The Use and Utilization of CO₂, as Part of the Fight with Greenhouse Effect

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Abstract. the Modern world is characterized by unsolved environmental problems that arise due to progress. So, become necessary today, objects become harmful to the environment. It is worth noting that there are methods to reduce the harm to the environment. Methods for reducing the amount of carbon dioxide will be considered in this article.

1. Introduction
Currently, one of the global environmental problems is the greenhouse effect. It consists in increasing the temperature of the earth's surface due to the fact that gases in the atmosphere do not give the heat received from the sun, will return back to space, thereby delaying the heat on the earth's surface and heating it. This leads to an increase in the surface temperature of the Earth, so that the glaciers begin to melt, raising the sea level. One such atmospheric gas is carbon dioxide. The more of this gas in the atmosphere, the more heat can not leave the planet and the higher the greenhouse effect.

2. Materials and research methods
To study the problem of global warming and ways to combat them, we studied the methods and tools used by developed European countries such as Russia, Germany, the United States and others. Among these methods, the following methods were considered and studied:

1. Carbon dioxide capture systems.
2. Placing carbon dioxide in special storage chambers.
3. The use of carbon dioxide for the production of light fractions of oil and its further filling of empty rocks.
4. The use of carbon dioxide as a source of alternative fuel.
5. Preparation of calcium carbonate from carbon dioxide.

3. Researches and results
The first method is the most common, it is to use carbon dioxide capture systems. The data capture system is extracted from the air carbon dioxide and detain him till the replacement state of the material. Then the material with the accumulated carbon dioxide is disposed of. It is worth noting that these carbon dioxide capture systems are installed in thermal power plants that use coal as a product for processing, a by-product of which is carbon dioxide. This system combats carbon dioxide by using carbon capture techniques, but not by recycling.
The second method is designed to retain carbon dioxide. It consists in placing the captured carbon dioxide in impenetrable storage for a long period for its further processing and disposal. This method reduces the amount of carbon dioxide in the atmosphere by keeping it in storage. But there is a problem associated with the placement of data storage, to change the amount of carbon dioxide in the atmosphere is necessary to build a huge storage capacity that in countries with a population density of 146 people per square kilometer becomes impossible, but this problem is solved by the construction of underground storage. This method combats carbon dioxide by its long-term storage without the possibility of seepage to the surface and into the atmosphere.

The third method is the use of carbon dioxide for the development of underground oil fields and its disposal. The essence of this method is as follows: oil is in porous rocks, which in their structure resemble a sponge. Carbon dioxide under pressure is driven into the oil field, thereby liquefying it and simplifying the process of its production. When oil is extracted, it is filtered and the capture systems purify it from carbon dioxide, thus allowing it to be used repeatedly. After the process of oil production is completed, it is proposed to fill the entire volume of porous rocks with their further burial. Carbon dioxide buried in this way will practically not come to the surface because of the structure of porous rocks that will retain their volume. This method is the best as the use, storage and disposal of carbon dioxide.

The fourth method is one of the most profitable and effective, since carbon dioxide is not just stored, but used as a fuel. Due to the conversion of carbon dioxide captured during combustion of coal and from the atmosphere into fuel, its content in the air will be significantly reduced. There are several ways and ideas how to "turn" carbon dioxide into fuel. One is the conversion of carbon dioxide into methanol, which can serve as an alternative to gasoline. Since carbon dioxide is relatively chemically inert, it is difficult to 'turn' it into something else, so tungsten diselenide is used as a catalyst in the form of nanoscale scales, which maximizes the surface area and increases its chemical activity. So we get carbon monoxide, which is also a greenhouse gas, but more reactive and able to convert into methanol. Also on the basis of methanol, there is a technology for creating coal-based suspension, which is an alternative to fuel oil, which is used for heating buildings. This suspension does not require special boilers and more energy-intensive unlike fuel oil.

The fifth method allows the use of carbon dioxide and calcium for the production of calcium carbonate, which is used in light and food industries. This method is carried out by means of carbonization as a result of a chemical reaction between two substances: carbon dioxide and calcium to form a harmless calcium carbonate, used later in industry. This is the best way to recycle carbon dioxide, but there is a problem with limited resources. To understand this problem, it is necessary to give the following example: one thermal power plant, providing a population of 1,000,000 people, with a capacity of 1,000 mW burns about 13,000 tons of coal per day, respectively, for the reaction it is necessary to spend 13,000 tons of calcium per day. To get such quantity of calcium and to bring it to GRES is a huge problem as nearby it will be necessary to construct plant for transformation of carbon dioxide and calcium in calcium carbonate and warehouses for calcium carbonate and calcium.

4. Conclusion
In conclusion, it should be noted 2 ways to combat carbon dioxide is the third and fourth ways. The third method is the best way to store, use and recycle carbon dioxide, due to the fact that the porous rocks do not have to fill in other substances to maintain its shape. The fourth method is the best way to recycle and use carbon dioxide, as this type of fuel is self-contained, as a source of energy spent on its production, can be used inexhaustible sources of energy, for example: solar energy. At this point in the development of science and technology, the use of these methods can reduce the amount of carbon dioxide in the atmosphere.

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