Features of the implementation of environmental policies by Russian fuel and energy enterprises

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Abstract. The study discovers the problem of combating greenhouse gas emissions, which is most relevant for companies in the fuel and energy complex. The country and industry structure of carbon dioxide emissions was analyzed based on available statistical data. Scenario forecasts of changes in the level of emissions developed by the international energy agency are presented here, possible fiscal measures aimed at preventing further development of the "greenhouse effect" are also considered. It was noted that Russian fuel and energy companies need to switch to regular accounting and reporting of actual greenhouse gas emissions, which can ensure that they maintain their achieved level of competitiveness in the world energy markets.

1. Introduction
Environmental pollution has now ceased to be a purely environmental problem. Resisting climate change under the influence of anthropogenic activities is now part of the business management process, which fully applies to the fuel and energy enterprises (hereinafter, the fuel and energy complex). Escalation of environmental liability is caused not only by the good faith of management of the respective companies, but also the legislation’s development in this field. More and more countries are developing and imbedding law’s drafts that limit the permissible level of environmental pollution, as well as the maximum allowable amounts of greenhouse gas (GHG) emissions, in particular, carbon dioxide CO

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2. Materials and methods
According to the Glossary of the Intergovernmental Panel of Climate Change (IPCC), greenhouse gases (GHGs) are gaseous components of atmospheric air of both natural and anthropogenic origin which absorb and emit infrared radiation (heat The Earth's surface). The main GHGs in the Earth's atmosphere are water vapor (H₂O), carbon dioxide (CO₂), nitrous oxide (N₂O), methane (CH₄) and ozone (O₃) [2]. The largest share of GHG emissions is carbon dioxide, CO₂, and is about 66% [2; 4-6].

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according to preliminary estimates of IEA analysts, in 2019, the volume of CO₂ emissions remained at the level of 2018 (33 GT) [3].

At the country level, GHG emissions were distributed as follows:

- China and the United States were responsible for more than 40% of global CO₂ emissions. At the same time, China is the leader in terms of CO₂ emissions in absolute terms (in 2018 - 11.3 Gt). U.S. emissions in 2018 were 5.3 Gt;
- The third position is held by India - 2.6 Gt (2018);
- Russia is in 4th place in terms of GHG emissions (2018) [2; 10].

However, when analyzing per capita emissions, the leader among the countries under consideration is Saudi Arabia, followed by Australia, the United States and Canada. When calculating CO₂ emissions per capita, Russia ranks 6-th among the countries under consideration.

The results of industry analysis show that the energy sector is the main source of GHG emissions into the atmosphere (37% of total emissions), ahead of transport and manufacturing in the aggregate of its constituent industries [2; 10].

At the local level, the problem of energy companies emissions is particularly relevant in the regions where coal resources are used. A possible solution to reduce the negative impact on nature can be more active use of wind and solar energy, namely, the creation of individual devices consisting of wind and solar stations in order to provide electricity to individual consumers.

3. Results

The international energy agency (IEA) is conservative in its forecasts: the reduction of CO₂ emissions in the energy sector by 2040 is possible exclusively within the framework of the implementation of the sustainable development scenario which assumes the implementation of the goals of the Paris agreement, which determined that CO₂ emissions in the energy sector by 2040 should be reduced by more than half compared to the level of 2018. If the current environmental protection policy is maintained, it is assumed that CO₂ emissions in the energy sector will increase by an average of 100 million CO₂ in the period from 2018 to 2040, which is less than the average growth rate observed since 2010 (350 million tons of CO₂), but this is not enough to achieve the goals of the Paris agreement and the overall level of CO₂ emissions will increase from 33 GT in 2018 to 36 GT in 2040 [2; 7; 10].

As for Russia, CO₂ emissions (excluding changes in land use) in Russia by 2010 decreased by 34.8% compared to 1990, but since 2010 there has been a rising of the quantity of greenhouse gas entering the atmosphere (the average annual rate is 0.29%).

It should be emphasized that the share of CO₂ emissions from the Russian energy sector is higher than the global average, at 46% versus 37%. In 2019, Russia adopted the Paris agreement and set some targets that set the direction for improving the state of the environment. In particular, by 2030, Russia plans to reduce greenhouse gas emissions by 25-30% relative to the 1990 baseline. However, the specific target for emissions by 2030 (18.5 t of CO₂/person) is several times higher than the value needed to keep the temperature increase within 2°C (4.7 t of CO₂/person in 2030) [2;7-8; 10].

In Russia, there is no mandatory reporting of GHG emissions, so trends within specific energy companies can be judged by one-time publications that are not of a regular nature. Compliance with the terms of the Paris agreement, as well as compliance with tougher environmental legislation will require Russian energy companies a more responsible attitude to the organization of the industrial ecological supervision.

4. Discussion

In the conditions of the global decarbonization policy’s realization, the energy sector is at the greatest risk of losing its previously achieved level of competitiveness, which needs to introduce more modern
technologies, reduce the consumption of fossil fuels, and take an active part in the realization of the state environmental program.

At the moment, the main method of government incentives to reduce GHG emissions, which is common in the world, is carbon pricing, which distinguishes the following two mechanisms: emissions trading and carbon tax. When using emission quotas, a fixed level of target emissions is set, this may gradually decrease over time. Companies receive quotas for GHG emissions through auctions or free of charge with the possibility of further resale. If a carbon tax is applied, companies contribute a set amount to the budget for each ton of CO$_2$ released into the atmosphere. Thus, the "carbon price" is set directly through the tax rate and the amount of carbon dioxide produced by burning fossil fuels. In 2019, by the world Bank’s ratings that the number of carbon pricing initiatives introduced worldwide is approaching 60 positions [8-9].

In addition to carbon pricing mechanisms, it is possible to reduce emissions through legal prohibitions and restrictions. The most significant initiative limiting global GHG emissions was the Paris agreement, which regulates the goals for reducing the content of carbon dioxide in the atmosphere. In the end of 2019, the agreement was ratified in 189 countries. UN analysts predict that in order to achieve the goals of the Paris agreement, it is necessary - reduce GHG by 25% for 2019-2050 (from 55.3 to 41 GT of CO$_2$ equivalent) to keep the average annual temperature increase within 2°C. Keeping the temperature increase at 1.5°C will require reducing GHG emissions by more than half [2; 10-11].

In Russia now, there is no fee for greenhouse gas emissions, and disclosure of data and accounting for emissions is Advisory in nature. The main reason for this situation is that, on the one hand, the introduction of a fee in the form of an emissions tax would help to achieve the goals set under the Paris agreement, which Russia signed in 2019, and on the other hand, such a fee would increase the fiscal burden not only on energy companies, but also on the final consumers of fossil fuels. The refusal to introduce an additional tax will preserve the financial stability of these companies and end-consumers, but will entail external risks associated with the aggravation of foreign economic relations and a decrease in trade volumes, in particular, with the EU countries.

Modern technologies for reducing emissions are divided into two complementary groups:

- Conservation of gross greenhouse gas emissions (switching from coal to gas and renewable energy sources, electrification of transport). In Russia, such technologies as rational use of APG, APG injection into the oil and gas reservoir, energy efficiency improvement, and CO$_2$ storage in the oil and gas reservoir are used. In the coal industry, cogeneration, installation of filters at thermal power plants, and utilization of coal mine methane have become widespread. Less popular is the use of renewable energy sources (about 1% in the Russian energy sector);
- Sequestration technologies: use of natural sinks (reforestation) and carbon capture and storage technologies to reduce the carbon content in the atmosphere (CCS, "carbon traps").

Thus, in order to reduce the negative impact of energy facilities on the environment, it is advisable to use renewable energy sources, the scheme of which is presented in the figure 1.

5. Conclusion

Thus, these data confirm the initial thesis that the problems of air pollution have gone beyond purely environmental problems and can have a significant impact on the activities of a single fuel and energy company, as well as on the economies of individual countries and the world as a whole.

Currently, the market for professional investments in the development of environmentally friendly technologies and the implementation of socially responsible policies in Europe is $14 trillion, in the United States - $12 trillion, and the return on shares of companies that meet the criteria for sustainable development often exceeds the return on their less socially responsible counterparts [10-11].
In this regard, Russian fuel and energy companies will have to adapt to changing conditions in order not to lose their positions in the global energy markets, which implies regular accounting of emissions, diversification of strategies and business plans in accordance with the need to switch to "green" technologies for the extraction, processing and consumption of fossil fuels.

References
[1] Gibadullin A A et al 2020 IOP Conf. Ser.: Earth Environ. Sci. 421 032051
[2] Russian statistical yearbook 2018 (Moscow: Rosstat) 694
[3] Lopatkin D S et al 2019 J. Phys.: Conf. Ser. 1399 033061
[4] Sadriddinov M I et al 2020 IOP Conf. Ser.: Mater. Sci. Eng. 734 012051
[5] Ivanova I A et al 2020 IOP Conf. Ser.: Earth Environ. Sci. 421 032039
[6] Energy Strategy of Russia until 2035 Retrieved from: https://minenergo.gov.ru/node/1920
[7] Romanova Ir N et al 2020 IOP Conf. Ser.: Mater. Sci. Eng. 734 012166
[8] Gibadullin A and Pulyaeva V 2019 Obstacles to the formation of a common electricity market of the Eurasian Economic Union E3S Web of Conferences 114 02002
[9] Ivanova I A et al 2019 J. Phys.: Conf. Ser. 1399 033038
[10] Ministry of Energy of the Russian Federation Retrieved from: https://minenergo.gov.ru
[11] Gibadullin A A et al 2020 IOP Conf. Ser.: Mater. Sci. Eng. 734 012170