

Implementation of the Climate Agreement in the Russian Oil and Gas Sector



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Abstract The strategic goal of the Russian environmental policy is to meet the challenges of ensuring environmentally-oriented growth of the economy, the preservation of natural resources, and the strengthening of the rule of law in the field of environmental protection. Important areas of environmental safety include the implementation of the Climate Doctrine of the Russian Federation—a comprehensive plan approved by 2020, for industry, including the oil and gas sector. The oil and gas sector is not the main supplier of greenhouse gasses, but it plays an important role in the extraction and use of carbon fuels. The study of statistical data on the results of monitoring greenhouse gas emissions by industrial facilities and the identification of the most promising technological solutions for reducing greenhouse gas emissions in the oil and gas industry was the aim of our study.

Keywords The Paris agreement · Climate doctrine · Greenhouse gases · Oil and gas industry · Atmosphere pollution · Decrease of release · Ecologically focused technologies

1 Introduction

The strategic goal in the field of Russian national environmental policy is to meet the challenges of ensuring an environmentally-oriented economic growth, the preservation of natural resources, and the strengthening of the environmental protection legislation. One of the important directions of ensuring environmental safety is the implementation of a comprehensive plan for Climate Doctrine of the Russian Federation approved for the period up to 2020, including the oil and gas sector.

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M. Ksibi et al. (eds.), *Recent Advances in Environmental Science
from the Euro-Mediterranean and Surrounding Regions (2nd Edition)*, Environmental
Science and Engineering, https://doi.org/10.1007/978-3-030-51210-1_166

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2 Methods of Research

To assess the fulfillment of the provisions of the Climate Doctrine by the oil and gas industry, we used the existing system for estimating anthropogenic emissions of greenhouse gases, the operation of which was provided by Roshydromet. The data were the aggregated estimates of greenhouse gas emissions by gas type and source category.

3 Results

The main target of the Climate Doctrine implementation plan is focused on the operational measures, mitigating the anthropogenic impact on climate and including two important sections: the development of intersectoral strategies for limiting greenhouse gas emissions and limiting greenhouse gas emissions in the industry and energy sector. At the same time, Russia must comply with the main provisions of the Paris Agreement, such as more active greenhouse gas emissions reduction, the introduction of low-carbon technologies, adaptation to climate change, etc. To date, it has not yet been possible to agree on uniform rules for the implementation of the Paris Agreement due to the substantial economic and social differences between the participating countries. As part of the implementation of the Kyoto Protocol, about 100 projects have been executed in Russia, but the issue of national plans to reduce greenhouse gases remains important.

The largest contribution to greenhouse gas emissions in the Russian Federation is made by the extraction, transportation, processing, and use of various types of fossil fuels (except for use as raw materials). The main emissions in this sector are associated with the combustion of fossil fuels produced in Russia (oil, natural and associated petroleum gas (APG), coal, and to a much lesser extent, peat and oil shale), as well as products of its processing (Fig. 1).

Until recently, Russia retained its leading position in terms of APG flaring [2], but with the adoption of a government resolution on an increase factor to the rates for APG emissions by 2015, its share was reduced to 12%. Taking into account plans for further development of production, the government sets the task of reducing emissions by 2020, by 1.2% to the achieved level [3].

Russian oil and gas enterprises pursue a policy aimed at assessing and controlling greenhouse gas emissions. Meanwhile, the total share of emissions in the industry is about 30% (Fig. 2).

In general, during the period under review, there is a stabilization of greenhouse gas emissions. The insignificant growth (since 2014) of greenhouse gas emissions by oil and gas companies is mainly associated with an increase in production and processing volumes in all segments of their operations. At the same time, it should be noted, the decrease in the volume of associated gas flaring in the industry average reached up to 5%.

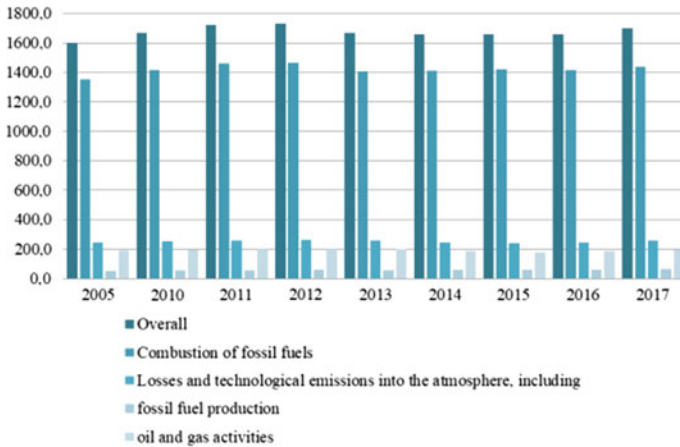
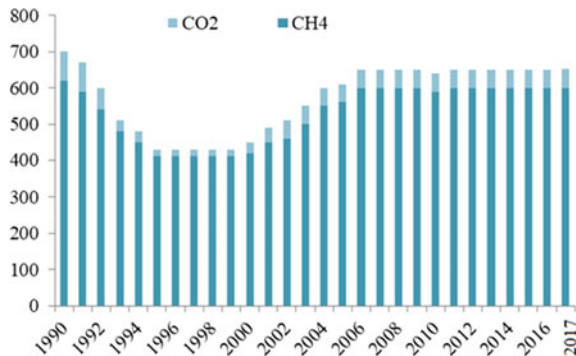


Fig. 1 Greenhouse gas emissions associated with the energy sector (million tons of CO₂-equivalent per year) [1]

Fig. 2 Share of greenhouse gas emissions associated with oil and gas activities (million tons of CO₂-equivalent per year) [4]



In order to reduce the impact on the atmospheric air and to fulfill the Climate Doctrine provisions, the oil and gas enterprises have implemented a number of measures, presented in Table 1.

4 Discussion

The main drivers of change in emissions in the Russian Federation are:

- general trends of economic development (an integral indicator of which is the change in GDP), change in the structure of GDP;
- changes in energy efficiency, as well as the overall efficiency of the Russian economy, changes in the structure of the fuel balance.

Table 1 Measures to reduce air pollution, implemented by the oil and gas industry in 2017

Company	Examples of measures
ROSNEFT	Modernization of gas distribution stations, degassers, and ejection units
TATNEFT	Reconstruction of flare installations and gas pipelines
LUKOIL	Reconstruction of APG utilization facilities, reduction of the share of fuel oil in the structure of combustible fuel, commissioning of an installation for the purification of gas from hydrogen sulfide, production of products with improved environmental properties
TRANSNEFT	The power plants modernization
GAZPROM	Start-up of gas treatment facilities, gas and vacuum compressor stations, increasing of APG delivery volumes
SURGUTNEFTEGAS	Formation of APG utilization infrastructure
NOVATEK	Start-up of APG utilization facilities

The general trend and interannual fluctuations of air temperature in Russia, which have an impact on emissions, through changes in energy consumption, contribute to the emissions' dynamic alterations.

5 Conclusions

The evaluation of the technical potential for reducing CO₂, CH₄, and N₂O emissions is possible based on an assessment of the energy saving potential for the four components of the effect:

- improving technologies;
- saving electric and thermal energy on end-use energy consumers' stage;
- replacing fuels in the electricity and heat power industries;
- reducing technological leaks and emissions due to lower fuel production.

The consequences of climate change are not the same for different regions of Russia, therefore, when implementing the provisions of Climate Doctrine in the oil and gas sector, a complex of natural, geographical, ecological, technological, and socioeconomic aspects should be taken into account. Thus, the main achievements to be noted are:

- the introduction of cogeneration technologies at gas turbine stations, leading to the reduction of combustion products emission, including and without limitation to greenhouse gases.
- the introduction of enclosed flare systems that provide smokeless combustion of the most difficult-to-burn gaseous and liquid wastes. The removal efficiency of the combustion products of gaseous and liquid wastes exceeds 99.9%.

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