GOALS TO REDUCE GREENHOUSE GAS EMISSIONS. ACHIEVEMENT OF CARBON NEUTRALITY IN RUSSIA AND IN THE WORLD

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Abstract

The fight against climate change is one of the key tasks both at the international level and in a single country. All regions of the world today are assessing the negative consequences of global warming, developing regulatory mechanisms in order to reduce the negative impact on the climate and adapt to it as much as possible, as well as transform economies to move towards a low-carbon development model. Goals are set and commitments are made to reduce greenhouse gas (GHG) emissions. More than 140 countries, accounting for 90% of global GHG emissions, have already reported targets for achieving carbon neutrality. Accordingly, business and entire sectors of the economy determine their opportunities in this direction, setting their own goals and identifying tools for reducing emissions and developing new technological solutions. Obviously, it is impossible to immediately switch to a new economic model and technologies with zero greenhouse gas emissions. For some industries, in principle, such solutions are complex, and alternatives to them appear extremely slowly. To achieve carbon neutrality goals, carbon dioxide capture, capture and storage projects play an important role. A climate project is a set of measures that reduce (prevent) greenhouse gas emissions or increase GHG1 absorption. The result of the implementation of climate projects are carbon units, expressed as the number of avoided or absorbed emissions in tons of CO2 equivalent. Special requirements are imposed on these projects and their justification, and their results are confirmed by external experts.

Keywords: greenhouse gas emissions, climate initiatives**,** climate change, environmental protection, technological solutions

I. Introduction

An increase in the concentration of greenhouse gases (hereinafter referred to as GHGs) in the atmosphere is one of the main challenges of the 21st century. The problem of climate change entails a number of negative, and often almost irreversible, consequences. The concern of country leaders with this issue led to the fact that in 1992 an international agreement was signed - the UN Framework Convention on Climate Change (hereinafter - the UNFCCC) [1]. To achieve the goals of the UNFCCC, the Third Conference of the Parties to the UNFCCC adopted the Kyoto Protocol, which is the first global agreement to reduce GHG emissions at the global level, which is based on the principle of common but differentiated responsibilities. The Kyoto Protocol was built on a top-down principle and included 3 market mechanisms: an emissions trading system, a joint implementation project and a clean development mechanism. As part of the top-down approach, a binding target for reducing total emissions has been defined, and based on this, emission targets have been set for developed countries and countries with economies in transition [2]. Despite

strong initial support from the international community, the Kyoto Protocol did not lead to significant global emission reductions because developing countries (such as the largest emitters China and India) made no quantifiable emission reduction commitments. This approach proved to be untenable, therefore, under the Paris Agreement, which actually replaced the Kyoto Protocol in 2015, the opposite "bottom-up" approach was used. Within the framework of this principle, it is assumed that each country independently sets national emission reduction targets based on its energy strategy, for the implementation of which it will be able to use the most convenient and effective methods of regulation, both market (different from the mechanisms of the Kyoto Protocol) and non-market ones.

The European Union is the world leader in green initiatives, despite the fact that the combined share of all countries is only 9.7% of global emissions. On December 1, 2019, the European Commission was headed by Ursula von der Leyen, for whom the further strengthening of climate policy is one of the priorities [4]. On December 11, 2019, the European Commission approved the proposed European Green Deal and submitted a corresponding communiqué with a roadmap (for consideration by the European Parliament, the Council of the EU, the European Council and a number of committees). Although the communiqué has no legal force, it characterizes the main directions of the EU green policy. The Green Deal is positioned as a new European strategy for sustainable growth and climate leadership: by 2050, Europe should become the first climate-neutral continent (with zero net greenhouse gas emissions). The deal affects a wide range of sectors of the EU economy, but above all energy, transport, agriculture and energy-intensive industries, which account for the bulk of European greenhouse gas emissions [1-2]. The European Commission estimates that current policies will only reduce EU GHG emissions by 60% by 2050, so countries plan to consider increasing the EU climate target for reducing GHG emissions by 2030 from 40% to at least 50% through measures such as extending the European GHG Emissions Trading Scheme to new sectors of the economy; increasing climate targets for sectors not covered by the system; adjusting the regulation of land use and forestry, as well as through the introduction of a carbon levy on imported goods. The introduction of such a levy would solve the problem of "carbon leakage" associated with international trade: companies from countries that have quantitative obligations to reduce emissions are motivated to move carbon-intensive production to developing countries where there are no such obligations (the so-called "pollution harbors"), and then import the products back. Approximately 25-30% of global emissions are imported and exported from country to country. The European Union is a net importer of carbon, the main exporters of CO2 to the EU are the countries of North America, Russia, China. Despite the fact that the implementation of the "pivot to the East" continues, Russia still remains one of the main partners of the European Union in energy trade. Further decarbonization of the EU economy increases the risks of shrinking the traditional Russian export market, and the introduction of a carbon tax on imports of goods, according to BCG estimates, could potentially cost the Russian oil and gas sector $1.4–2.5 billion annually, the ferrous metals and coal sector — 0.6–0.8 billion US dollars, non-ferrous metals — 0.3–0.4 billion US dollars, other sectors of the economy — 0.8–1.1 billion US dollars [4]. In addition, BCG analysts point out that, due to its higher carbon intensity, Russia may lose part of the EU oil market to Saudi Arabia due to lower profitability, and for producers of nitrogen fertilizers, the carbon fee may become extremely high, reaching 40-65% of the current export value of fertilizers2. However, it is not yet clear how the responsibility for collecting such taxes on exporters will be distributed and how the collected funds will be used.

II. Methods

The challenges posed by current global climate policy trends dictate the need for further level. A pollutant is any substance whose concentration or quantity in the environment exceeds natural background values. Pollutants introduce adverse changes in the physical, chemical or biological properties of the environment and have a negative impact on public health. Emissions of pollutants are accounted for by their state of aggregation (solid, gaseous and liquid), by individual substances (ingredients) and by type of emission sources (stationary and mobile) [5]. Regional data are aggregated by source of emissions: statistical accounting of pollutants from stationary sources has been carried out since 2000, and from mobile sources, taking into account railway transport, since 2012. According to Rosstat, most of the pollutants are in the gaseous and liquid state: in 2019, their share in Russia amounted to 94.5% of all air pollutants. More than a third was carbon monoxide (37.9%), sulfur dioxide - 18.1%, hydrocarbons (without volatile organic compounds) - 17.5%, and nitrogen oxides - 12.7% [6].

A significant driver of demand for carbon credits is corporate commitment to carbon neutrality, linked both to voluntary carbon neutrality targets and market expectations, including the investment community, and a premium for carbon neutral products. Climate projects must meet several basic principles: 1. The principle of Additionality implies the reduction or absorption of more emissions over a certain period of time than in the implementation of a scenario in which there is no project. Moreover, it must be proven that the project would not have been implemented without additional financial resources raised in the carbon market [7]. 2. The principle of persistence (Permanence) shows that the project must not only ensure the absorption of emissions, but also prevent the subsequent return of carbon to the atmosphere (for example, in forest projects it is necessary to prevent forest fires). 3. The principle of avoiding double counting (Double-counting) is that the amount of carbon units received as a result of the project should be sold only once and must 5 One year later: The path to carbon negative — a progress report on our climate 'moonshot' — The Official Microsoft Blog 6 carbon-market-survey-2021.pdf (refinitiv.com) 7 Taskforce on Scaling Voluntary Carbon Markets, January 25th, 2021. Summary pack (TSVCM_Summary.pdf (iif.com)) to be submitted only one register. In case projects are implemented in regulated industries, the volume of received and sold carbon credits is added to the volume of recorded emissions of organizations for which they are implemented [8]. 4. The principle of leakage prevention (Leakage) assumes that the implementation of the project should not lead to the fact that the emission source was transferred to another region. 5. These principles have been recognized as the basis for the standards and schemes of the carbon market for over 20 years. But, nevertheless, these standards and requirements for projects as a whole are not unified enough. With the similarity of the standards used, there is no consensus on the market about full confidence in them. Many leading companies, such as Microsoft5, are ready to additionally analyze climate projects on their own in order to minimize risks and sustainable removal of GHGs from the atmosphere. According to a study by Refinitiv6, certification of a project to a certain standard is only the second most important factor in selecting a climate project after determining the category of the project (e.g. removal of emissions is preferred over simple reduction, reforestation is preferred over reforestation projects REDD+) [9]. In addition, it is also important to increase the confidence of buyers of carbon credits through transparent pricing and to keep a balance between new and long-term projects. To consolidate the voluntary market for carbon units and increase its efficiency, the Taskforce on Scaling Voluntary Carbon Markets (TSVCM) initiative was created, within which it is planned to develop a single standard (Core Carbon Principles), increase market liquidity (including the creation of a secondary market), increase confidence in the use carbon credits to offset emissions, further drawing the attention of buyers to this mechanism. The concept of carbon market development is based on the notion that, regardless of their origin, greenhouse gases that accumulate in the atmosphere have a negative impact on the climate system

on a global scale. Accordingly, reducing their emissions, wherever it occurs, serves to mitigate climate change. In recent years, the market has been turning into a powerful economic mechanism for mobilizing global resources for the development and dissemination of the most promising low-carbon technologies and, in general, for transferring the world economy to an innovative, low-carbon development path [6].

III. Results

Voluntary (verified) schemes for offsetting emission reductions based on the implementation of investment projects in this area have already existed for about 30 years. The catalyst for their development was the entry into force of the Kyoto Protocol in 2005. In this market, companies can act as issuers of credits (carbon credits) or as buyers of credits to offset their carbon footprint. Voluntary carbon credit purchasers are generally commercial and non-profit organizations that are not subject to mandatory emission control schemes but who nonetheless make a voluntary commitment to reduce or eliminate their carbon footprint [7]. This can be done by offsetting your emissions, in whole or in part, by purchasing carbon credits verified against voluntary standards. In most cases, the acquirers do so in order to fulfill their corporate social responsibility strategy or to improve the company's image. However, in a number of cases, purchasers purchase voluntary emission reduction units in the hope of subsequently offsetting them against future mandatory GHG emission control and reduction requirements [8]. During its existence, the voluntary market has created its own carbon schemes, standards and registries, which are gradually gaining official recognition. The voluntary market, in contrast to the regulated market, is more flexible and allows the choice of the most suitable standard for a particular project from a variety of standards. In addition, its concept and mechanisms make it possible to reduce emissions in the most economically feasible way (that is, in a way independently chosen by the company and where it is currently cheaper and more profitable). In order to be compensated for voluntary emission reductions, the beneficiary must meet strict requirements, including quantification. The processes may differ depending on the standard, but it is most common to go through a similar series of steps [9].

At the global level, standards such as the Gold Standard, the Verified Carbon Standard (VCS), which account for about 85% of the total market, and the Clean Development Mechanism (Clean Development Mechanism (CDM), American Carbon Registry (ACR), Climate Action Reserve (CAR), Plan Vivo. While international mechanisms are very similar, they are often distinguished by the areas of projects that they take into account. For example, all standards accept carbon credits from forestry projects and waste management, but only the American Carbon Registry and Clean Development Mechanism are loyal to the potential of carbon capture, storage and utilization (CCS) projects. Speaking about the project implementation timeframe, all standards consider the project start date to be the day when the project began to generate GHG reductions or removals (with the exception of the Gold Standard, where the project start is considered to be the day when the project founder began to bear the costs of it) [10]. For AFOLU (agriculture, forestry and other land uses), the start date of projects is the day on which preparatory work (eg soil preparation) began. However, the period during which a project generates carbon credits varies depending on the standard: the duration of AFOLU projects can range from 20 to 100 years; for other types of projects, different standards set different time frames, which range from five years to 21 years. However, none of the standards addresses projects that are longer than 100 years, although such approaches are already being developed. All analyzed standards require that the implementation of projects does not lead to negative consequences for the social and environmental environment,

to violation of the current legislation [8].

In addition to requirements for reducing emissions, purchasers of voluntary carbon credits also make demands on the social and environmental significance of carbon projects, preferring, all other things being equal, those in which this focus is better expressed. In particular, such requirements can be traced in one of the most popular standards, the Gold Standard [9]. This probably explains to some extent the fact that in 2021 special attention is paid to projects aimed at preserving and preventing deforestation, which are not only natural carbon sinks and storages, but also the habitat of various fauna and flora, including rare and disappearing. In addition, such projects are characterized by long cycles, since it takes a long time from the planting of trees to the effect of the first serious emission reductions. However, this direction is gaining more and more supporters. If in 2020 the segment ranked second in terms of the number of issued and redeemed carbon units, then in eight months of 2021 it took the leading positions (45% and 47% of the total market volume, respectively). Thus, the number of units based on forest and land projects in circulation has already increased by almost 90% compared to the whole of 2020, and those purchased by 16% [4-5].

IV. Discussion

Solving the problem of climate change has become one of the key challenges of the 21st century for politicians around the world [5]. In recent decades, global climate change and its regional impact continues to negatively affect the stable economic development of any country. Thus, anomalous hydrometeorological processes contribute to an increase in the number of natural disasters, mudflows, floods, squalls, droughts, strong winds, heavy rains, forest fires, fluctuations in the level of water bodies and other phenomena. At present, the economy not only of individual states, but of the whole world as a whole is subject to significant damage under the influence of climate change. A real danger to humanity is being created, which requires active decisions and actions from the world community, scientists and politicians. The report of the Intergovernmental Panel on Climate Change on the consequences of global warming of 1.5°C, published in 2018, indicated that even a 1.5°C increase in temperature will lead to irreversible changes for the environment [9]. To limit global warming, human-caused carbon dioxide (CO2) emissions need to be reduced by 45-60% by 2030 compared to 2010, scientists say. And by 2050, we need to reach zero balance, when all anthropogenic CO2 emissions will be absorbed by ecosystems. In the Eastern Europe, Caucasus and Central Asia (EECCA) region, countries are already feeling negative impacts from climate change. On the territory of all EECCA countries, an increase in the average annual temperature is recorded. The Central Asian region is considered one of the most vulnerable regions in the world. Also, in the EECCA countries, changes in the duration of the seasons, the amount and distribution of precipitation, drought, flooding, and a decrease in the provision of water resources are already being recorded. As global temperatures rise, the negative impact will only increase. All countries in the EECCA region have ratified the Paris Agreement, which set the goal of not allowing global temperatures to rise by more than 2°C and to make significant efforts not to exceed global temperature rises of more than +1.5°C. Achieving these goals will depend on a wide range of different policy instruments that can be used at the national level to mitigate climate change.

The World Business Council for Sustainable Development (WBCSD) is a global coalition of 170 companies from 35 countries and 20 industries [10]. It cooperates with a network of 50 national and regional business councils and partner organizations, including about 1000

companies. The Council's largest members include BP, Shell International, Volkswagen, Gaz de France, Philips, Stat Oil, ABB, Alcan, Alcoa, Chevron Texaco and many other world business leaders. Russia's business council includes Gazprom, Basic Element and AFK Sistema (www.wbcsd.org). In connection with the problem of global climate change, WBCSD, together with the World Resources Institute (WRI), has launched an initiative to develop and promote internationally GHG accounting and reporting standards for companies, corporations and industry associations. Most of the largest companies, non-government and many official organizations have joined this initiative. A wide range of specialists (about 700 experts from the largest companies around the world) from most industries, industry associations and leading industry and environmental institutions, as well as government agencies were involved in the work on the standard. In addition to the protocol, guidelines and software tools have been created for calculating GHG emissions and their absorption by terrestrial ecosystems. In the near future, a standard for accounting and reporting on GHG emissions and removals for emissions management projects should appear. These developments should help companies and other industry organizations and associations: to conduct an inventory of emissions that meets the requirements of the IPCC for the quality of accounting and reporting; ensure comparability of assessments and reporting of different companies; comparability of GHG reporting formats with other types of corporate reporting, including financial reporting; create an information base for effective emission management and development of a reduction strategy [8]. In general, the protocol will help to minimize companies' costs for inventory, facilitate the fulfillment of climate obligations to states, and increase commercial attractiveness in the eyes of external partners and investors. The peculiarities of the inventory of companies/concerns and industry associations are determined by the fact that, unlike a country or region that has certain territorial boundaries and a diversified structure of sources of GHG emissions and sinks, companies' enterprises are often scattered geographically. However, they have a more homogeneous structure of sources, typical for the respective industry [9]. The modern business is distinguished by a complex system of production location. The energy supply, the production of components, packaging, etc. closely link companies all over the world. The protocol recommends following the concept of boundaries, similar to those used in financial reporting. The latter are based on the concepts of control/management and influence. Control/governance is defined as the ability of a company to direct the operational policies of an enterprise/division, usually when the company owns a controlling stake (> 50%) of the shares of the enterprise/division.

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