

***International Economy***

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**THE ROLE OF THE BSEC COUNTRIES  
IN SOLVING THE ECONOMIC PROBLEMS  
OF CLIMATE CHANGE**

**Abstract**

Black Sea region is one of the few regions of the world, which have been achieved the goal of reducing emissions of anthropogenic greenhouse gases embodied in the Kyoto Protocol to the UN Framework Convention on Climate Change. Emissions of carbon dioxide in the twelve countries – members of the Black Sea Economic Cooperation in the pre-crisis in 2007 decreased by 22,8 % compared with 1990, while worldwide emissions increased by 75,7 %. The effectiveness of international mechanisms of climate change will promote the use of emissions per unit of land area as a source of objective indicators in calculating the potential of quotas on trade in emission rights.

**Key words:**

Black Sea Economic Cooperation, the adjustment of economic basis mechanisms to reduce emissions.

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In the second half of the twentieth century has steadily increased the volume of global consumption of fossil fuels – coal, oil and natural gas, which was accompanied by a rapid increase of anthropogenic emissions of carbon dioxide (CO<sub>2</sub>) and, along with a decrease in the adsorption capacity of the planet due to mass deforestation – the main sink of CO<sub>2</sub> has led to annual increase in average temperature of Earth's atmosphere. Territory numerous countries on all continents have become increasingly subjected to destructive floods, prolonged droughts and forest fires. To eliminate the consequences of these natural disasters the world community annually spends hundreds of billions of dollars.

In early 1990, it became apparent that the growth of CO<sub>2</sub> emissions will lead to intensification of global warming and ultimately to the planetary environmental catastrophe. Security environment was considered an important priority for the international community in the Declaration of Rio de Janeiro, adopted June 14, 1992 at the UN Conference on Environment and Development, with participation of 179 countries. Outcome of the Rio Summit, Agenda XXI Century has identified sustainable development as a global imperative, and outlined the main directions of international cooperation to achieve harmony between economic growth and preserving habitat. The Conference adopted the UN Framework Convention on Climate Change, which has the most important institutional principle of « common but differentiated responsibilities of Parties» to ensure the reduction of greenhouse gas concentrations in the atmosphere to a level that would prevent dangerous anthropogenic interference with the climate system [1, Article 4 ].

Obligations of Parties to the Convention on hold in 1997 in the Kyoto Protocol, under which 39 states, including all members of the EU-15 should have until 2012 to reduce total emissions of greenhouse gases by 5,2 % compared to 1990 levels [2]. However, at present among the major industrial countries, this requirement could be fulfilled only by Ukraine and Russia, while Japan's CO<sub>2</sub> emissions increased by 18,4 %, while in the U.S. at 31.5 % [3].

It is obvious that the obligations of the Parties to the UN Framework Convention on Climate Change will not be fulfilled within the prescribed period of Kyoto Protocol. As shown in Table 1, the amount of global CO<sub>2</sub> emissions, reaching pre-crisis peak in 2007, increased by more than 75 % compared with 1990 growth not adsorbed CO<sub>2</sub> emissions is aggravated by the fact that in developing countries, intensive deforestation (according to the UN, the annual deforestation rate in 1990 – 2005 years ranged from 0.5 % in Brazil and Mexico to 1,6 % in Indonesia, 2.4 % in Nigeria, 2.5 % in Honduras and 2,9 % in Togo), that

is not fully compensated by the increase in the area of new plantings in the European Union, the USA, Canada, Australia and other developed countries.

It should be noted that some reduction in CO<sub>2</sub> emissions in the world, observed in 2008 – 2009 caused by the global recession is reducing energy consumption, is temporary in nature, and breaking the recession in world GDP growth in emissions back to pre-crisis level as early as 2013–2015 years.

One of the main reasons for the continued threat of increased global anthropogenic emissions of CO<sub>2</sub> is the destructive position of China, India and other developing countries that refuse to accept binding commitments to reduce emissions. These governments mistakenly believe that the accumulation of greenhouse gases in the atmosphere is the result of over-industrialization of the rich countries and, therefore, only those with high per capita income must bear the economic responsibility for the problem of global warming. However, calculations made according to Table 1, indicate failure of such a position.

The share of developed countries in the production of CO<sub>2</sub> emissions decreased from 63.9 % in 1980 to 48,7 % in 2007, and the major polluters of the atmosphere are now just low-and middle-income countries, due to the extremely high annual growth rate of emissions CO<sub>2</sub>, which in 1980–2007 amounted to 5,1 % in China, 5.5 % in India, 5.7 % in Iran, 5.8 % in Indonesia, 6.3 % in Pakistan, 7.6 % in Malaysia and 7.9 % in Thailand compared to 1.2 % in the U.S. and Japan.

At the UN Conference on Climate Change in December 2009 in Copenhagen, developing countries in defense of his position once again led as the argument that permitted in industrial countries historically established levels of CO<sub>2</sub> emissions per capita are much higher than for developing countries, which in the opinion of the latter, unfair. At first glance, this argument seems reasonable. As seen from Table 2, the amount of emissions per capita (an indicator of  $E_{PC}$ ) in developed countries by an order higher than in countries with low income.

However, the use of this index as a criterion for measuring the extent of human impacts on the ecosystem of the Earth distorts the real scale of the country's responsibility for global pollution, and the role of each country in tackling climate change should be assessed taking into account the excess of the intensity produced in the territory of CO<sub>2</sub> emissions relative to average sound level of [8].

The intensity of emission  $I_E$  is defined as

$$I_E = E / A, \quad (1)$$

where  $E$  – the amount of CO<sub>2</sub> emissions;

$A$  – area of the country.

Comparison of the intensity of emission leads to the conclusion that the actual level of pollution in many developing countries is only slightly inferior to the level of pollution in the U.S. and many times greater than those for developed countries such as Australia or Canada.

Table 1.

**Anthropogenic carbon dioxide (CO<sub>2</sub>) emissions in 1990–2007**

Region, income group, country	Annual total CO <sub>2</sub> emissions metric tons (millions) <i>E</i>		Share of annual world total CO <sub>2</sub> emissions, %		Change <i>E</i> 2007/1990, %	CO <sub>2</sub> emis- sions per capita, met- ric tons <i>E<sub>PC</sub></i>	
	1990	2007	1990	2007		1990	2007
<b>World</b>	<b>16,183.1</b>	<b>28,432.2</b>	<b>100.00</b>	<b>100.00</b>	<b>75.7</b>	<b>3.3</b>	<b>4.3</b>
Low income group	1,376.8	2775.1	8.51	9.76	101.6	0.7	2.1
Middle in- come group	5,772.8	11,823.4	35.67	41.58	104.8	2.7	2.8
High in- come group	9,033.5	13,833.7	55.82	48.66	53.1	11.9	13.1
The largest CO <sub>2</sub> emissions producers <sup>1</sup>							
USA	4,824.0	6,342.1	29.81	22.31	31.5	19.3	19.5
China <sup>2</sup>	2,428.5	5,706.5	15.01	20.07	135.0	2.1	4.3
Russian Federation	1,954.4	1,498.4	12.08	5.27	-23.3	13.1	10.8
India	675.3	1,465.3	4.17	5.15	117.0	0.8	1.3
Japan	1,070.7	1,267.4	6.62	4.46	18.4	8.7	9.6
Countries – members of the Organization of the Black Sea Economic Cooperation							
Albania	8.4	4.0	0.05	0.01	-52.4	2.6	1.2
Armenia	3.7	4.2	0.02	0.01	13.5	1.0	1.4
Azerbaijan	47.1	37.9	0.30	0.13	-19.5	6.4	4.4
Bulgaria	75.3	43.3	0.47	0.15	-42.5	8.6	5.5
Georgia	15.2	4.9	0.09	0.02	-67.8	2.8	1.1
Greece	72.2	96.3	0.45	0.34	33.4	7.1	8.7
Moldova	21.8	8.0	0.13	0.03	-63.3	5.0	2.1
Romania	155.1	94.1	0.96	0.33	-39.3	6.7	4.2
Russian Federation	1,954.4	1,498.4	12.08	5.27	-23.3	13.1	10.8
Serbia	58.9	34.1	0.36	0.12	-42.1	7.8	4.8
Turkey	143.8	285.3	0.89	1.00	98.4	2.6	3.5
Ukraine	631.1	349.4	3.90	1.23	-44.6	12.1	7.9
<b>BSEC-12</b>	<b>3,187.2</b>	<b>2,459.9</b>	<b>19.70</b>	<b>8.65</b>	<b>-22.8</b>	<b>9.3</b>	<b>7.4</b>

Notes: 1. Ranked by CO<sub>2</sub> emissions in 2007.  
2. Including Hong Kong and Macao.

Sources: [3, p. 362]; [4, pp. 292-293]; [5]; [6, pp. 352-353].

Using the units  $I_E$  avoids the misconception about an imaginary reduce emissions in countries where population growth exceeds the rate of production of pollution. For example, in South Africa in 2000, the amount of emissions and pollution intensity increased by 13 % compared with 1990, although the rate of  $E_{PC}$  decreased by 11 %, because during this period the population increased at an average of 2 % per year.

Unit  $I_E$  allows you to define a real, not imaginary, the degree of excess of each country's average level of contamination.

The accumulation of  $CO_2$  in the atmosphere occurs when the produce in the area emissions are not fully adsorb the existing green areas. The number of excess emissions  $Q_E$  is defined as:

$$Q_E = (I_i - I_w) A_i - a_{gi} A_{Fi} \quad (2)$$

where  $I_i$  – the actual intensity of  $CO_2$  emissions in the  $i$  country, tons /  $km^2$ ;

$I_w$  – the intensity of  $CO_2$  emissions worldwide, adopted as a criterion for ecological security, tons /  $km^2$ ;

$A_i$  – Surface area of the  $i$  country,  $km^2$ ;

$a_{gi}$  – adsorption characteristics of the country (number of  $CO_2$ , assimilable to its territory in the process of photosynthesis, forests and other greenery during the year, tons /  $km^2$ );

$A_{Fi}$  – area of of tree plantings in the  $i$  country  $km^2$ .

The magnitude  $A_{Fi}$  (excluding the area of agricultural crops) will be determined as:

$$A_{Fi} = K_{Fi} A_{Li} \quad (3)$$

where  $K_{Fi}$  – coefficient of forest area (proportion of land area occupied by forests and shrubs);

$A_{Li}$  – country's surface area (area of the country without the area of lakes and other inland waters),  $km^2$ .

Calculated by formula (2) negative values indicate the relative  $Q_E$  environmental well-being of the country, positive values indicate the need to pay other countries for the neutralization of the excess emissions on their territory.

The total cost of  $S$  quotas on trade in emission rights  $Q_E$  (or the amount of payments surplus of pollution  $Q_E$ ) can be calculated by the formula:

$$S = Q_C \cdot Q_E \cdot P_1, \quad (4)$$

where  $Q_C = 12/44$  – Conversion rate of  $CO_2$  emissions in the solid carbon;

$P_1$  – Cost reduction unit of carbon emissions.

Table 2 shows the results of calculations of excess emissions of  $CO_2$  in the twelve countries of the Black Sea Economic Cooperation (BSEC). As an en-

vironmentally sound baseline adopted the world average emission intensity in 1980,  $I_W = 102$  tons / km<sup>2</sup>, the adsorption capacity of coniferous and mixed forests is taken to be  $a_g = 1500$  tons CO<sub>2</sub>/ km<sup>2</sup>; absorption of CO<sub>2</sub> by agricultural plants was ignored. As seen from Table 2, in general of the BSEC countries not only to fully absorb its own emissions, but the cleaners are «foreign» emissions that fall into their territory due to the circulation of the atmosphere of the planet. In this case Russia at its giant forest-covered area absorbs almost 50 % of all global CO<sub>2</sub> emissions. It should be noted that among the BSEC countries leading the restoration of green areas with an annual rate of 0,9 % is Greece, which will allow it in the near future to bring the forest cover rate to 0.4 and to neutralize carbon dioxide emissions on its territory.

Table 2.

**Excess anthropogenic carbon dioxide (CO<sub>2</sub>) emissions  
in BSEC countries in 2007**

Country, region	CO <sub>2</sub> emissions, $E_i$ , metric tons (millions)	Surface area $A_S$ , 1000 sq.km	Land area, $L_A$ , 1000 sq.km	Forest area, % of land area	Emissions intensity $I_i = E_i/A_S$ , tons per sq.km	Excess* CO <sub>2</sub> emissions $Q_{E_i}$ , metric tons (millions)
Albania	4.0	28.8	27.4	29.0	139.0	-10.9
Armenia	4.2	29.8	28.2	10.0	140.9	-3.1
Azerbaijan	37.9	86.6	82.7	11.3	437.6	15.0
Bulgaria	43.3	111.0	108.6	33.4	390.1	22.4
Georgia	4.9	69.7	69.5	39.7	70.3	-39.2
Greece	96.3	132.0	129.0	29.1	729.5	26.5
Moldova	8.0	33.8	32.9	10.0	236.7	0.4
Romania	94.1	238.4	230.0	27.7	394.7	-25.9
Russian Federation	1,498.4	17,098.2	16,381.0	49.4	87.6	-12,384.5
Serbia	34.1	88.4	88.4	38.3	385.7	-25.7
Turkey	285.3	783.6	770.0	13.2	364.1	52.9
Ukraine	349.4	604.0	579.0	16.5	578.5	144.5
<b>BSEC-12</b>	<b>2,459.9</b>	<b>19,304.3</b>	<b>18,526.7</b>	<b>8,511.8</b>	<b>127.4</b>	<b>-12,227.6</b>

Note. A negative value indicates that a country adsorbed CO<sub>2</sub> emissions from foreign countries.

Sources: [1, p. 362]; [3]; [4, pp. 332–334, 352–353]; [5]; [7].

Exit to the world market trade in emission rights of anthropogenic greenhouse gases can provide environmentally «safe» countries of BSEC receipt of hundreds of millions of dollars «green investment». This should immediately expedite the development and practical implementation of the institutional framework and mechanisms for implementation of national quotas (the creation of emissions inventories, the legislative regulation of the distribution of foreign exchange funds between sectors and enterprises, etc.).

Implementation of international programs to restore the planet's ecosystems is the production of public goods – a clean and safe environment. As is known, for public goods not subject to exceptions, so any country will benefit from the implementation of programs to reduce greenhouse gas emissions, regardless of whether it has made financial or material contribution to these programs, or declined to participate in them. Therefore, the involvement of all countries to participate in programs of climate change should be based on substantially the adjusted institutional and economic principles of the UN Convention and the Kyoto Protocol. They should supplement the provisions of the possible imposition of trade and other sanctions against countries where the increase in atmospheric pollution is a threat to the world community.

Furthermore, not lost its relevance put forward at the summit of the «Rio + 5» Germany, Brazil, South Africa and Singapore and initiatives to change the UN Charter in a way that sustainable development and protecting the environment were recognized as two new objectives for the UN, as well as to create Supreme Organization United Nations Environment Programme, whose decisions shall be binding on all subjects of international law.

Only official documents such level as the UN Charter, can bind all countries to pursue economic activities in accordance with environmental standards.

It is also appropriate adjustment of baseline emissions of CO<sub>2</sub>, which is calculated potential of quotas on trade in emission rights. Indicators 1990, recorded for the Parties to the Kyoto Protocol as a baseline to underestimate the required amount of emission reductions. Even after reaching the prescribed reductions in emissions will be achieved by 12–15 % higher than the level in 1980. Just after 1980 have been recorded 15 years with a maximum average temperature, and the twentieth century was the warmest in the past six centuries. In 2001, the first time at the North Pole was discovered ice water, and in 2007–2010 in the northern hemisphere's warmest winter recorded in the history of weather observations.

Therefore, as a basic criterion for calculating the allowable levels of air pollution and potential of quotas on emissions trading to be adopted by the world average intensity of carbon dioxide emissions in 1980,  $I_{EW} = 102 \text{ tons} / \text{Km}^2$ .

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