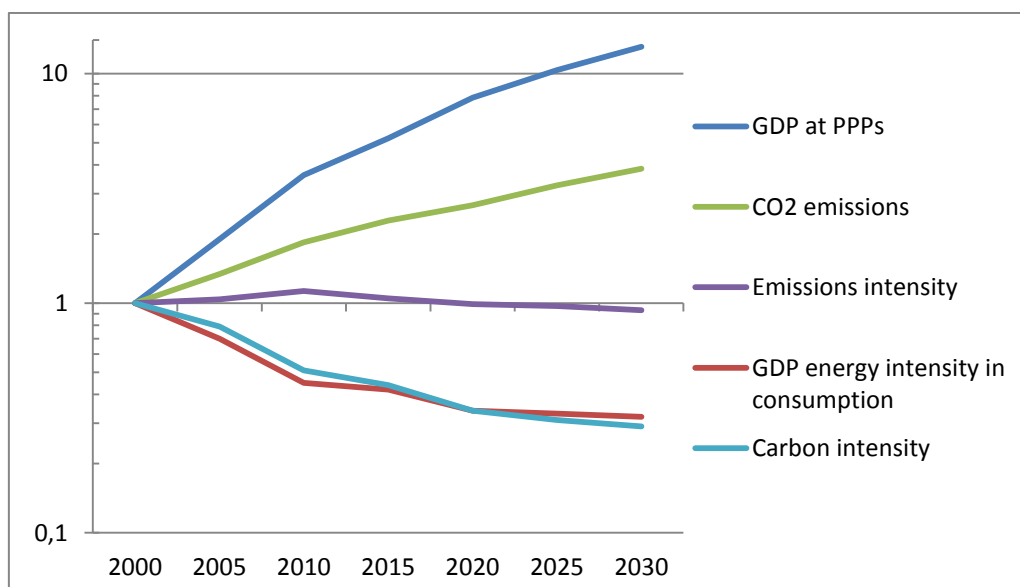
### **Forecasted assessment of energy consumption and GHG emissions in the long term until 2030**

Forecast of the volume of energy consumption in Turkmenistan until 2030 is calculated on the basis of the baseline scenario of economic development. The baseline scenario takes into consideration measures envisaged in the National Program for social-economic development of Turkmenistan for the period 2011-2030 in compliance with needs of the economy, its active modernization and transition to industrial-innovative type of development, targeted programs, laws and regulations adopted in 2007 – 2014. Under this scenario, in 2030 the total volume of production of primary and secondary energy resources will reach 288 740.4 thousand toe. The production volume of energy resources will increase at 3.76 times as compared to 2012. In 2030, consumption of primary and secondary energy resources will amount to 81 475.9 thousand toe, which is 2.3 times more than in 2012.

According to forecasts, by 2030 greenhouse gas emissions will increase 4 times compared to the level of emissions in 2000, and approximately 2 times compared to 2012 and due to a decrease of growth rate of emissions it will reach in all 135 833 Gg CO<sub>2</sub> equivalent. Moreover, the planned large-scale measures on reduction the GHG emissions will lead to further reduction of emissions. Also, due to the high growth of the national economy carbon

intensity will decline and by the end of the forecast period it'll amount to 0.0004 tons of CO<sub>2</sub> equivalent/thousand US \$ GDP in PPP, which is 1.7 times less than the level of 2000.

Thus, according to preliminary assessments, a significant increase in the rate of emissions particularly in 2020 are not observed and the faster growth of energy efficiency contributes to lower GHG emissions and improving quality indicators, such as the emission intensity and carbon intensity.



**Fig.1. Dynamics of actual (2000-2012) and forecast (2014-2030) economic indicators and greenhouse gas emissions**

The baseline scenario of economic development ensures sustainable average annual growth of the economy for the period of 2015 – 2030. During this period, the growth rate of GHG emissions will be far behind on the rate of GDP growth. Thereupon the energy intensity and carbon intensity of the economy, as well as the intensity of the GHG emissions will be reduced. So it can be noted that the growth rate of GHG emissions will significantly lag behind the GDP growth. Such a result would be achieved by the country at the expense of its own financial resources and require limited support from the developed countries to carry out preparatory work for developing legislative and regulatory documents and plans, as well as for implementation of actions to improve institutional, administrative and expertise potential on problems for reducing emissions. If financial and technological support is provided by developed countries, Turkmenistan could achieve zero growth in emissions and even reduce them up to 2030.

### **Why INDC are fair and ambitious, taking into account the national circumstances?**

Based on the achievements of the claimed INDC for 2030, there may be a bond breakage (gap of linkage) between the economic growth and greenhouse gas emissions. There will be a reduction in greenhouse gas emissions per unit of GDP. At the same time stabilization of emissions by 2030 is not an obstacle for the economic and social development of the country and it is consistent with the overall objectives of economic development, increasing energy efficiency, reducing energy intensity and increasing the share of renewables in the energy balance of Turkmenistan.

## **How INDC contributes to achieving the objectives of the Convention?**

Stabilization or beginning of reducing GHG emissions by 2030 will allow Turkmenistan to enter the trajectory of low-carbon development, compatible with long-term global goal - not exceeding the 2-degree rise in temperature levels.

## **Means of implementation of the contribution**

Means of implementation is primarily the state budget of Turkmenistan. Project proposals and measures providing the necessary level of reduction of GHG emissions were designed in the framework of preparation of the Third National Communication and National Action Plan to reduce greenhouse gases. The country's economy has the potential to further reduce emissions of greenhouse gases, but in this case, the country will need additional financial resources and technological support. At a certain international support, Turkmenistan could achieve zero growth in emissions and even their decrease until 2030.

## **Monitoring and evaluation**

The process of monitoring and evaluation of INDC at the international level will be developed taking into account decisions taken at the COP 21.

At the national level the progress of implementation of the envisaged activities to reduce GHG emissions are controlled by the government and relevant ministries and agencies. Regularly 2 times a year, all ministries, departments prepare reports for higher instances on implementation of the National Strategy on Climate Change of Turkmenistan and the national mitigation plans.

# **ADAPTATION**

The climate of Turkmenistan is sharply continental and extremely dry desert of moderate type. Daytime temperatures of the summer season often exceed 40 ° C. The absolute maximum of it 50, 1°C +, and the absolute minimum is -36, 0°C. Turkmenistan belongs to the zone of insufficient humidity. Mean annual precipitation varies from 76 to 380 mm. The results of analysis of climatic data for the last 60 years demonstrate an increase of surface air temperature by 1% to 2.5% (an average of 2 degrees), and minor changes in annual precipitation. Modeling of the future climate in Turkmenistan until 2100 also indicates further increase in air temperature. However, the annual precipitation will decrease over time, especially in the second half of the century.

## **Climate risks**

Climate change in Turkmenistan appears in strengthening and acceleration of such phenomena like as droughts, heat waves, strong hot and dry winds, high dustiness, increase in the number of dry years, dust storms, heavy rains and floods, low winter temperatures, prolonged frost and others. The negative effects of the climate change mainly affect such sectors as agriculture, water management, health, soil and land resources, ecosystems (flora and fauna) and forestry. Calculations showed that the projected increase in temperature and decrease in rainfall first of all would adversely affect all available water resources. The agriculture is the main consumer of

water in Turkmenistan, and therefore the problem of changing the flow of rivers and hydrography, namely its reduction during the vegetation period may worsen. This problem is even more aggravated because of the necessity of increasing irrigation norms due to rising temperatures and the transpiration. As a whole, the need for additional water resources will be around 5.5 billion m<sup>3</sup> by 2030 without taking into account the growth of irrigated area. Assuming failure of timely adaptation measures, less received volume of production could reach 20% by 2030, and the loss of value of crop production only for the 15-year period (2016-2030 years) will amount to 58 777 billion manat (20.5 billion dollars). The Government of Turkmenistan warning these losses prepared the list of adaptation measures early in advance for preventing damages. According to preliminary estimates, the cost for implementing planned adaptation measures will amount to 10.5 billion dollars.

**The drought** is a significant risk for social and economic welfare of the country, which appears due to high temperatures and water scarcity. Currently, there is a noticeable tendency of increase in frequency of low water years in Turkmenistan's major rivers - the Amu Darya and Murghab. Global warming will be an additional risk factor for the development of hydrological drought and desertification negatively affecting water resources and naturally agriculture. Large destruction and significant economic damage are caused by **floods and mudslides**. In Turkmenistan mudflows are observed at 229 permanent and temporary watercourses/channels. The most dangerous months are April and May, which account for 54% of all recorded landslides. In winter there were observed **ice phenomena**, especially in the middle flow of the Amu Darya in Turkmenistan. In certain years as a result of lowering the temperature to -25-30°C, Amu Darya is fettered by ice forming a powerful hanging ice dams, resulting in sharply raise of water levels in it and its surrounding areas. The list of adaptation measures has been prepared in all priority sectors in the framework of preparation of TNC and the National Action Plan on Adaptation. Currently, costs for these activities are foreseen within the state budget.

### **National commitments**

Policy of Turkmenistan to mitigate climate change is reflected in main government programs, especially in the "National Strategy of social and economic transformation of Turkmenistan until 2030" and the "National Strategy of Turkmenistan on Climate Change." Adaptation to climate change is a major focus of the National Strategy of Turkmenistan on Climate Change. The Strategy will be implemented through the National Action Plans for Adaptation and Mitigation, which in future should become an integral part of national programs and plans for socio-economic development.

### **Report on planned adaptation activities**

In order to ensure the sustainable development of the country in response to climate change, it is important to prepare a detailed national action plan for adapting to climate change, including the list of specific actions, timelines for their implementation and assessment of implementation costs. In elaboration of the National Action Plan for Adaptation to climate change an important role is given to measures for developing preventive programs to reduce impact of adverse effects of climate change and development of specific recommendations on various aspects of adaptation to extreme changes of weather conditions. National Action Plan on Adaptation will include adaptation measures for sectors of water, agriculture, soil and land resources,

ecosystems. Construction of the Turkmen Lake of «Golden Century» occupies a special focus among other activities carried out in Turkmenistan on adaptation to climate change. Among the ongoing adaptation measures in the region this important project is currently unique and beneficial not only for Turkmenistan but for the rest of the Central Asia. Collection of drainage water into the lake in the Karakum Desert, and their further use after desalination demonstrate large-scale implementation of measures to adapt to climate change in the sector of water resources of the country.

### **Monitoring and evaluation**

At the national level, the progress of implementation of adaptation measures is under control of the government and relevant ministries and agencies. Regularly 2 times a year all ministries, departments prepare reports for the higher instances on implementation of the National Strategy of Turkmenistan on Climate Change and national adaptation plans.