

Upward march of the global emissions markets

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Abstract: World statistics show a steady increase in greenhouse gas emissions in the planet's atmosphere. Continuous growth of greenhouse gas markets occurred despite the financial crisis (2008) and the pandemic (2019-2022). Currently there are about 70 market mechanisms in the world that capture some 20% of greenhouse gas emissions. Despite obvious progress, the terms of the Paris climate agreement are far from being met. The current situation requires the global community to strengthen measures to combat climate change. New approaches are needed to develop market-based instruments to achieve climate goals. The study explores the volumes and trends the market economic mechanisms abroad. These mechanisms can cover a significant part of greenhouse gas emissions. Russia has so was not involved in the development of global carbon markets, unlike its western and eastern neighbors. The study of the experience of these countries is necessary for the successful assertion of national Russian interests in the global carbon policy and markets. Carbon credits are traded on a mandatory and voluntary markets. They are divided into primary and secondary. Carbon markets reached \$800 billion in 2021, more than international trade in grains or oil. Voluntary markets have surpassed the \$800 million mark and continue to grow rapidly. It is expected that by 2030 their volume will be at least 100 billion US dollars. The current study highlights promising directions for the Russian carbon markets, taking into account world experience and development trends. Key words: carbon emissions, greenhouse gases, compliance carbon markets, voluntary carbon markets, offset mechanisms.

1 Introduction

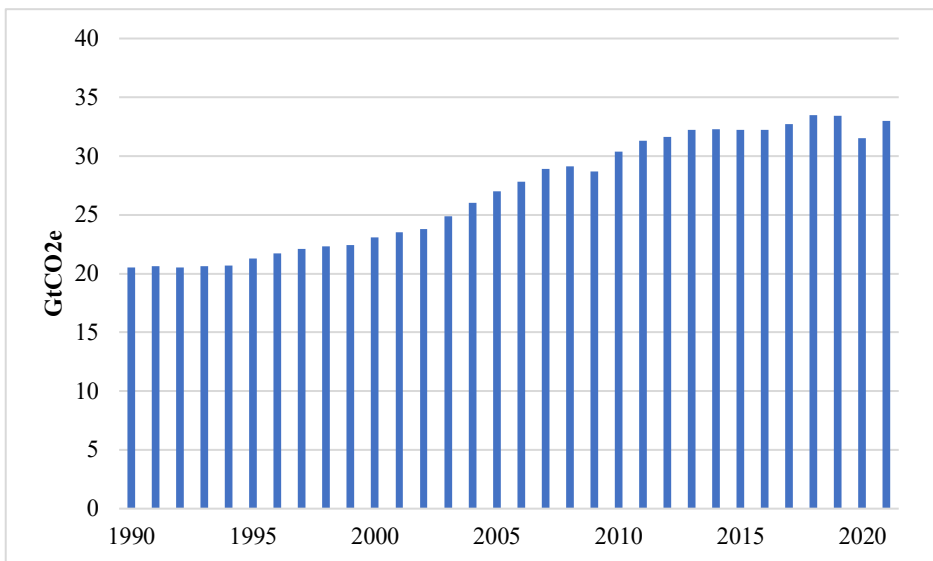
In the past thirty years, carbon markets have grown and developed rapidly around the world. However, in Russia they have not yet received noticeable development. Meanwhile, Russia has huge reservoirs for carbon sequestration in its forest, soil and water resources. Russia plays a key role in regulating the global climate and in providing environmental services for society and the economy of the country and the entire planet. Russia's forests rank first in the world in terms of area [1]. They play a primary role in absorbing global anthropogenic carbon

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dioxide emissions from the burning of fossil fuels, which are also produced in significant quantities in Russia. However, Russia has hardly materialized the potential for financial reimbursement for the climate mitigation services it provides to the rest of the world [2]. The main reasons for the country's inability to attract funding to support climate projects are the novelty of the product, the underestimation of its prospects, and the weakness of the national legal framework for the carbon market. This study was carried out to study the best foreign experience in the development of economic mechanisms for climate change mitigation. It aims to support the development of the carbon market, strengthen institutional capacity, and increase private investment in Russia's green and blue economy.

2 Materials and methods

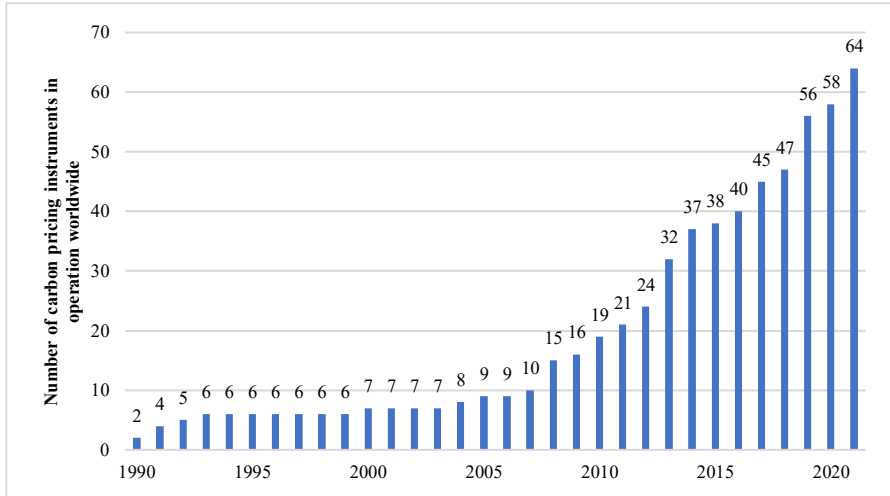
According to the global statistics, the greenhouse gas emissions keep steadily increasing. Only financial crisis in 2008 and recent pandemics could interrupt the upward curve to some extent, Figure 1.



Source: Wolf, 2021[3]

Fig. 1. Dynamic growth of the global greenhouse gases emission.

According to the recent World Bank's annual "State and Trends of Carbon Pricing" report [4] a total of 64 carbon pricing instruments are now in operation around the globe, covering only 20% of global greenhouse gas emissions. They generate \$US53 billion in revenue. This advancing represents a 17% increase in revenue from last 2019 year. However, the full potential of carbon pricing remains largely untouched [5]. Despite progress, carbon-pricing efforts are not on track to meet Paris Agreement goals, Figure 2.

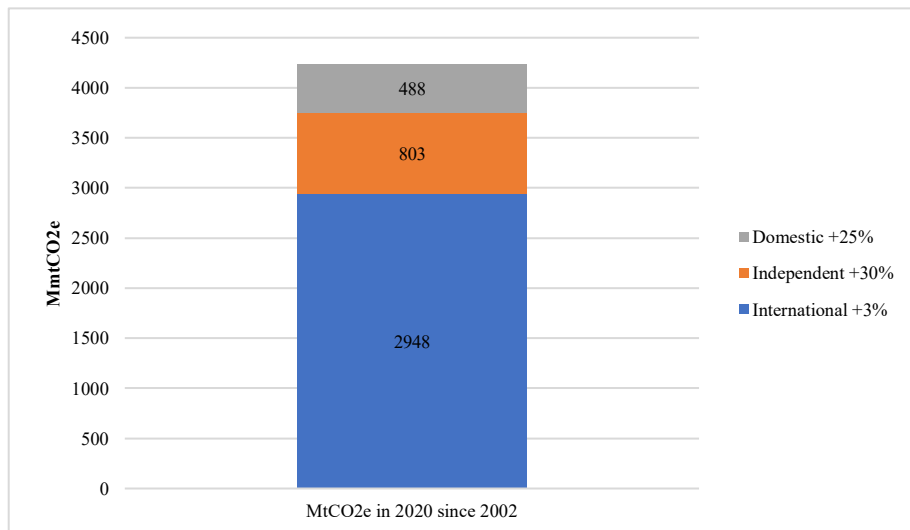


Source: World Bank, 2021 [4].

Fig. 2. Growing number of carbon pricing mechanisms in operation worldwide.

Revenue growth is driven mainly by the rise in allowance prices under the European Union Emissions Trading System, which caps emissions and requires countries that exceed agreed GHG emission limits to purchase additional allowances [6]. Global emissions trading systems have proven resilient during the COVID-19 pandemic and the associated decline in economic activity.

According to the World Bank, some three quarters of GHG emission credits are issued by international bodies, with the remainder issued by independent or domestic mechanisms, as illustrated in figure 3.

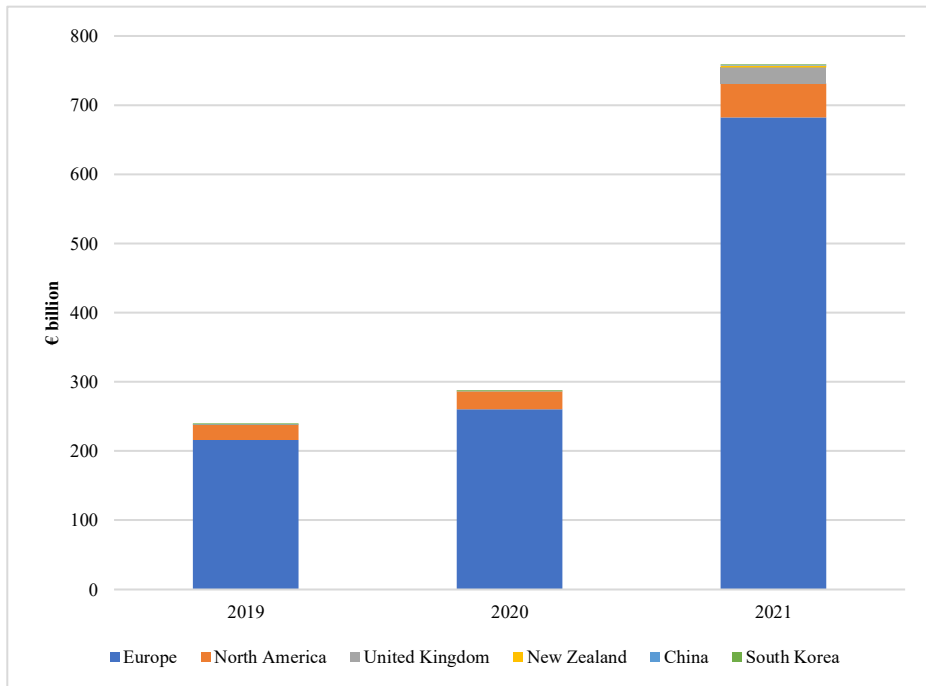


Source: World Bank, 2021.

Fig. 3. Cumulative issuance of carbon credits in million metric tons of carbon dioxide equivalent (MmtCO₂e) and percentage increase in domestic, independent, and international credits in 2019–2020.

In 2021, the cost of carbon permits soared by 140 percent in the European Union. That trend has continued into 2022 on the back of the Union's ambitious climate agenda. Indeed, carbon prices have climbed a further 15 percent, supported by developments in European energy markets and the rise in coal power generation.

A similar but less pronounced trend has been observed with mandatory carbon markets in other global regions. For example, the value of the North American carbon market, which includes the Western Climate Initiative and the Regional Greenhouse Gas Initiative, has increased by 89 percent year on year. According to a recent report by Refinitiv, a large private-sector provider of financial markets data and infrastructure, the total turnover of global carbon markets grew by 164 percent in 2021 to €760 billion, equivalent to some \$850 billion [7]. Those figures are illustrated in Figure 4.

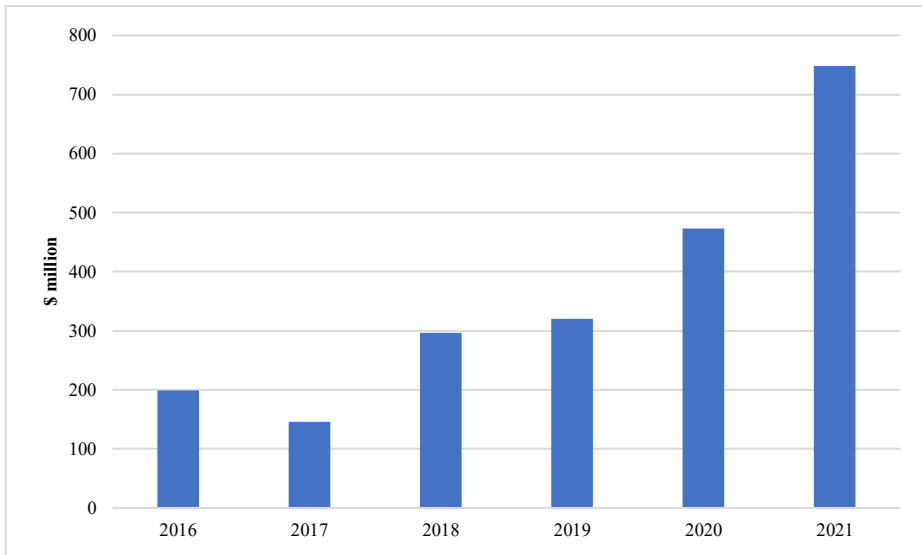


Source: Refinitiv, 2021 [7].

Fig. 4. Mandatory carbon markets.

While the European Union Emissions Trading System was certainly responsible for most of that growth, growth was also driven by the launch of national emissions trading schemes in the United Kingdom (after it withdrew from the European Union) and China, although the Chinese scheme is still less liquid than its European and North American counterparts [8].

The upward trend has also been seen in carbon markets in which carbon credits are purchased voluntarily. As illustrated in Figure 7, the number of carbon credits purchased on voluntary carbon markets in 2021 to offset emissions (carbon offsets) rose by 58 per cent compared with 2020 figures.



Source: Ecosystem Marketplace, 2021 [9].

Fig. 5. Carbon offsets purchased on voluntary markets.

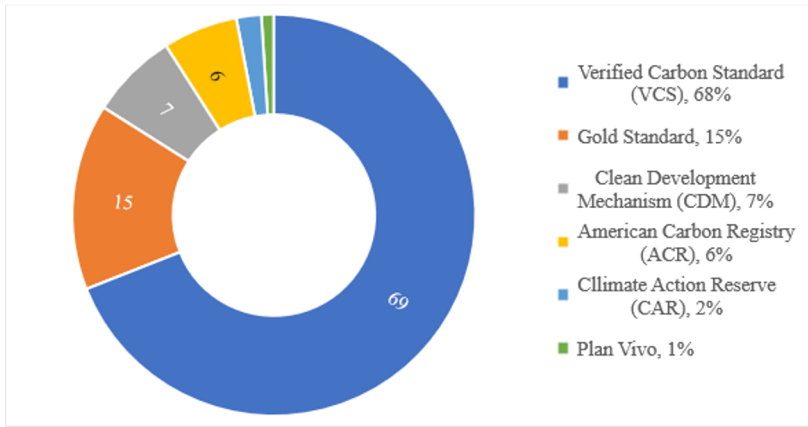
Those totals include offsets reported by the American Carbon Registry (TCR), Architecture for REDD+ Transactions, Climate Action Reserve (CAR), the California Air Resources Board, the UN Clean Development Mechanism (CDM), City Forest Credits (CFC), Climate Forward, Coalition for Rainforest Nations (CRN), EcoRegistry, Global Carbon Council (GCC), the Gold Standard (GS), Plan Vivo, ProClima, and the Verified Carbon Standard (VCR) [10].

The voluntary carbon market value is likely to expand further. It is expected to be worth some \$100 billion by 2030 and some \$550 billion by mid-century as more companies strive to become carbon-neutral and uphold their climate-related commitments.

3 Results

Carbon credits are traded both on compliance (compulsory or mandatory) and voluntary markets. Both markets can be further divided into primary and secondary markets [11]. A primary carbon market transaction refers to the first sale of carbon credits from the project owner to the buyer. The secondary carbon market occurs when a secondary seller sells guaranteed carbon credits to another purchaser in the secondary market [12]. Those include primary project developers providing project-specific guarantees.

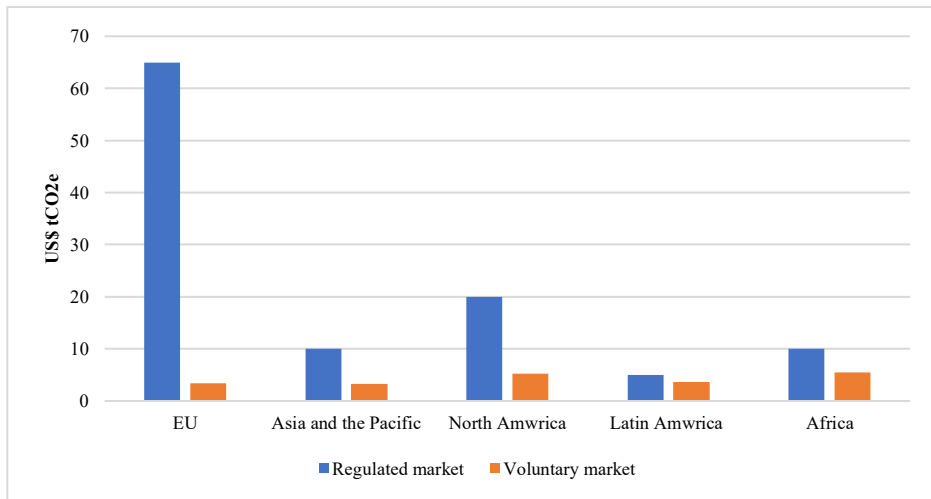
As illustrated in Figure 6, a number of established carbon trading mechanisms are used to facilitate climate projects in a wide range of fields, including agriculture and carbon capture and storage.



Source: EcosystemMarketplace, 2021 [9].

Fig. 6. International trade on primary carbon markets by trading mechanisms (2020).

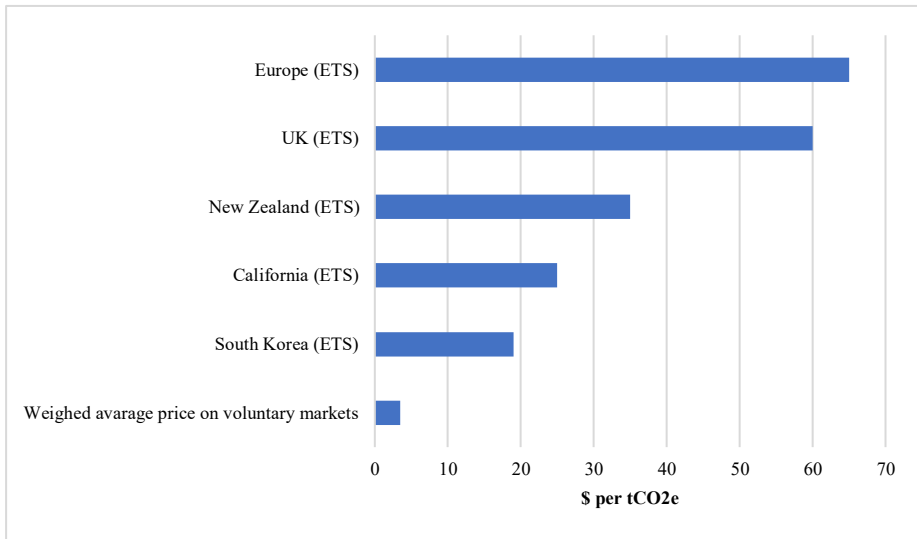
A major obstacle to investment in climate projects is the fact that prices on voluntary carbon markets are typically much lower than those in regulated markets [13]. At present, and as illustrated in Figure 7, global prices are approximately \$3.40/mtCO₂e on voluntary markets, while the price currently stands at some €65.00/mtCO₂e in the European Union Emissions Trading System (ETS).



Source: Ecosystem Marketplace, 2021 [9].

Fig. 7. Regulated vs voluntary carbon market prices.

Investors are generally wary of spending money on climate projects, as the average price of carbon offsets on voluntary markets is still much lower than on mandatory markets. This is illustrated in Figure 8. The overall trend is clear, however: over the last year, the average price of a carbon unit, expressed as a ton of CO₂ equivalent, rose from \$2.50 to \$3.50, while by mid-century prices are expected to range between \$50.00 and \$120.00 (Ross-Thomas and Rathi, 2021). This has prompted several multinational corporations to launch their own climate projects to achieve their corporate agendas and diversify their revenue streams.



Source: Ecosystem Marketplace, 2021.

Fig. 8. Average weighed carbon credits price on compliance (ETS) and voluntary markets in mid 2021.

While the voluntary carbon market was worth almost \$1 billion in 2021, its total value had been estimated at only \$300 million in 2018. Furthermore, the voluntary market could be worth as much as \$100 billion by the end of the current decade.

4 Discussion

Carbon offsets are a good way for companies to invest in an environmental project and utilize carbon accounting benefits. This option is usually in developing nations for offsetting their own carbon footprint. Amounts depend on options. One option is to be fully carbon neutral, another one is to offset a particular product or service. Environmental projects may cover a wide range of businesses and activities. It is necessary that they really serve the purpose of removing greenhouse gases from the atmosphere. This can be through activities such as creating or restoring emissions absorbing habitats or investing in carbon capture technologies. Carbon offsetting is not an exact science. It yet needs standardization. So far, it was attractive to companies who intended to build market value around them. There has been significant growth in voluntary offsetting with more and more businesses aiming for net zero emissions. According to the recent data, global carbon markets grew to about \$800 billion in 2021, almost a fourfold increase for only two years since 2019 [7]. While there is a wide array of Offset Providers available for businesses to choose from, buying offsets from credible sources such as United Nations carbon offset platform or Gold Standard is always recommended.

GHG reporting is often loosely labeled as “carbon footprint” reporting and considers the most important anthropogenic GHG emissions. Emissions are generally expressed in metric tons of carbon dioxide equivalent (mtCO₂e). The carbon footprints of companies, businesses and products include direct and indirect emissions. Direct emissions take place on site because of productive activities. Indirect emissions occur upstream or downstream of the direct emission process. Those emissions are generated by the same producers but are beyond their direct control and are not directly related to the activities of the producer. In short,

companies are responsible for reporting all emissions that are traceable to their business activities.

Given the increasing complexity of the commercial relations among companies, it is very important to avoid double accounting and shield companies from excessive tax and reporting burdens. This is possible when the following GHG accounting and reporting principles are fully respected: relevance, completeness, consistency, transparency, and accuracy. Those principles are also standard financial accounting principles. Any standardized and harmonized GHG protocol should incorporate all those principles. It should enhance the efficiency and market integrity and value chains. An advanced standardized and harmonized GHG protocol should also enhance the transparency and predictability of transactions of credits earned because of reduced GHG emissions

5 Conclusions

Modern science has helped to deepen understanding of the links between global warming and atmospheric greenhouse gases (GHGs), including carbon dioxide (a long-lived climate forcer), and methane, nitrogen oxides and several other gases (short-lived climate forcers). Global warming causes climate change, weather extremes, biodiversity loss and floods, and gives rise to countless risks and threats to societies and economies. Accounting for, reporting and verifying GHG emissions has thus become an urgent priority for all countries striving to limit the impact of climate change. Accounting for GHG emissions should be a key driver of business and economic policies. Large public and private corporations, small and medium-sized enterprises, consumers, civil society organizations, academic institutions, investors, and legislators are now accepting GHG reporting as an integral part of their regular activities.

While the voluntary carbon market is close to \$1 billion in 2021, it could be worth up to \$100 billion by the end of this decade, up from about \$300 million estimated in 2018. Russia will receive significant advantages after entering the world carbon markets, if it has learnt appropriate lessons from the experience of foreign countries on building institutional capacity and a legal framework for the development of climate projects.

6 Recommendations

1. Russian Federation is to promote GHG markets in the country for the benefit of the national ecology and green economy.

2. Russian government is to establish national centralized carbon credits Registry, protocols and manuals for the carbon offsetting system to facilitate carbon markets development.

3. Russian authorities need to be prepared to enter huge global carbon compliance and voluntary markets to monetarize the environmental services rendered to the global environment by the national natural resources.

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