ORIGINAL ARTICLE
DOI: https://doi.org/10.18599/grs.2021.3.4 Russian Original 2021. Vol. 23. Is. 3. Pp. 24–31

On the possibilities of launching a regional pilot project for the development of a low-carbon economy in the Republic of Tatarstan

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Abstract. Decarbonization is one of the main trends in global development of the last decade. More than 120 countries have already announced plans to achieve net-zero emissions by the middle of the century. Among them are Russia's largest trading partners, including the European Union, China, Japan, the Republic of Korea, Kazakhstan, as well as the United States. These ambitions are supported by a tightening carbon regulation: carbon pricing has already been set up in 64 countries and regions. In the largest emissions trading system – the European one – carbon price has already exceeded 50 euros per ton of emissions.

Significant effort in decarbonization has been taken in many industries (e.g., civil aviation, maritime transport, oil and gas industry), companies (which set up carbon neutrality targets and introduce internal carbon pricing) and the financial sector. Standards for corporate information disclosure about emissions and strategies for their reduction, in particular CDP and TCFD, are being developed and adopted. At the same time, ways to put pressure on competitors who do not want to bear the costs associated with reducing greenhouse gas emissions are being developed. For example, the Carbon Border Adjustment Mechanism (CBAM) will be launched by the European Union in 2023. All these trends mean that products with low carbon footprint become not just a competitive advantage for a company, but also an inevitable condition for its presence on the international market. Companies with a high carbon footprint face less favorable conditions of borrowing, as well as trading barriers and growing pressure from customers both corporate and individual.

In this regard, the development of low-carbon economy in Russia is inevitable to minimize the costs associated with tightening regulation. It is becoming particularly relevant for export-oriented regions with large emissions, including the Republic of Tatarstan. In our opinion, the launch of a pilot project to regulate greenhouse gas emissions in this region is important not only for GHG reduction itself, but also for increasing competitiveness of Tatarstan companies on international markets and attracting investment from both Russian and foreign investors. In this paper, we explain the need to launch such a pilot and relying on the existing Russian and international experience on the one hand and taking into account the characteristics of Tatarstan's economy on the other, we demonstrate a scheme by which such a project can be organized.

Keywords: low-carbon economy, decarbonization, Carbon Border Adjustment Mechanism, carbon footprint, international markets, GHG emissions regulation, pilot project

Recommended citation: Makarov I.A., Muzychenko E.E. (2021). On the possibilities of launching a regional pilot project for the development of a low-carbon economy in the Republic of Tatarstan. *Georesursy = Georesources*, 23(3), pp. 24–31. DOI: https://doi.org/10.18599/grs.2021.3.4

Decarbonization trends

With climate change worldwide recognized as one of the key threats, the country's long-term socio-economic policy should include plans to decarbonize the economy. An increasing number of countries around the world are setting goals to reduce greenhouse gas emissions and introducing carbon regulation mechanisms. As of December 2020, 127 countries, 823 cities, 101 regions and 1,500 companies have announced plans to achieve carbon neutrality by mid-century (World Bank. State and Trends of Carbon Pricing, 2021).

At the international level, the goals of low-carbon development are fixed by the Paris Agreement, which entered into force in 2016 and has already been ratified by 191 countries, including Russia[1]. The Paris Agreement aims to contain the global average temperature rise to

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[1] Status of Treaties. United Nations Treaty Collection. https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en

2 °C from pre-industrial levels and to take action to limit it to 1.5 °C. Within the framework of the agreement, countries set nationally determined contributions – goals for reducing emissions, which together should lead to the achievement of the global goal (Paris Agreement ..., 2015).

To achieve the goals set for decarbonization of national economies, states are forced to introduce instruments for regulating greenhouse gas emissions, and enterprises have to implement various solutions to reduce the carbon intensity of their products in order to comply with the requirements and maintain their competitiveness. In the energy sector, among the key trends in low-carbon development is the growth in the use of renewable energy sources, the cost of which has dramatically decreased over the past decade. In particular, over a ten-year period (by 2019), the cost of generating electricity using solar panels decreased by 82%, onshore and offshore wind – by 40% and 29%, respectively (IRENA, 2021). In industrial processes, the introduction of energy-saving and material-saving technologies continues, and at the level of industrial systems – the construction of a cyclical economy. In order to reduce emissions in the transport sector, a number of countries are promoting the use of green alternatives, in particular by introducing various tax breaks and subsidies for electric vehicles and hybrid vehicles, while others are using administrative instruments, imposing bans on the sale of vehicles with internal combustion engines. A significant upward trend is also observed in the green finance market, which promotes the implementation of environmental and low-carbon projects: in 2020, the volume of newly issued green bonds amounted to $ 297 billion, and the total market volume exceeded $ 1.2 trillion[2].

In order to create incentives for reducing greenhouse gas emissions abroad, economic instruments are widely used, in particular, the introduction of a carbon price. In one form or another, the price of carbon is already present in 64 countries and regions of the world. The spread of the carbon price is growing: in 2020, the turnover of the carbon markets reached $ 53 billion, which is 8 billion more than in 2019. The carbon price already covers about 22% of global greenhouse gas emissions (World Bank. State and Trends of Carbon Pricing, 2021).

While more and more economic actors are pursuing carbon neutrality and carbon pricing, current efforts are still insufficient to keep global temperature rise within 2 °C (World Bank. State and Trends of Carbon Pricing, 2021). In this regard, climate regulation will continue to expand and tighten, ensuring greater coverage of industries and volumes of emissions, as well as a higher price for them.

The expansion of greenhouse gas regulation is self-sustaining. Companies that are exposed to it lose competitiveness to those who do not bear the costs of decarbonization. As a consequence, the former insist on additional barriers in relation to the latter. Likewise, new restrictions are emerging for businesses from countries that do not want to make their own efforts to reduce emissions. In particular, the European Union plans to introduce border barriers for imported products, the production of which generates high carbon intensity. This mechanism is called the Carbon Border Adjustment Mechanism (CBAM). According to a document published by the European Commission on July 14 (Carbon Border Adjustment Mechanism, 2021), at the first stage of its implementation, the electricity and carbon-intensive industries (cement, fertilizers, steel and iron, aluminum) will fall under the regulation, however, it is possible that future coverage can be expanded. The Ministry of Economic Development of the Russian Federation believes that the mechanism will affect Russian exports to the EU in the amount of $ 7.6 billion, including the supply of electricity, iron, steel, aluminum, pipes and cement (Reshetnikov, 2021).

Decarbonization has a dual purpose in Russia. On the one hand, the country is exposed to the risks of climate change and, like other states, should be interested in reducing greenhouse gas emissions to prevent its further increase. On the other hand, decarbonization on a global scale poses numerous threats to the current model of Russia's economic development. In particular, the demand for Russian energy exports will gradually decrease (Makarov et al., 2020), and Russian producers of energy-intensive goods (metals, fertilizers, chemical products, etc.) will face the requirements to reduce their carbon footprint on international markets. Meanwhile, decarbonization for Russia can act as a tool for diversifying the national economy and transitioning to a different model of economic development, which is more contributive to economic growth in the long term.

In Russia, the low-carbon agenda has been actively developing over the past few years (Bashmakov, 2020; Porfir'ev et al., 2020). In 2016, the Plan for the implementation of a set of measures to improve state regulation of greenhouse gas emissions and preparation for the ratification of the Paris Agreement was approved. In 2019, Russia joined the Paris Agreement. In 2021, the federal law "On limiting greenhouse gas emissions" was adopted. Strategy for long-term economic development with low greenhouse gas emissions is in the process of approval. There is a gradual linking of emission reduction plans with programs to improve energy efficiency, support for renewable energy sources, and develop green technologies funding. At the same time,

[2]Green Bonds Market 2021. https://www.climatebonds.net/

according to the regulatory framework taken as the basis for these efforts, the federal level is mainly focused on soft regulation, which consists in building a system of accounting and reporting on greenhouse gas emissions, as well as coordinating business actions and helping it to implement projects in the field of reducing emissions and their absorption.

Many companies, especially those on international markets, are making serious efforts to reduce their carbon footprint and develop ESG (Environmental, Social and Governance) in general. Companies from sectors vulnerable to CBAM, as well as companies from the oil and gas sector, are forced to do this most actively. Some Russian companies join the standards of information disclosure related to emissions and climate risks, demonstrating their readiness to contribute to combating climate change.

Despite the actions of the authorities and individual companies, Russia's efforts at the moment seem to be insufficient in comparison with the climate policies of many other countries. In particular, the draft document of the Strategy for long-term economic development with low greenhouse gas emissions contains several scenarios, in each of which emissions will be higher than in 2017[3]. In many international rankings, Russia's climate efforts are also considered to be insufficient. So, in the Climate Change Performance Index Russia is ranked 52nd (out of 61)[4], in the Green Future Index – 73rd (out of 76)[5]. This carries additional risks on international markets.

Stricter regulation, involving ambitious emission reduction targets and implementation of a carbon price, is currently being developed at the regional level. In particular, a pilot project to set up an emissions trading system aimed at ensuring carbon neutrality by 2025 has been launched in the Sakhalin Region. The launch of similar pilot projects is being discussed in the Altai Territory, the Khanty-Mansiysk Autonomous District and the Kaliningrad Region. A similar approach of starting with regional regulatory schemes is already being implemented in a number of countries, including Canada, the United States, Australia and especially China, where the creation of 7 pilot emissions trading schemes was a step towards launching a nationwide system.

Experience of regional systems

Regions are interested in developing low-carbon regulation for several reasons. First, it is a means of keeping their companies competitive in global markets with high standards in terms of their carbon footprint. Secondly, it is a way to attract investments to the region from Russian and, in the long term, foreign companies that are forced to reduce the carbon footprint of their products (for example, to reduce losses from CBAM, follow industry regulations or respond to the requirements of product's consumers), but are not able to do this solely through internal efforts. It is cheaper to cut emissions in Russia than in most large economies (except China and India), and only the lack of regulatory frameworks both domestically and at the subnational level is holding back such an inflow of investments. Third, comprehensive efforts to reduce emissions can become a driver of economic growth in the region – through the development of more modern technologies that are also less carbon intensive.

Often, the establishment of emission regulation not at the national level, but within individual administrative units, has certain advantages. In particular, the formation of climate policy at the subnational level can allow a country to experiment with different systems and mechanisms and avoid the high and unjustified costs of creating large-scale country-wide regulation, which could potentially be less effective and more costly. In some areas (for example, municipal solid waste and transport), the efficiency of emission reductions is higher at the regional level, since it brings clear co-benefits to the population. It is also easier for the governments of administrative units to adapt the climate regulation to changing circumstances due to the higher flexibility of such systems.

The introduction of economic regulatory mechanisms, in particular emissions trading system, as a climate policy tool is easier for economies with smaller scale and higher levels of homogeneity. This is due to the fact that with a more homogeneous economic system, it becomes possible to more accurately select the companies to regulate, determine the required cap of emissions, monitor and manage the trade of allowances, etc. In other words, based on less diversified markets, climate regulation can be organized in the most efficient way at the lowest cost[6]. In many countries (for example, China, Canada, USA), the establishment of climate regulation begins precisely at the level of individual administrative units – regions, states, provinces and even cities.

[3] The Ministry of Economic Development of Russia has prepared a draft Strategy for the long-term development of Russia with a low level of greenhouse gas emissions until 2050 (2020). Ministry of Economic Development of Russia. https://www.economy.gov.ru/material/news/minekonomrazvitiya_rossii_podgotovilo_proekt_strategii_dolgosrochnogo_razvitiya_rossii_s_nizkim_urovnem_vybrosov_parnikovyh_gazov_do_2050_goda_.html

[4] Climate Change Performance Index. https://ccpi.org/

[5] The Green Future Index (2021). MIT Technology Review. https://www.technologyreview.com/2021/01/25/1016648/green-future-index/?utm_source=telegram.me&utm_medium=social&utm_campaign=indeks-zelenogo-buduschegoindeks-zelenog

Currently the most popular regulatory mechanisms are economic instruments based on the introduction of a carbon price. Their advantage is that emission reduction occurs at the lowest cost since economic agents have the opportunity to independently choose for themselves the most efficient and least resource-intensive methods.

The carbon price can be set in the form of a carbon tax or an emissions trading system. Carbon tax is the collection of a certain fee per unit of emissions, while the emissions trading system involves fixing greenhouse gas emissions at a certain level, allocating allowances for emissions between companies and trading them. If the set emission cap is exceeded, companies will have to buy additional allowances, and if there is a surplus of them, they can sell: both of which create financial incentives for enterprises to reduce emissions.

Carbon tax and emissions trading systems both have advantages and disadvantages. The introduction of an emissions trading system (ETS) allows for highly accurate forecasting of emission reductions compared to tax, but at the same time has higher administration costs. When a carbon tax is imposed, it is easier for companies to estimate potential costs in the absence of emission caps, while an ETS creates additional uncertainty as a result of fluctuations in the price of allowances (Goulder, Schein, 2013). Hybrid schemes that combine elements of a carbon tax and an emissions trading system are also being considered to overcome the disadvantages associated with both systems.

Regional carbon management systems use both approaches. Specifically, a subnational carbon tax applies to some provinces in Canada (British Columbia, Newfoundland and Labrador, New Brunswick, and Prince Edward Island), the states of Mexico (Zacatecas, Baja California) and Spanish Catalonia. Nevertheless, due to the limited authority of the regions in many countries (including Russia) in terms of tax policy, emission trading systems are used more often. The largest ETS at the regional level operate in California (USA), Quebec (Canada), as well as under the Regional Greenhouse Gas Initiative[7] (RGGI) in the Northeast USA[8] (Fig. 1).

Regional carbon regulation differs not only in the mechanisms used to stimulate emission reductions by economic agents, but also in the objects and volumes of regulation.

For example, among subnational emission trading systems, there is high differentiation in terms of coverage of regulated sectors and volume of emissions. For example, the ETS in Quebec includes 4 sectors (energy, industry, transport and residential) and covers about 80% of emissions, while the Tokyo ETS includes only 2 sectors (residential and industry) with only 20% of emissions (Emissions Trading Worldwide..., 2021).

The advantages of regional ETS can be traced both in the direct reduction of greenhouse gas emissions and in synergistic effects: an increase in innovation activity, a decrease in the negative impact on public health, and an increase in energy security. At the same time, the experience of regional ETS also demonstrates their compatibility with economic growth, despite widespread fears that actions to reduce emissions may undermine the pace of economic growth. For example, the reduction in the carbon intensity of the electricity sector in the states participating in the RGGI decreased by 30% in 2008–2015 due to the operation of the ETS, while the economy increased by 25% in the same period (Benefits of Emissions Trading ..., 2018).

In China, an ETS pilot project in 7 regions of the country in 2013–2014 ended up with the launch of the world's largest emissions trading system in 2021. The success of China's regional ETS lies in accelerating green technological development, as manifested in an increase in the number of green patents. Innovative activity in the field of low-carbon technologies has increased in the country as a result of the launch of pilot ETS not only at the expense of companies included in the existing configuration of the program, but also due to the "spill-over effect", which forced enterprises at risk of falling under regulation to take care of technological options for reducing emissions in advance (Zhu et al., 2019). Similarly, in the EU, innovative activity in the field of low-carbon technologies increased by 10%, and at the same time, the effect of displacement of other technologies was not recorded (Calel, Dechezleprêtre, 2014).

Thus, economic regulatory mechanisms have several significant advantages that make them attractive instruments in international decarbonization policy. The introduction of a carbon price not only leads to a decrease in the carbon intensity of the economy, but also brings with it a set of co-benefits, including increased green innovation, improved air quality and reduced disease, attracting investment, and supporting competitiveness in foreign markets.

At present, in Russia, carbon regulation based on the use of economic instruments is limited to plans to launch a pilot ETS in the Sakhalin Region from January

[6] IPCC: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change

[7] RGGI members are Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, Vermont and Virginia

[8] World Bank. Carbon Pricing Dashboard. https://carbonpricingdashboard.worldbank.org/map_data

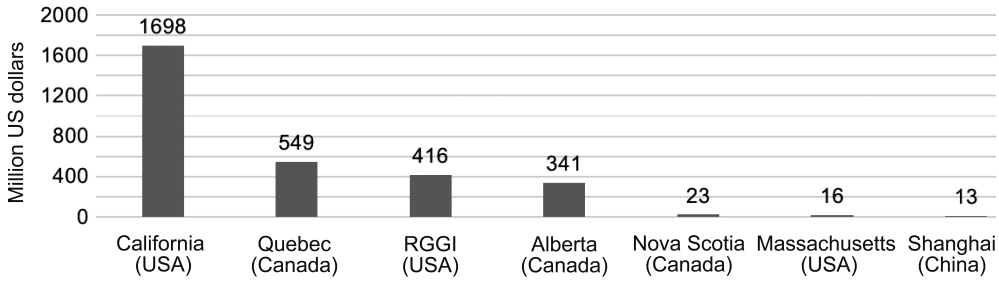

Fig. 1. Largest regional ETS by trade revenue, USD million, 2020. Source: World Bank. State and Trends of Carbon Pricing, 2021.

2022. The Ministry of Economic Development of Russia came up with a bill on the introduction of experimental regulation in the Sakhalin Region, the implementation of which assumes the achievement of carbon neutrality by the end of 2025. The draft states that companies whose emissions will amount to 50 thousand tons of CO_2 or more from January 1, 2023 and 20 thousand tons or more from January 1, 2025 will be subject to regulation (On Conducting an Experiment on Quotas ..., 2019).

Possible system in Tatarstan

Tatarstan is one of the regions where a pilot low-carbon development project would be most appropriate. The region has a developed and diversified economy, combining a powerful mining and manufacturing sector with knowledge-intensive industries.

Tatarstan is the 7th region of Russia in terms of gross regional product (GRP). The main sectors of the region's economy are the extractive sector, which accounts for almost a third of the added value, as well as manufacturing, which makes up about 16% of the GRP. At the same time, the region is also one of the largest export centers in the country. The key commodity groups of its export are the products of the fuel and energy complex and the chemical industry, the extraction and production of which is characterized by the highest emissions per unit of output. These industries are also of great importance for the regional budget revenues. Income tax revenues of Tatarstan, which is the main source of income, from oil production and chemical production accounted for more than two-thirds of the total revenues under this article in 2019 (Budget implementation report of the Republic of Tatarstan for 2019 ..., 2019) (Fig. 2).

The structure of the value added of the region and the export orientation of the Republic of Tatarstan determine the possible interest of the region in the introduction of carbon regulation. In the face of increasingly stringent requirements for carbon-intensive products in international markets, the lack of domestic climate regulation may affect the position of export-oriented companies. A particularly important role in this regard is played by the introduction of the world's first mechanism of cross-border regulation CBAM in the European Union, which is the main direction of export supplies from the Republic of Tatarstan (more than 70% of the total export volume).

Since the leaders of the region's economy are companies operating not only in the Russian market, but also abroad, they are exposed to potential barriers associated with a high carbon footprint, and they themselves will have to take measures to reduce greenhouse gas emissions to ensure their international competitiveness.

Some of the largest companies in Tatarstan are already highlighting climate risks as part of their strategic planning and are also announcing plans to reduce emissions. In particular, Tatneft became a member of the Science Based Targets initiative, created by the United Nations, the Wildlife Fund and the World Resources Institute. The company plans to achieve carbon neutrality by 2050 and consistently reduce emissions. By 2025, Tatneft sets a goal to reduce its carbon intensity by 10%, by 2030 – by 20% compared to the base year 2016[9]. Kazanorgsintez also announced the implementation of energy efficiency initiatives that have the potential to reduce emissions by 1 million tons of CO_2 by 2020[10]. Companies in the region also join the standards of disclosure of information related to climate change issues – since 2016, Nizhnekamskneftekhim has been submitting carbon reporting according to the CDP (Carbon Disclosure Project) standard. In 2021, the company began developing a climate strategy and it plans to join the disclosure of corporate information under the TCFD (Task Force on Climate-related Financial Disclosures)[11] standard.

[9] Climate and a sustainable energy future. PJSC TATNEFT. https://www.tatneft.ru/ustoychivoe-razvitie/klimat-i-ustoychivoe-energeticheskoe-budushchee/?lang=ru

[10] Sustainable Development Report. Kazanorgsintez PJSC (2015). https://www.kazanorgsintez.ru/upload/docs/otchet_ob_ustoichivom_razvitii_2015.pdf

[11] Care for the environment: Nizhnekamskneftekhim intensifies efforts to reduce greenhouse gas emissions. Real time. https://realnoevremya.ru/articles/213081-nizhnekamskneftehim-sokraschyaet-vybrosy-parnikovyh-gazov

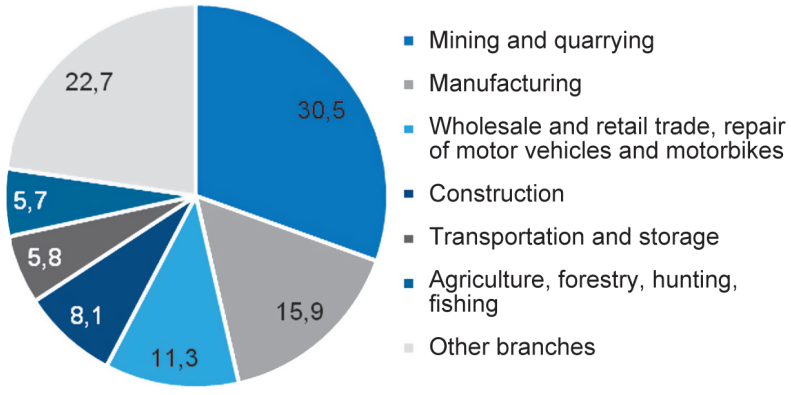

Fig. 2. Sectoral structure of gross value added of the Republic of Tatarstan, in %, 2018. Source: Rosstat

While some companies are pursuing strategies to reduce emissions, most businesses do not have their own goals due to the lack of explicit incentives to reduce carbon intensity. The introduction of regulation by the government of the Republic could help create the necessary conditions for this. Tatarstan is also interested in the fact that efforts to reduce emissions, undertaken by companies of the Republic to enter foreign markets, are concentrated within it, and not implemented outside the region due to the lack of a proper regulatory framework.

At the same time, due to the fact that there have been no systemic efforts to reduce greenhouse gas emissions in the region, there is a potential for cheap emission reductions that can be commercialized. In addition, the scale of the region's economy makes it possible to create working market mechanisms for reducing emissions here, the main advantage of which is ensuring the possibility of reducing emissions where it is cheapest (Makarov, Stepanov, 2017). In addition to reducing emissions, market mechanisms will help attract investment, increase economic growth as a result of innovative development, and maintain the competitiveness of companies in the region on international markets.

There is a well-developed scheme for constructing any carbon management system[12]. It starts with the development of a monitoring, reporting and verification of greenhouse gas emissions. Further, a goal is set to reduce them and a system of incentives is developed that encourages companies to ensure the achievement of this goal at the lowest possible cost. These incentives can range from support for low-carbon projects to a carbon tax, and in most cases are used in a combination of "sticks and carrots". The latter may include targeted government support for investments in specific low-carbon technologies, which are the focus of innovative enterprises in the region. This will make decarbonization a driver of technological development in the Republic. "Carrots" can be offered not only at the republican, but also at the national level: in particular, projects to reduce emissions in Tatarstan can use the instruments of green financing developed by the Bank of Russia and the development corporation "VEB.RF".

A separate scheme for offsetting carbon credits (offsets) is developed, which creates opportunities for companies to reduce emissions not only in their core activities, but also outside it (including through the implementation of projects in housing and communal services, in the field of infrastructure development or in the field of absorption of emissions in the forestry sector). The offset system is critically important in Russian realities: it actually makes it possible to combine the demand for the implementation of low-carbon projects presented by export-oriented companies interested in reducing their carbon footprint with the cheapest projects to reduce emissions, which, moreover, are associated with significant social benefits: from the modernization of municipal boiler rooms to measures to combat forest fires.

At the same time, the entire regulatory framework is not only brought into line with Russian legislation in the field of emissions and removals regulation, but also harmonized with the mechanisms of low-carbon regulation in other Russian regions and international standards. The latter is necessary to ensure that these mechanisms are taken into account within the CBAM as well as the ability to attract extra-regional and foreign investment in low-carbon projects.

The general scheme presented above has many nuances in its implementation which requires taking into account the regional specifics. A pilot project in the field of low-carbon development at the level of the Republic should be based on an integrated approach that involves combining emission regulation instruments (including carbon price) with mechanisms for adapting traditional industries to the challenges of green development, as well as launching green

[12] World Bank. Carbon Pricing Assessment and Decision-Making: A Guide to Adopting a Carbon Price (2021)

investment processes. To develop the details of such a project, it is necessary to combine the efforts of the regional administration, business, as well as centers of competence both within the Republic of Tatarstan and abroad.

Conclusion

The project to create the Sakhalin greenhouse gas emissions trading system laid the foundation for climate regulation in the Russian Federation. Several Russian regions have already expressed a desire to follow this example. The Republic of Tatarstan also appears to be a promising region for creating a pilot project in the field of low-carbon development. The region is distinguished by a high share of the mining and manufacturing industries, mainly in the field of oil refining, chemical industry, and mechanical engineering. Since many enterprises of the Republic are focused on selling products on international markets, they will incur costs due to cross-border regulation, which will be introduced in a transitional period in the European Union starting from 2023 and in full force starting from 2026. It is likely that in the future the list of products subject to the EU Carbon Border Adjustment Mechanism will expand, and similar schemes will appear in other countries. This means that an increasing number of companies in the region will be subject to an additional burden, and internal carbon regulation is needed to minimize this risk.

Comprehensive efforts for the low-carbon development of the Republic of Tatarstan will bring a number of advantages to the region in addition to directly contributing to the reduction of greenhouse gas emissions. First of all, they will increase the competitiveness of companies on international markets due to the tightening of requirements for carbon-intensive products, which dominate the region's exports. In addition, incentives will be created for the development of technologies that, on the one hand, will help to reduce emissions, and on the other, will lead to accelerated economic growth. Green development, especially if Tatarstan launches it one of the first among Russian regions, will allow attracting investments from both Russian investors and international ones interested in reducing their own carbon footprint. The circle of such investors is constantly growing and includes the largest aviation, IT, oil and gas companies, for which the possibilities of reaching carbon neutrality by exclusively optimizing internal processes have technological limits.

To build an effective carbon regulation in the region, it will be necessary to create a system for monitoring and verifying emissions, defining mechanisms for their reduction, and organizing a carbon crediting scheme. It is also necessary to identify the most promising areas of "green" development, which have a scientific and technological base within the Republic of Tatarstan, as well as to establish some instruments, both at the republican and national levels, to stimulate them. Building a comprehensive scheme for a pilot project for the development of a low-carbon economy will become possible only with the coordination of the actions of the republican authorities, expert centers and businesses with the support of federal authorities.

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Manuscript received 19 July 2021;
Accepted 2 August 2021; Published 30 August 2021