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DEVELOPMENT OF THE EMISSIONS TRADING SYSTEM OF THE EUROPEAN UNION

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ABSTRACT

The Emissions Trading System of the European Union (EU ETS) is a milestone of the EU's policy to combat climate change. It is established in 2005 and is its key instrument for reducing greenhouse gas emissions (GHG) cost-effectively. The EU ETS is the world's first major carbon market and remains the biggest one. It is established with Directive 2003/87/EC as a response to the commitments under the United Nations Framework Convention on Climate Change (UNFCCC) which is the first international agreement to recognize the detrimental effects of GHG emissions caused by human activity. Its objective is to stabilize GHG concentrations in the atmosphere to a point where they won't cause further deepening of climate change. The EU aims at achieving climate-neutrality and net-zero GHG emissions by 2050, but global temperature continues to rise, and so does the magnitude and frequency of natural disasters. Along with the mitigation of adverse climate effects, there are numerous advantages to lowering GHG emissions, such as improved human well-being and air quality, preserving biodiversity, and secure energy supply. Achieving zero-carbon emissions without sacrificing economic growth is essential to ensuring long-term sustainability. To meet the climate targets, additional reforms are required beyond the efforts accomplished so far. It is imperative to further decrease free emission allowances, improve their regulation, and encourage the shift to renewable energy sources. The main objective of the paper is to examine the development of the EU ETS in relation to the changes and updates of EU strategies and long-term environmental goals.

Keywords: *emissions trading system of the European Union, emissions trading, greenhouse gas emissions, climate change.*

INTRODUCTION

Europe has been warming twice as much as the global average since the 1980s, with deepening impacts on the social, economic and ecological systems. The late spring and summer heatwaves in 2022 led to more than 61 000 deaths in Europe and to numerous wildfires which affected more than 182 000 ha across the EU, 40 % above the 2003-2022 average. The heatwaves were followed by heavy precipitation and unprecedented floods with many fatalities (COM (2023) 653 final). The last four decades have been warmer than any previous decade, due to human activity.

Compared to the 1850-1900 period, the 2003-2012 was warmer with 0.78° C and the 2011-2020 period – with 1.09° C (UN, 2021). At the same time, according to the Emissions Database for Global Atmospheric Research (EDGAR) (EC, 2023), the global levels of GHG emissions, which are considered as the main cause of global warming and climate change, continue to rise. On the other hand, the EU has made progress in lowering the levels of GHG emissions, which is a step towards its goal of having a net-zero GHG emissions economy and becoming climate neutral by 2050, but achieving tangible and long-lasting global impact requires global commitment.

The United Nations Framework Convention on Climate Change (UNFCCC) (UN, 1992) is the first international document acknowledging the detrimental effects of GHG emissions caused by human activity, pointing out that since GHG concentrations in the atmosphere have been significantly rising. It could be expected that the Earth's surface and atmosphere will warm further on average, which would result in negative effects on both humankind and natural ecosystems. The UNFCCC claims that while historically and currently, the largest share of global emissions has originated in developed countries, emissions in developing countries are relatively low, but it is expected their share to increase to meet their development needs. Due to the global nature of climate change, all nations must work together and take part in an appropriate and effective international response, according to their unique social and economic circumstances, as well as their shared but distinct responsibilities.

Despite the efforts at international level, recent studies show that global emission levels continue to rise, which results in escalation in climate change (COM (2023) 653 final). So, in the early 2050s, worldwide net-zero CO_2 emissions must be attained if the goal is to keep temperature increases to 1.5° C with little to no overshoot. By 2030, global GHG emissions must decrease by 43 % and by 84 % compared to 2019 levels.

More than three decades after the UNFCCC, the EU Climate Action Progress Report 2023 (COM (2023) 653 final) confirms that anthropogenic GHG emissions are causing global warming, which is escalating the frequency and intensity of climate and weather extremes. The effects of global warming will only get worse with each degree of warming, so stopping it and preparing for its effects requires immediate global climate action.

As climate change is already affecting every region across the globe, the year 2021 marks the beginning of the first global stocktake process, which will assess the collective progress towards the Paris Agreement goals (UN, 2021). As of 2021, the aim is for at least 20 % of key players across sectors to take a part in transforming the sector in line with the Climate Action Pathways by 2023. It is estimated that systemic change would be accelerated to a point where it can no longer be stopped by creating sufficient activity among a critical number of actors within a sector. By September 2021, actors across 18 designated sectors have risen to the challenge, and reached or surpassed the 20 % mark. The progress is monitored by the Global Climate Action Portal (GCAP), launched in 2014 and at the end of the first global

stocktake period in 2023, the results lead to the conclusion that a greater ambition and accelerated action is needed to limit global warming to 1.5 °C by 2030 and build resilience (UN, 2023).

The main objective of the paper is to examine the development of the EU ETS in relation to the changes and updates of EU strategies and long-term environmental goals.

MATERIALS AND METHODS

This paper is based on a detailed review of reports, analysis and official documents as action plans, declarations, programs and data related to the measurement of GHG emissions levels, emission trading system, its implementation and the policies aimed at supporting the transition towards achieving climate-neutrality and an economy with net-zero GHG emissions by 2050.

Although the UNFCCC sets the target of reducing GHG emissions, the first steps and commitments towards the implementation of that target followed the adoption of the Kyoto Protocol in 1997 and its entry into force in 2005. In Article 3 a mandatory emission reduction objective of an average of 5% below 1990 levels over the first commitment period of 2008–2012 is established (UN, 1997). The Doha Amendment to the Kyoto Protocol (UN, 2012) marks the second commitment period, 2013–2020 with updated lists of GHGs to be reported on, new pledges, and updated versions of other items related to the initial commitment period. The next step in combating climate change and its negative effects is the Paris Agreement (UN, 2015). Its goal is to limit global average temperature increase to below 2°C above pre-industrial levels with the ambition to limit it to 1.5°C by the end of this century. To achieve this, GHG emissions must peak before 2025 and decline 43% by 2030.

RESULTS AND DISCUSSION

The scheme for GHG emission allowance trading is established with Directive 2003/87/EC (EU, 2003). According to Article 10, for the first three years period, starting on January 1, 2005, Member States should provide at least 95 % of the allowances free of charge. For the next five years period, starting on January 1, 2008, the free of charge allowances should be at least 90 %, as the percentage of free of charge allowances must decrease in each subsequent period. The decrease should be by 1.74 % for the 2013-2020 period, by 2.2 % for the period from 2021 to 2023, by 4.3% between 2024 and 2027 and by 4.4% from 2028. The Directive also states that agreements for the mutual recognition of allowances between the EU ETS and other GHG emissions trading schemes should be concluded with third countries that accepted the Kyoto Protocol.

In order to meet the commitments made under the European Climate Law, the European Green Deal, and the Paris Agreement to a greater extent, Directive 2003/87/EC have been amended several times, as the latest changes were adopted in Directives (EU) 2023/958 and 2023/959 in which some additional measures regarding stationary installations, aviation and maritime transport are included. Directive 2023/958 focuses on further emissions reduction from the aviation sector

with the aim all aviation allowances to be traded by 2026 (EU, 2023), while Directive 2023/959 represents overall reform of the existing EU ETS with increased level of emission reduction of 62 % (previously 43 %), inclusion of new sectors and additional reduction of the annual cap on allowances (EU, 2023).
The changes in the GHG emissions levels are monitored by the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and the Emissions Database for Global Atmospheric Research (EDGAR, 2023) provides an independent, worldwide database for human-caused greenhouse gas emissions and air pollution (fig. 1).

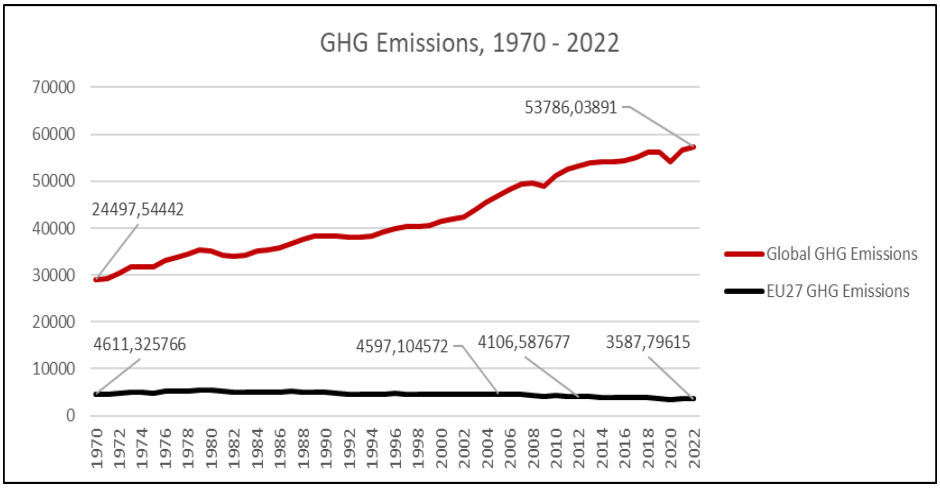

Figure 1. GHG emissions for the 1970-2022 period, Mt CO_2eq/year
Source: Emissions Database for Global Atmospheric Research, European Commission, 2023

As represented in fig. 1 above, global levels of GHG emissions continue to increase, while their levels in the EU are decreasing. After the launch of the EU ETS in 2005, there is a decrease of 490,5 Mt CO_2eq by 2012, which exceeds the commitment of 8 % emission reduction for the period. The trend continues and the decrease for the 2005-2022 period is 1 009,3 Mt CO2eq, or about 28 %. These results bring the EU closer to achieving the goal of a 55 % emissions reduction by 2030, but still, the EU is far from reaching the 2050 net-zero GHG emissions target and greater efforts and better international cooperation are needed. Still, this data validates the EU's leadership in climate action as the reduction of GHG emissions at EU level does not lead to negative impacts on the competitiveness and the performance of regulated actors.
The reduction of GHG emissions at EU level, while their global levels are constantly growing, calls for improved international cooperation. For achieving a global climate impact, more comprehensive change, better international cooperation and inclusion of more sectors and installations is needed.

According to Dechezleprêtre et. al. (Dechezleprêtre et. al., 2023), the EU ETS has a significant impact on carbon emissions and economic performance in Europe. It reduces carbon emissions by around 10 % and led to an increase in revenues and fixed assets for regulated firms. The EU ETS appears to have led to some reductions in carbon emissions without negative impacts on the economic performance of regulated firms and the competitiveness of European industry. But it has been found to have some carbon leakage (Wang et. al., 2024), primarily in the carbon content of imports to EU ETS participants. It also showed significant decreases in export values, carbon intensity, and carbon content for ETS countries. The total carbon embodied in trade has increased due to the ETS, as the carbon leakage offsets decreases in exported carbon content. At the same time, the ETS significantly inhibits carbon emission intensity (CEI) and restricts it through economic intensity promotion and green technology innovation (Liu et. al., 2024). However, the ETS policy produces different carbon reduction effects for different cities, with edge cities having a significant but negligible impact on CEI.

Exploring the impact of emission trading schemes, energy innovation, technology transfer, population growth, and inflation on economic performance, Zhang et. al. (Zhang et. al., 2024) come to the conclusion that carbon taxes have a positive impact to regulating businesses and providing high-quality resources. Renewable energy production reduces fossil fuel consumption, while technology transfer increases advanced technology use. High population growth and government efforts during inflation improve economic practices, leading to better performance.

On the other hand, a study by Adamolekun et. al. on the impact of membership in emission trading schemes (ETS) on corporate environmental practices show that firms that are members of ETS emit more carbon and have more environmental scandals, suggesting that they may join for greenwashing purposes. At the same time they are more effective in their carbon reduction efforts (Adamolekun et. al., 2024). However, membership could discourage a quick transition to sustainable operations and that firms that exit the scheme continue to emit more.

While the amount of free emission allowances has decreased, the price of traded allowances has increased by 45.5 € per ton for the 2005-2024 period (fig. 2).

As shown in fig. 2 below, since the establishment of the ETS in 2005, there have been two main deviations from the trend of gradual increase in price of emission allowances. The first one is in 2007, just before the start of the first commitment period 2008-2012, when the values were close to 0 € per ton. This suggests that very few traded allowances were available at the time, and sales did not occur prior to 2008 when free allowances were awarded. The first peak occurred in the middle of 2008, when prices were close to 30 € per ton. Prices stayed below this level almost until the end of 2020. After the economy started to recover from the COVID-19 pandemic, there was a second peak, and in February 2023 the price was above 106 € per ton, before dropping again to reach 70.25 € per ton in July 2024.

Figure 2: EU carbon permit prices, 2005 – 2024, € per ton

Source: https://tradingeconomics.com/commodity/carbon, *07. 2024*

The simultaneous increase in both price levels of GHG emission allowances and levels of GHG emissions could be indicative that the prices are not high enough to stimulate a faster transition to more sustainable and low-carbon production. On the other hand, the reduction of the total number of allowances also contributes to the price increase. However, more stringent measures in the allocation and reporting of emissions are needed, as well as joint efforts at both regional, national and global levels, to achieve climate targets.

CONCLUSION

Despite the increasingly alarming scientific data on climate change and its consequences, actions in this area continue to be insufficient to achieve real results. While emission levels are reduced within the EU, their global levels are continuously rising. Since the EU ETS's launch in 2005, there has been a decrease of about 28 % of GHG emissions levels in the EU by 2022. This brings EU closer to achieving its goal of a 55 % emissions reduction by 2030, but to meet the 2050 net-zero GHG emissions objective, EU will need to accelerate the transition of all sectors towards more sustainable production models and set more ambitious emission reduction targets.

On the other hand, the reduction of GHG emissions at EU level, while their global levels are constantly growing, indicates the need for improvement of international cooperation. As climate change is a global issue, achieving long-lasting global impact requires global commitment. In order resilience to be created and the global warming to be limited to 1.5 °C by 2030, more ambitious and rapid actions should be undertaken. In order for governments and other stakeholders to make the shift toward a net-zero resilient society, a collaborative regulatory framework is needed. Higher pricing of emission allowances could also contribute to encouraging the actors to shift towards more sustainable production processes.

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