

# Study of the State of Carbon Regulation and Perspectives for Russia

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**Abstract.** This article aims to investigate the current state of the problem of carbon regulation in the world and to discuss the general concept of carbon regulation in Russia. The main mechanisms and approaches to regulating greenhouse gas emissions in the international aspect are considered. It is concluded that under conditions of transboundary carbon regulation it is important to move to preactive actions in the framework of climate policy and to focus on support of domestic economy competitiveness. Studies of the conceptual foundations of the application of economic instruments in the fight against carbon emissions are carried out by a significant number of domestic and foreign scientists. Standard methods of taxation and collection underlie carbon taxation policy as a useful tool for resource management and environmental protection. A carbon tax is one of the economic tools for regulating greenhouse gas emissions. An emissions tax puts a price on a unit of emissions thereby creating incentives for emitting companies to reduce them. It is currently used in over 40 countries around the world in one form or another.

## 1 Introduction

At the stage of making a decision to introduce a carbon tax in the national system of regulation and control of greenhouse gas emissions, there is a need to assess the cost of adaptation to climate change. Socio-economic efficiency should be taken into account, i.e. to assess the value of benefits and benefits, primarily from the reduction of expected damage from climate change in comparison with the present costs. A key issue in the development of the national concept of a carbon tax is that it is necessary to harmonize it with other fiscal instruments that are provided to combat greenhouse gas emissions. In addition, it is important to investigate the benefits of alternative instruments for regulating carbon dioxide emissions. In the long run, the potential of reducing emissions through a carbon tax is slightly greater than through a greenhouse gas emissions trading mechanism.

The implementation of a carbon tax must be accompanied by a decision about the direction of use of the significant revenues that can be generated by its application. The decision on how to use the revenue is seen as a fiscal problem. It should be noted here that a carbon tax can be motivated by the double dividend hypothesis, as the revenues from the carbon tax can be used to reduce the distorting effects of the carbon regulatory mechanism, that is, the possible increase in public welfare while reducing environmental damage. The

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following directions of spending the funds generated by the carbon tax are possible: Compensating the carbon tax burden on consumers, producers, and the economy as a whole; stimulating further efforts to reduce greenhouse gas emissions; repairing damage to the environment; and funding various government priority socioeconomic programs. Individual studies have shown that the double dividend is more pronounced when emissions tax revenues are offset to consumers through income tax reductions rather than through lump-sum transfers to households. Existing empirical research confirms that the neutral status of revenue (or directing revenue to fund research and development of renewable energy programs) from a carbon tax is key to public support for the use of this economic tool in carbon regulation.

It was found that the introduction of a carbon tax can affect the level of income of low-income populations because of the higher proportion of their income that is spent on the consumption of carbon-intensive goods. The study of the distributional effects of carbon taxation has been studied by some domestic and foreign scientists. An important aspect of the study of this problem is an analysis of the distributional effects of carbon tax reform when accounting for a living wage for carbon-intensive goods.

The nature and mechanism of the carbon tax, with little coordination among countries on climate regulation, makes it a source of “carbon leakage”. This problem within the framework of carbon regulation is the most debated in the academic literature.

## 2 Research Methodology

The methodological basis of the study are such methods of general scientific knowledge as classification, definition, axiomatic method, graphic, statistical, comparative-legal analysis, synthesis and analogy, generalization and justification, systematic method, extrapolation, methods of induction and deduction. The theoretical basis of the study consisted of studies and publications of domestic and foreign authors dealing with the problems of carbon regulation. Statistical information serving as a basis for some theses and conclusions in the study was obtained from the official sources of the Federal Statistics Service of Russia (Rosstat) and some independent research organizations. Climate regulation in one form or another is becoming an integral element of the transformational changes taking place in the economies of many. For Russia, the task of decarbonizing the economy is relevant for at least two reasons: first, because of the physical negative effects of global warming, and second, because of external pressure under the pretext of the need to reduce GHG emissions. An example of such pressure could be the transboundary carbon tax planned to be introduced by the EU.

In this regard, the most discussed tool in Russia for the implementation of the decarbonization plan has become a carbon tax. Scientific discussion is mainly related to the analysis of the advantages and disadvantages of the introduction of a carbon tax in Russia and the assessment of possible risks. One of the key disadvantages of the carbon tax for the Russian Federation is its regressive nature, i.e., for example, the rising cost of fossil fuels becomes an additional burden for the population with low incomes. This raises the problem of the gradual introduction of the carbon tax in Russia in the context of the EU steadfast transition to the FTT.

A significant number of scientific research is related to the study of the consequences of the introduction of transboundary carbon regulation mechanisms on the development of industry in Russia, which is generally recognized in the academic community. First of all, there is a risk of a decline in the geopolitical potential of the country. It is predicted that such areas as petrochemicals, metallurgy and fertilizer production will suffer the most. In addition, the lack of a flexible carbon regulation strategy may have an extremely negative impact on the availability of financial resources and investment attractiveness of Russian

industrial enterprises, which in the long run will have a negative impact on the economic sustainability of the RF and the future competitiveness of carbon-intensive sectors of the domestic economy.

It has been revealed that the introduction of a carbon tax in Russia will lead to a significant increase in the tax burden on business which substantiates more radical approaches to the application of economic instruments in the regulation of carbon emissions in Russia, expressed in complete negation of the feasibility of the introduction of the carbon tax. According to preliminary estimates, the additional tax burden on business after the introduction of the carbon tax could be up to 1936 billion rubles. In this regard, there is an increasing need for scientific justification of the introduction of the carbon tax in terms of the formation of the multiplier effect of increasing the expenditure of “carbon revenues” received by the budget.

However, in view of the benefits of carbon taxes, some researchers believe that the negative impact of these taxes on GDP is acceptable. This approach is based on the idea of fast-growing economies that do not give up on harmful emissions and pollution until a certain maximum is reached.

Russia’s lack of balanced national instruments to curb carbon expansion leads to the risk of carbon leakage from other countries actively developing the use of economic instruments in the fight against greenhouse gases. Various effects and behavioral aspects of economic entities under the conditions of introduction of economic instruments of decarbonization are studied by some foreign scientists. It is scientifically substantiated and confirmed by practice that there are several possible responses to the introduction of carbon regulation: first, through changes in the industrial structure of the; second, the relocation of production capacity in accordance with the emission standards, especially in carbon-intensive industries. Regional carbon taxes have been found to affect the ability of some businesses to compete with others that are not taxed. Thus, the possible effects of the introduction of ST should be considered in the development of national standards of carbon taxation, taking into account the principle of a single economic space of the country.

Some authors take a more neutral position in the discussion on the choice of the most appropriate instrument of carbon containment for Russian conditions. It is emphasized that the main component of the emissions regulation system is not the type of regulation, but the ultimate goal, given the fact that the Russian Federation is fundamentally different from all other countries that have so far implemented one or another model of carbon regulation.

A significant contribution to the development of methodology and conceptual framework for the introduction of carbon tax regulation in Russia is contained in “Mechanisms for Tax Regulation of CO<sub>2</sub>-Equivalent Emissions”. To date, this study is one of the few that contains the most pragmatic conclusions confirmed by statistical data and econometric calculations concerning the conceptual foundations of the Russian carbon taxation. Firstly, it is established that without the development of an effective system of regulation and monitoring of domestic consumer prices, the introduction of a carbon tax will be a significant blow to the welfare of citizens. Secondly, the specifics of greenhouse gas emissions, namely methane and other associated gases, must be taken into account when developing a taxation mechanism. Thirdly, the main issues to be resolved are the definition of the tax base and taxation rates. Based on the calculations made on the estimated amount of revenue from the introduction of ST, it is revealed that there are significant risks both for the companies themselves, and for consumers, as potential carriers of additional tax burden. Studies confirm that such risks primarily arise for enterprises and industries with low profit margins.

A significant contribution to the development of carbon pricing methodology was made by the World Bank, which published in 2021 general recommendations in the following areas: development and implementation of domestic carbon crediting mechanisms; ensuring

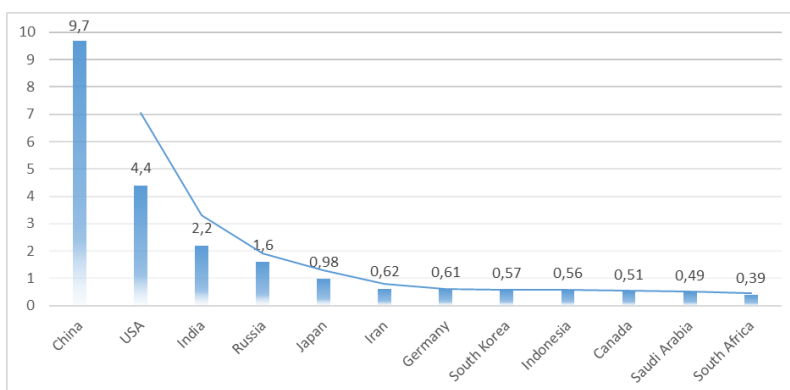
confidence in carbon pricing tools; assessment of environmental, economic and social impacts of carbon regulation.

Regardless of what conceptual approaches will form the basis of state regulation of carbon emissions, the decision to impose a carbon tax should be accompanied by careful macroeconomic calculations and a comparison of the effect of the tax with other measures leading to emission reductions.

### 3 Results and Discussions

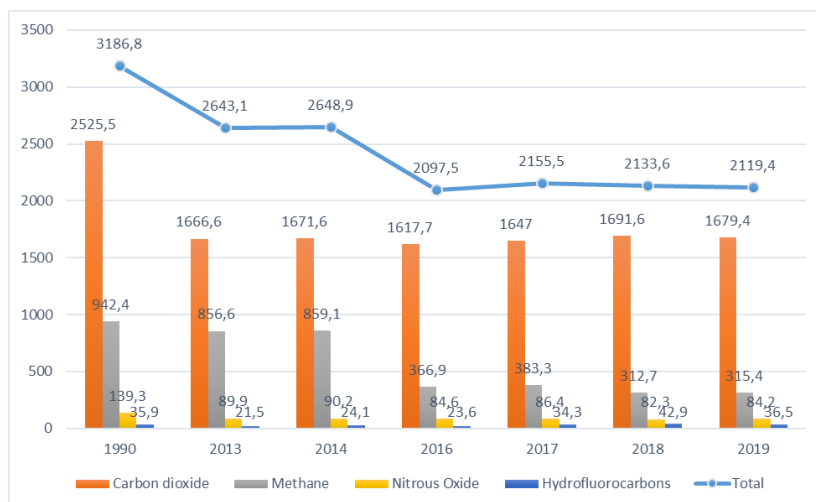
Internationally, carbon regulation has evolved over the past 30 years (since 1990). The July 2021 Regulation of the European Parliament and of the Council on the adoption of a mechanism for transboundary carbon regulation can be considered as a turning point in determining the priority areas of the strategy to achieve carbon neutrality and the establishment of conceptual approaches to the construction of a specific mechanism to combat carbon emissions. The adopted Regulation was developed in the framework of the so-called Green European course (2019). The key objective of the adopted Regulation is to stimulate trading partners (especially countries with commodity export-oriented economies) to reduce greenhouse gas emissions and carbon footprint in the so-called energy-intensive products.

Carbon taxation is a kind of payment for the burning of carbon-containing fuels. In addition, the carbon tax is an effective financial and credit instrument to curb the consumption of fossil fuels on the way to clean energy. The OECD Climate Strategy views a carbon tax as “an instrument for internalizing environmental costs, namely an excise tax on producers of crude fossil fuels based on the relative carbon content of those fuels”. Another definition of a carbon tax is “a type of Pigouvian tax paid by businesses or individuals because of participation in activities that cause adverse side effects to society.” Regardless of the substantive characteristics underlying the term “carbon tax,” one thing is clear - achieving carbon neutrality is a global problem. And it is all the more acute for the countries that are among the leaders in carbon emissions. The ranking of countries in terms of carbon emissions is shown in Figure 1. As can be seen, the Russian Federation is among the leading countries in terms of carbon dioxide emissions.



**Fig. 1.** Ranking of countries in terms of carbon dioxide emissions, billion tons (2020)

The dynamics and structure of total greenhouse gas emissions in the Russian Federation are presented in Fig. 2. It can be observed that no significant changes in the volume and structure of greenhouse gas emissions have been observed in Russia in recent years.



**Fig. 2.** Total greenhouse gas emissions (million tons of CO<sub>2</sub>-equivalent per year)

Key benchmarks for reducing the carbon intensity of domestic economic sectors are contained in the Strategy for socio-economic development of the Russian Federation with low greenhouse gas emissions until 2050. It should be noted that this strategy is aimed at the development of the agreements under the Paris Agreement on Climate. The targets for achieving carbon neutrality in the Russian Federation are presented below (Fig. 2).

The presence of risks to the sustainable development of the national economy after 2040 does not allow ignoring the climate agenda and justifies the need to develop an adequate domestic carbon tax model, taking into account international trends in climate regulation (Table 1).

**Table 1.** International trends in climate regulation

Methods and approaches	Content and objectives
<b>Carbon regulation mechanisms</b>	
Initiatives of private corporations based on the adoption of their own strategies to achieve carbon neutrality	Aimed at reducing greenhouse emissions, encouraging the transition to renewable energy, and improving energy efficiency
Ban on the sale of products with a high carbon footprint	Introduction of technical standards that limit the level of greenhouse gas emissions for transport (Denmark, Norway, China, etc.). Providing a competitive advantage in the market for goods with a low carbon footprint by labeling in accordance with national criteria for environmental and energy efficiency.
Own climate strategies of major cities	More than 70% of greenhouse gas emissions come from cities. Currently, the intention to achieve carbon neutrality has united more than 100 cities (Helsinki, Moscow, Rostov-on-Don, Stockholm, etc.).
Cross-border EU carbon regulation Greenhouse gas emissions trading in the EU	The introduction of a transboundary carbon tax aimed at preventing the “leakage” of carbon in the countries where the institutions of carbon regulation are underdeveloped or absent at all.  It is envisaged to expand the scope of the “green” quotas trading system with a phased abandonment of the provision of free quotas for greenhouse gas emissions
Development of sustainable	Aimed at aligning financial flows with the trajectory

financing mechanisms that focus on the principles of environmental responsibility.	toward low-carbon development.
<b>Development of green technologies</b>	
Clean technology development	Aimed at improving the energy efficiency of fuels and ensuring a reduction in greenhouse gas emissions. Technologies are based on the use of natural gas, hydrogen and methane-hydrogen mixture. Technologies based on steam-gas cycles and fusion are being developed.
Technologies for the disposal of production and consumption waste	Aimed at reducing the use of hydrocarbon raw materials in production and involving biodegradable raw materials in production cycles.

The study and development of conceptual mechanisms for the application of carbon taxation adapted to the socio-economic, natural and environmental conditions of Russia, which are fundamentally different from the countries that currently apply economic instruments to achieve carbon neutrality (including taxation of carbon units) is a relevant direction in the national climate doctrine, which has fixed the priority of national goals in the field of climate. This circumstance dictates the need for a more comprehensive and detailed study of promising areas of application of the tax on carbon units in Russia as a possible tool within the framework of a comprehensive plan for the implementation of the Climate Doctrine for the period up to 2050.

Today, Russia is among the largest emitters of greenhouse gases. This fact leads to increased attention to the objectives of national climate policy at the international level. Although the Russian Federation has substantially reduced greenhouse gas emissions (by 30.3%) over the last few decades, the carbon intensity of Russia’s economic sectors has been growing. This picture poses a serious challenge to the image of the Russian Federation as climate-responsible.

In addition, the raw material orientation of the Russian economy at a time when the number of countries, regions and companies that support the phase-out of fossil fuels for climate reasons is growing, makes it a challenge to reduce demand for traditional energy resources in the medium term. In these circumstances, it seems important to move to proactive action in the framework of climate policy and focus on supporting the competitiveness of the domestic economy. In connection with the above, the introduction of national mechanisms of carbon regulation (carbon tax) will partially or fully provide tax revenues to the budget system of the country and will be a symmetrical response to the actions implemented within the framework of the international climate agenda.

The development of the national concept of carbon regulation in Russia is determined by two reasons: firstly, internal adaptation of the economy and society as a whole to climate change, and secondly, the need to respond to the strengthening of external climate constraints (the planned introduction of the EU cross-border carbon tax).

It is assumed that the introduction of a transboundary tax carries significant risks for the manufacturing industry in Russia and will be a serious factor that will affect the economic sustainability of the Russian Federation in the future. In addition, the lack of a flexible carbon regulation strategy can have an extremely negative impact on the availability of funds and investment attractiveness of Russian industrial enterprises. In this direction, it is very relevant to assess the correctness of the proposed mechanism of transboundary regulation in terms of compliance with “clean” climate policy.

Since the application of the carbon tax involves the need to work out the methodological basis for the formation of the tax base, the development of fundamentally new standards for the national system of reporting and monitoring of greenhouse gas emissions and removals is a critical element of this infrastructure. It is believed that the currently used mechanism for accounting carbon emissions and their absorption does not fully reflect the actual

picture. In this aspect, the development of a map of the carbon balance of territories and regions of the Russian Federation is also considered relevant. For this purpose, it is necessary to develop a scientific and methodological platform for justification of the objective carbon balance of territories, taking into account the intensity of greenhouse gas emissions and the absorption potential of the ecosystems of territories. The problem of developing and improving the methodology of measuring the carbon balance and greenhouse gas fluxes is the center of attraction of the interests of scientific communities.

## 4 Conclusions

The development of the domestic mechanism of carbon taxation requires the need to take into account the variety of existing mechanisms in the world, approaches in achieving “carbon neutrality” as well as trends in the development of low-carbon technologies. In addition, the introduction of any measures to regulate inefficient carbon-intensive industries of the domestic economy should be carried out taking into account assessments and forecasts of the socio-economic consequences of their application. In our opinion, it is advisable to test the effectiveness of some or other measures of limiting greenhouse gas emissions by conducting experiments within certain territories or regions of the Russian Federation.

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