BIBLIOGRAPHY

1. *Mochan, S. I.* Thermal calculation of boilers (normative method). Third edition, revised and supplemented / S. I. Mochan and others. – St. Petersburg, 1998. – 257 p.

ENVIRONMENTAL SAFETY: DISCUSSION OF CLIMATE CHANGE PROBLEMS

V. Kankova, I. Narkevitch

Belarusian Research Center «Ecology»
Minsk, Republic of Belarus
konkowa_wiktorija@mail.ru

The Republic of Belarus has ratified the Paris Agreement that was signed at the 21st session of the Conference of the Parties to the United Nations Framework Convention on Climate Change, on September 20, 2016. According to international estimates, the environmental efficiency index of the Republic of Belarus for 2016 is 82,3 percent (the Republic of Belarus ranks 35th among 180 countries).

Keywords: the Paris Agreement, greenhouse gas emissions, climate change, consequences of climate change.

In comparison with many other countries, the advantage of the Republic of Belarus is the higher adaptation potential of the country on the whole, due to:

- high rate of forest cover of the territory;
- availability of water resources;
- a considerable proportion of peatlands and special protection natural areas.

The obligations of the Republic of Belarus under the Paris Agreement are to reduce the greenhouse gas emissions by 28 percent by the year of 2030 compared to 1990. These obligations do not include the possibility of using the mechanism of international trade on the Carbon Markets and do not take into account the greenhouse gas emissions and leakages in the sector "Land use, land use change and forestry".

The activities of the Republic of Belarus in the field of climate change are the following:

- The legal framework has been created and is being improved, and strategies and programs have been developed and adopted in the field of energy efficiency, energy saving and climate change.
- Scientific research in the field of climate change is being carried out.
- The institutional framework for a national accounting and control system has been established to fulfill obligations under international climate agreements.
- A system of education, training and information in the field of climate has been established.
- International cooperation with other countries, international organizations, Programmes and Projects is carried out.

In the Republic of Belarus, it is planned to create a regulatory and legal framework for the period after 2020 aiming at stimulating the reduction of greenhouse gas emissions in the country, including the attraction of the latest technologies and financial support.

The National Plan for the implementation of the obligations of the Republic of Belarus under the Paris Agreement should be developed taking into account the rules and procedures that were developed and adopted in Marrakech with respect to all elements of the Paris Agreement: financing, adaptation, mitigation, forests, etc. In addition, the adoption of a number of decisions on the requirements for the national system, the issues of future reporting, adaptation, and requirements for a nationally-defined contribution are planning.

The process of climate change in the Republic of Belarus has both positive and negative consequences. Among the positive issues are: reduction in energy costs during the heating season; improving the structure and expansion of the plant growing zone, as well as improving the efficiency of livestock production (with a number of additional conditions and taking certain measures); increasing forest productivity.

Negative consequences of the expected results of climate change for the Republic of Belarus are: increased risk to health (increase in morbidity and mortality); increase in the frequency, intensity and duration of droughts in Brest and Grodno regions; extreme precipitation, floods in Vitebsk and Mogilev regions; increase of the fire risk in forest areas; violation of ecological balance, including the displacement of some biological species by others; the spread of new infectious and parasitic diseases; an increase in electricity consumption for air conditioning in the summer season in public areas.

Ecologically safe development of the country in the conditions of a changing climate can be ensured only by the joint participation of all sectors of economy of the Republic of Belarus on the basic of the necessary legislation. Important steps in solving these issues are: the transition to a "green economy", the modernization of production

processes, provision of energy efficiency of buildings, forests protection, the introduction of the principles of low-carbon agriculture, sustainable use of natural resources of the Republic of Belarus. Prevention measures are very important to reduce the risk of natural disaster consequences.

EMPIRICAL EVALUATION OF THE ARRIVAL OF THE DAILY SUM OF DIRECT AND SCATTERED RADIATION

V. Kovshik, A. Butko, V. Pashinsky

Belarusian State University, ISEU BSU,
Minsk, Republic of Belarus
pashynski@mail.ru

The article describes the use of empirical models that allow calculating the arrival of direct and scattered radiation.

Keywords: scattered radiation, empirical model, solar radiation.

In the world practice, a number of empirical models are used that allow calculating the arrival of direct and scattered radiation on the basis of monthly data of total solar radiation, among which the models of Collares-Pereira, Reible, and others can be distinguished.

Comparing the results of the simulation with the actual measured values of the input of scattered solar radiation, it was proved that the proposed models are not acceptable for the territory of Belarus. This discrepancy is due to a number of factors, such as: the difference between measurement techniques, methods of data correlation, geographical location of registration and data completeness.

Special interest is caused by the data of the daily sum of total solar radiation, design and operation of active and passive energy supply systems are only estimated when solving engineering problems related to the modeling.

In the development of correlation relationships of the empirical estimation of the daily daily and scattered solar radiation fluxes, surface network actinometric observations were carried out by the State Republican Hydrometeorological Center of the Minsk Oblast Medical Academy Minsk (φ = 53,92 °, λ = 27,63 °) obtained for the period from 2006–2015 years.

Based on the results of the study, the following equations were obtained:

$$H_D = H_Q \begin{cases} 0{,}99 & K_T \le 0{,}17 \\ -0{,}5792K_T^2 - 0{,}9643K_T + 1{,}2111 & 0{,}17 \ge K_T > 0{,}75 \\ -0{,}0318K_T + 0{,}2619 & 0{,}75 \ge K_T > 0{,}8 \\ 4{,}4082K_T - 3{,}3433 & K_T \ge 0{,}8 \end{cases}$$

where H_Q – is the total solar radiation, MJ / m2; H_D – scattered solar radiation, MJ / m2; $K_T = H/H_0$ – the index of atmospheric clarity, characterizes the ratio of the actual total solar radiation entering the earth's surface H to solar radiation entering the upper boundary of the atmosphere H_0.

Direct solar radiation H_S, MJ / m2, is determined by the formula:

$$H_S = H_Q - H_D$$

The reliability of the approximation of the proposed equations (for the number of arguments in the sample n = 2888) between the measured and calculated values of the total solar radiation is R2 = 0,88. A graphic interpretation of the approximation H_D/H_Q is shown in Fig. 1.