

Thus, developed functional structure of software and hardware complex for monitoring and control of parameters and modes of solar collectors will allow to create a mentioned above system that can realize remote automated operation with solar collectors that are difficult to maintain, as well as located in hard-to-reach places, and make prerequisites for rather effective and optimal solutions of its' using.

## **SPATIAL-TEMPORAL CHANGES OF EMISSIONS OF POLLUTING SUBSTANCES IN ATMOSPHERIC AIR OF BELARUS**

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Atmospheric air is one of the vital elements of the environment, a favorable condition which is the natural basis of sustainable socio-economic development of the state. In the work of the basic indicators characterizing state of atmospheric air of the Republic of Belarus for the period from 2010 to 2016.

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Air condition is largely predetermined volumes of pollutant emissions from stationary and mobile sources. During the 2005–2016 there is a general tendency to reduce them. Since 2010 total emissions of pollutants into the atmosphere has stabilized, while there was a slight increase from their stationary sources and the reduction from mobile sources. In 2015 it noted a significant reduction in pollutant emissions of mobile sources in comparison with the previous two years (from 881–928 to 801 thousand tons) and an increase of 22,8 % compared to 2010 emissions from stationary sources (from 377 to 463 thousand tons) [1].

The highest emissions are typical for industrial centers (Navapolack, Mazyr, Minsk – more than 30 thousand tons), as well as the values of emissions per unit of area (more than 15 tons / km<sup>2</sup> for the listed cities) and 1 person. (Mazyr, Navapolack, Kasciukovičy, Novalukoml' – to more than 250 kg per person).

The structure of emissions from stationary sources by economic activity is characterized by an increase in the share of agricultural organizations (from 13,2 % in 2010 to 33,7 % in 2016) and a decrease in the share of manufacturing companies (with 49,6 % to 40,2 %). Share of organizations of other types of economic activity compared with 2010 has not changed significantly.

A significant impact on climate change, greenhouse gas emissions have. The main greenhouse gas in Belarus is carbon dioxide (CO<sub>2</sub>), whose share in the greenhouse gas emissions of CO<sub>2</sub> equivalent of about 65,0 %, followed by methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O), each more than 17,0 %, respectively, the proportion of HFC, and SF<sub>6</sub> is practically zero, and thousandths of a percent. During the period 1990–2015 carbon dioxide emissions have decreased by 41,7 %, nitrous oxide at 29,0 %, methane emissions increased by 8,3 % [2]. Sources of greenhouse gas emissions in Belarus are primarily the "Energy", "Agriculture" and "Waste".

According to the results of observations of air quality in the framework of the National Environmental Monitoring System found that during the 2005–2016 the content of pollutants in the air most of the cities controlled by the Republic of Belarus was below the maximum permissible concentration (TVL). The proportion of samples with concentrations of pollutants from 0.5 MAC or less accounted for 93,0 %, and the number of samples exceeding the maximum single TVL, in 2014 amounted to 0,9 %.

Air condition industrial centers of the country quite well. For a long period, the average annual concentrations of most of the regulated pollutants below the MRL and the number of days with average daily concentrations of particulate matter PM-10 in the air above the TVL in most monitored cities (Mahilioŭ, Žlobin, Hrodna, Salihorsk, Polack, Navapolack, residential areas of the city of Homiel', Viciebsk and Minsk) is significantly lower than the EU countries to target. Only occasionally average daily concentration of nitrogen dioxide and sulfur dioxide exceeded the TVL in certain cities [3].

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