



CONSIDERING THE EFFECTIVENESS OF THE EU ETS REFORM: A SOCIO-LEGAL APPROACH

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Abstract: The European Emission Trading Scheme is one of the most important tools in the Fit for 50 package of the European Union. However, there have been many issues that occurred during the operation of this mechanism that have lessened its role in helping the European Union achieve the carbon neutrality target by 2050. Many reforms have been made to increase the efficiency of the European Emission Trading Scheme. Especially in 2020 and 2023, the European Emission Trading Scheme experienced significant changes with robust measures. Despite the overall reforms, it is unclear whether the reforms are effective. This article is conducted using the socio-legal methodology to answer the question on the effectiveness of the reformed law and regulations regarding the European Emission Trading Scheme. The article finds that the reformed law and regulations effectively reduce emissions and maintain firms' profitability. Adversely, the reformed European Emission Trading Scheme creates new risks such as cost-passing into products and the uncertain function of the new Market Stability Reserve.

I. Introduction

The European Emission Trading Scheme (EU ETS) is a primary tool through which European Union (EU) policymakers hope to achieve deep emission cuts. The EU ETS is the world's second-largest ETS by regulated emissions, the largest by monetary value, and arguably the most advanced ETS globally.¹ The system provides flexibility in cutting emissions. At the beginning of each year, the European Commission determines the total emissions for the next year, which is called the allowance cap.² Then, EU ETS provides the regulated firms with a specific number of emission allowances based on their average annual emissions, which is called the allowance allocation process. Each allowance represents one tonne of emission. At the end of each year, the regulated firms must return the number of allowances equivalent to

¹ 'What is the EU ETS?', <https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/what-eu-ets_en> (accessed 1st January 2025).

² Directive (EU) 2023/959 of the European Parliament and of the Council of 10 May 2023 amending Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union and Decision (EU) 2015/1814 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading system, Art. 1 (3) (a).



their annual emission.³ This process is also called surrender of allowance. The flexibility of this mechanism is that regulated firms can choose to reduce their emission or buy allowances from other firms to accomplish their allowance surrender obligation. Buying allowance allows regulated firms to obligate the EU ETS while not significantly reducing their production intensity, which can cause a loss in profit.

However, throughout the operation of the EU ETS, this mechanism has been criticized for its inability to reduce emissions effectively. This is because allowances were easily obtained during its early operation (2005 to 2012). The first cause of this widespread obtainability is the over-allocation of free allowance during this period. Regulated firms have already earned many free allowances at the start of each year. The number of allocated allowances exceeded firms' emissions, leaving a surplus of allowances. The cumulative surplus allowance at the end of 2012 was 995 million tonnes.⁴ The second cause is the low price of allowance. Because of the imbalance between supply and demand, the EU ETS's allowance price decreased harshly to around 5 EUR/allowance in 2012.⁵ Regulated firms can earn many allowances for free. If they over-emit, they can buy allowances for very low prices. For this reason, firms did not consider that the EU ETS could impact their profitability and reduce the impact of EU ETS on firms' decisions to reduce emissions and invest in low-carbon technologies. This reduces the direct effect of EU ETS on emissions reduction.⁶ There have been some amendments by the European Commission to counter these negative consequences of the EU ETS in the early operation in the third phase (2013 – 2020). However, many claimed that this reform of the EU ETS is ineffective in minimizing its negative consequences. Understanding this issue, the EC implemented other reforms in 2020, which greatly changed the allowance cap, allocation, and the Market Stability Reserve function.

The reform of the EU ETS in 2020 increased the robustness of the EU ETS function. However, the effectiveness of this reform still remains uncertain. For this reason, this research is dedicated to analyzing the effectiveness of the reformed EU ETS laws and regulations. The socio-legal approach is applied since it is the most appropriate methodology for the research. To justify the effectiveness of laws and regulations requires putting them into practice. The socio-legal methodology uses an interdisciplinary approach to theoretical aspects of the law and the law in practice. In other words, socio-legal aims to clarify the practical aspects of law.⁷ By applying the socio-legal approach, the research analyzes the laws and regulations of the

³ Consolidated version of Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a system for greenhouse gas emission allowance trading within the Union and amending Council Directive 96/61/EC [2024] (Directive 2003/87/EC), Art. 12.

⁴ European Commission, *Report from the Commission to the European Parliament and the Council: The state of the European carbon market in 2012* (Brussels, 2012), pp. 5

⁵ *Ibid.*

⁶ Corjan Brink, Herman R.J. Vollebergh, Edwin van der Werf, 'Carbon pricing in the EU: Evaluation of different EU ETS reform options' (2016) 97 *Energy Policy* 603 - 617, 612 - 613; Tim Laing et al, 'Assessing the effectiveness of the EU Emissions Trading System' (2013) Centre for Climate Change Economics and Policy Working Paper No. 126, Grantham Research Institute on Climate Change and the Environment Working Paper No. 106, 24 - 26 <<https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2014/02/WP106-effectiveness-eu-emissions-trading-system.pdf>> accessed 15 August 2024; Maria Carratù, Bruno Chiarini, Paolo Piselli, 'Effects of European emission unit allowance auctions corporate profitability' (2020) 144 *Energy Policy* 1, 8 - 9.

⁷ Don Harris, 'The Development of Socio-Legal Studies in the United Kingdom' (1983) 2 *Legal Studies*, pp. 315.



reformed EU ETS (Legal) and examines data on the emissions rating and economic effect... from the data reports by the EC and previous publications (Socio). The research results are whether the reformed EU ETS laws and regulations are effective and what amendments should be applied to better the performance of the EU ETS in accordance with its role as a primary emission reduction tool for the EU.

II. Overview of the EU ETS reform

As mentioned in the introduction, the EU ETS reforms to be analyzed are the reforms in the year 2020 and 2023. Accordingly, the reforms focused on three aspects of the EU ETS, which are the rules on cap determination, allowance allocation and the MSR function.

Regarding the cap determination rules, they received two changes in 2020 and 2023. In 2020, a new rule was introduced to reduce the allowance cap. The EU ETS allowance cap is adjusted to be lower each year to reduce the total emissions.⁸ At the time of the introduction of this mechanism, the total allowances are decreased by 1.74% per year (linear reduction factor - LRF).⁹ In 2023, the cap was tightened to bring emissions down by 62% by 2030, compared to 2005 levels. In specific, the LRF increased to 2.2% from 2021 to 2023, 4.3% from 2024 to 2027, and 4.4% from 2028.¹⁰

The second change is in the rules for allowance allocation, which occurred in the year 2020. Most of the pre-reformed EU ETS allowances were allocated for free, but this was then restricted under the new rules. Allowance auction is used as the primary allocation measure.¹¹ Electricity is excluded from free allocation, while firms in other sectors must apply for it even if they are eligible for free allocation.¹² The carbon border adjustment mechanism¹³ has also been established to replace free allocation with carbon leakage mitigation.¹⁴ The new measures regarding have restricted the amount of allowance allocated for free, which reduces the availability of allowance on the EU ETS and increases the pressure of the EU ETS on regulated firms.

The third change of the reformed EU ETS is the Market Stability Reserve (MSR) function. MSR reserves allowance to decrease the overall allowance on the market when the total number of allowances in circulation (TNAC) exceeds a specific amount. After a period, the MSR will return those allowances to the market.¹⁵ On the other hand, MSR can react to

⁸ 'What is the EU ETS?', <https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/what-eu-ets_en> (accessed 21st September 2024).

⁹ Directive 2003/87/EC, Art. 9.

¹⁰ Directive 2003/87/EC, Art. 9.

¹¹ Directive 2003/87/EC, Art. 10a.

¹² Commission Delegated Regulation (EU) 2019/331 of 19 December 2018 determining transitional Union-wide rules for harmonised free allocation of emission allowances pursuant to Article 10a of Directive 2003/87/EC of the European Parliament and of the Council, Art. 4.

¹³ Carbon Border Adjustment Mechanism is the EU's tool to put a fair price on the carbon emitted during the production of carbon intensive goods that are entering the EU, and to encourage cleaner industrial production in non-EU countries. Accordingly, goods imported into the EU must go alongside information on the emissions during the goods production. EU companies that import the goods must pay the excess price in accordance with the emissions of the imported goods. Each emission is priced equal to the allowance auction price in the EU ETS (Source: https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en)

¹⁴ Directive 2003/87/EC, Art. 10a.

¹⁵ Decision (EU) 2015/1814, Art. 6 and 7.



market price fluctuations by increasing or decreasing the amount of allowance circulating on the EU ETS.¹⁶ After 2023, the allowances in the MSR can be invalidated (canceled) when they exceed a fixed allowance threshold.¹⁷ The MSR was established to cope with the abundance of allowances in the EU ETS, contributing to its significantly low price in phases 2 and 3.¹⁸ It reduced the surplus allowances and maintained a high allowance price. Additionally, the MSR protected the EU ETS from price decreases during the COVID-19 Pandemic, when the risk of allowance surplus is high due to low emissions by firms.¹⁹

In overall view, the reforms of the EU ETS introduced some ambitious measures on the function of the EU ETS which greatly increase its pressure on regulated firms. The next part justifies whether the mentioned reform can increase the effectiveness of the EU ETS and the issues raised from the reforms.

III. Analyses of the effectiveness of the reformed EU ETS laws and regulations

3.1. EU ETS positively impacts the environment without hindering the economy

The new regulations regarding the cap of the EU ETS and the allocation of allowances have positively affected its performance. The section below analyzes the strength of each change and justifies the effectiveness of the reformed EU ETS.

The first change to be analyzed is in the EU ETS cap determination rules, which is considered stricter. The literature shows that this cap suits the EU's reduction target. Most suggest a strict cap with an annual LRF of around 4% to 5%.²⁰ If the EU ETS follows a less stringent cap, it needs to decrease significantly after 2030 to allow the EU to achieve carbon neutrality by 2050.²¹ This situation can result in increased expenses to comply with the EU ETS, negatively affecting the economy.²² On the other hand, national energy policies are implementing drastic measures for climate change mitigation, such as coal phase-out policies and supporting schemes for renewable energy.²³ This further reduces emissions, creating the risk of allowance surplus. The current LRF can better reflect the new energy policies and minimize the risk.²⁴ Additionally, a stringent EU ETS cap can accelerate the energy transition by 3-17 years, which is crucial for long-term climate change mitigation efforts.²⁵ The energy transition allows companies to pursue emission reduction strategies that do not compromise profitability. The faster the energy transition, the less expense firms must pay to comply with the stricter EU ETS cap. With the new rules for cap determination, the EU ETS plays a better

¹⁶ Directive 2003/87/EC, Art. 29a(1).

¹⁷ Decision (EU) 2015/1814, Art. 5a.

¹⁸ Christian Flachsland, et al, "How to avoid history repeating itself: the case for an EU Emissions Trading System (EU ETS) price floor revisited" (2020) 20 Climate Policy 133, 134 – 135.

¹⁹ Reyer Gerlagh, Roweno J.R.K Heijmans, Knut Einar Rosendahl, "COVID-19 Tests the Market Stability Reserve" 2020 Environmental and Resource Economics 76 855 - 865, 863.

²⁰ Aleksandar Zaklan, et al, 'EU ETS Cap must and Can be Reduced More Quickly', (2020) 10 (26/27) DIW weekly report 293, 298 – 299; Aleksandar Zaklan, Jakob Wachsmuth, Vicki Duscha, 'The EU ETS to 2030 and beyond: adjusting the cap in light of the 1.5°C target and current energy policies' (2021) 21:6 Climate Policy 778, 787 – 789; Robert C. Pietzcker, Sebastian Osorio, Renato Rodrigues, 'Tightening EU ETS targets in line with the European Green Deal: Impacts on the decarbonization of the EU power sector' (2021) 293 Applied Energy 116914, 116927 – 116929.

²¹ Aleksandar Zaklan, Jakob Wachsmuth, Vicki Duscha, (n 20), 787 - 789.

²² Aleksandar Zaklan, Jakob Wachsmuth, Vicki Duscha, n (20), 782 - 785

²³ Aleksandar Zaklan, et al, n (20), 298; Aleksandar Zaklan, Jakob Wachsmuth, Vicki Duscha, n (20), 786 – 788.

²⁴ Aleksandar Zaklan, Jakob Wachsmuth, Vicki Duscha, n (20), 788 - 789.

²⁵ Robert C. Pietzcker, Sebastian Osorio, Renato Rodrigues, n (20), 116925 – 116926.



role in fastening the emission reduction rate and minimizing the adverse effects on the economy.

The second change to be analyzed is the rules for allowance allocation. Reducing free allowance allocation by these new rules is appropriate to maintain the ability of the EU ETS in reducing emissions. Much literature supports restricting free allocation since it can negatively impact the EU ETS.²⁶ Firstly, firms didn't feel the need to cut carbon emissions because they got plenty of free emission allowances.²⁷ Secondly, free allocation can slow down low-carbon technological change. It reduced the impact of low-carbon technology improvements by firms, as they would cost lower expenses when buying allowances.²⁸ Thirdly, even though free allocation was used to minimize carbon leakage, there were no precise results of its efficiency.²⁹ Lowering the amount of free allowances can pressure firms to reduce emissions and invest in low-carbon technologies.³⁰ Additionally, allowance auctioning as the primary allocation method can better finance green energy and low-carbon technologies. Revenues from allowance auctioning can be used to fund projects that increase emissions reduction efficiency.³¹ The more allowances auctioned, the more revenue is provided to support projects in the new EU ETS. Financial support is necessary to improve environmental innovation, especially for firms with limited cost pass-through options.³² With the innovation of emission reduction efficiency technologies, firms can still comply with the strict EU ETS while not significantly reducing their performance. This minimizes the drawbacks of emissions reduction on the economy while increasing the emission decrease annually.

Based on the analysis above, the reformed EU ETS pushes the emission reduction higher while not crippling economic development due to the innovation of low-carbon technology and green energy. However, empirical studies that justify this statement are lacking. Most of the studies focused on the impact of the EU ETS on the firms' performance in individual countries, while no analysis of the effects of the reform on the environment was found.

Regarding the environmental impact, the justification for the impact of the reformed EU ETS will be mainly based on empirical data collected from EU reports. The data on emissions reduction in the EU ETS sectors show some ineffectiveness at the start of phase 4. In 2021 and 2022, emission reduction was less efficient than in previous years, with emissions increasing

²⁶ Maria Carratù, Bruno Chiarini, Paolo Piselli, (n 6), 3 – 4; Jordi Teixido, Stefano F. Verde, Francesco Nicolli, “The impact of the EU Emission Trading System on low-carbon technological: The empirical evidence” (2019) *Ecological Economics* 164, 174 – 175; Nathalie Muller, Jordi J. Teixido, ‘The effect of the EU ETS free allowance allocation on energy mix diversification: the case of Poland’s power sector’ (2021) 21:6 *Climate Policy* 804, 816 – 817.

²⁷ Maria Carratù, Bruno Chiarini, Paolo Piselli, (n 6), 3 – 4.

²⁸ Jordi Teixido, Stefano F. Verde, Francesco Nicolli, (n 26), 174 – 175; Nathalie Muller, Jordi J. Teixido, (n 26), 816 – 817.

²⁹ Stefano F. Verde et al, ‘Free allocation rules in the EU emissions trading system: what does the empirical literature show?’ (2019) 19:4 *Climate Policy* 439, 449 – 448.

³⁰ Massimo Brodignon, Duccio Gamannossi degl’Innocenti, ‘Third Tim’s a Charm? Assessing the Impact of the Third Phase of the EU ETS on CO2 Emissions and Performance’ (2023) 15 *Sustainability* 1, 13 – 14; Piotr Gretszel, ‘Testing for the economic and environmental impacts of EU Emissions Trading System: A panel GMM approach’ (2020) 21 (2) *Managerial Economics* 99, 118; Maria Carratù, Bruno Chiarini, Paolo Piselli, (n 6), 3 – 4.

³¹ Directive 2003/87/EC, Art. 10a (8) and 10c.

³² Francesco Scotti, et al, ‘Demand-pull and technology-push environmental innovation: a policy mix analysis on EU ETS and EU Cohesion Policy’ [2024] *Climate Policy* 1, 14.



by 6% compared to the 2020 level in 2021 and only reduced by 2% compared to the 2021 level in 2022.³³ However, the emissions in 2021 (1,308,778,363) and 2022 (1,285,777,879) are always lower than the 2019 level (1,385,331,147). This proves that the reformed EU ETS has reduced more emissions than the pre-reformed. Additionally, emissions significantly reduced by 18% in 2023 despite keeping the same LRF.³⁴ The reason can be the change in energy shares. Compared to 2022, the share of renewable energy in 2023 increased to 9% for solar energy, 18% for wind energy, and 12% for hydro energy, while coal was reduced to 12% and gas was reduced to 17%.³⁵ On the other hand, the energy sector reduced the most emissions in 2023. Low-carbon technology did not contribute much to this because a study shows that up to 2022, the EU ETS did not spur the required low-carbon technological changes.³⁶ Despite some issues at the start of phase 4, the EU ETS is still cutting high emissions in the covered sector. The role of the change in energy share is believed to contribute the most. However, the low-carbon technology innovation effect achieved by the EU ETS was not clearly shown. This is mainly because of the EU ETS cap in the pre-2023 periods.³⁷ The cap increase in 2024 is believed to fix this problem, but more time and data are needed to justify this.

This research can only reach three studies on economic performance. Each study has a different range of research: Portugal, Sweden, and the EU. Despite differences in the range, those studies show that the reformed EU ETS did not negatively affect firm performance, which is a strong clue to prove that the EU ETS does not adversely affect the economy.³⁸ This effect on firms' performance lies primarily in the role of low-carbon technology. Despite the EU ETS's proven inability to improve low-carbon technology, the current situation still effectively affects firms' performance. However, this still needs to be improved further to cope with the more stringent obligations in the future.

Based on the analysis above, the reformed EU ETS can be considered effective when it cuts higher emissions without greatly hindering the economy. However, due to the shortage of

³³ European Commission, *Report from the Commission to the European Parliament and the Council on the functioning of the European carbon market in 2022 pursuant to Articles 10(5) and 21(2) of Directive 2003/87/EC* (Brussel 2023), 23; EU Emissions Trading System (ETS) data viewer, <<https://www.eea.europa.eu/data-and-maps/dashboards/emissions-trading-viewer-1>> (accessed 25th August 2024).

³⁴ Andrei Marcu, et al, *2024 State of the EU ETS report* (The European Roundtable on Climate Change and Sustainable Transition 2024 Brussel), 10 - 11; EU Emissions Trading System (ETS) data viewer, <<https://www.eea.europa.eu/data-and-maps/dashboards/emissions-trading-viewer-1>> (accessed 25th August 2024).

³⁵ Andrei Marcu, (n 34), 10 - 11; Andrei Marcu, et al, *2023 State of the EU ETS report* (The European Roundtable on Climate Change and Sustainable Transition 2023 Brussel), 11.

³⁶ Rahel Mandaroux, Kai Schindelbauer, Houdou Basse Mama, 'How to reinforce the effectiveness of the EU emissions trading system in stimulating low-carbon technological change? Taking stock and future directions (2023) 181 Energy Policy 1, 11 - 12.

³⁷ Rahel Mandaroux, Kai Schindelbauer, Houdou Basse Mama, (n 36), 12; Aleksandar Zaklan, et al, (n 20), 298 - 299; Aleksandar Zaklan, Jakob Wachsmuth, Vicki Duscha, (n 20), 787 - 789; Robert C. Pietzcker, Sebastian Osorio, Renato Rodrigues, (n 20), 116927 - 116929.

³⁸ Mara Madaleno, Monica Meireles, 'EU ETS Impact on Companies Performance in Portugal: A Sector Analysis' (2023), 4 - 5; Joar Haraldsson, Linus Logren, 'EU ETS Fourth Phase Firm-Level Effects: An Exploratory Study of Implications for Swedish Industry within the EU ETS' Master of Science Thesis KTH Royal Institute of Technology, 79 - 81; Whelsy Boungou, Bastien Dufau, 'EU ETS phase IV and Industrial performance' (2024) 236 Economics Letters 1, 4.



empirical research and data on this issue, the practical effects of the reformed EU ETS will need more time to be precisely justified.

3.2. Problems of the new EU ETS

The reform still leaves some problems that need addressing. This part of the research focuses on the effect of those issues on the EU ETS performance.

The first issue is the risk of the allowance price pass-through. Empirical studies have shown that the allowance price is closely related to the product's price, especially in the energy sector.³⁹ Firms can include the allowance price in the product price to compensate for the cost of buying allowance, also called cost pass-through. The pass-through rates vary by sector, ranging from 20% to 100%.⁴⁰ Cost pass-through negatively affects the social and economic effectiveness of the EU ETS. First, the end-user has to bear the allowance price, which causes them to face higher product prices. Second, cost pass-through is a holdback on the EU ETS's effectiveness. Since the end-user bears the cost of the allowance price, firms would not face enough pressure to cut down their emissions.⁴¹

The main reason for firms' cost pass-through under the EU ETS is the lack of competition. Firms can increase their product prices by the allowance price without losing their competitive power. This is why the energy sector has the highest rate of price pass-through, especially electricity, where only a few firms compete in the market.⁴² Another reason for the cost pass-through is the lack of low-carbon energy innovation alongside with high allowance prices. Strict EU ETS obligations require firms to cut emissions deeper every year, but the lack of low-carbon energy innovation leaves them with few options to comply with the EU ETS without risking their profit.⁴³ Buying allowances is their highest priority. However, high allowance prices can substantially affect their profit, especially for firms without low-carbon technology. To minimize the expense of buying allowances, they have to pass the cost onto the product price.

Although no studies have proven the occurrence of cost pass-through in the new EU ETS, there is a high risk. Firstly, low-carbon technology innovation is still ineffective in the EU ETS, making low-carbon technology less widespread than needed. Additionally, the allowance price is very high (above 50 EUR/allowance for three years), increasing the cost of buying allowances.⁴⁴ Secondly, introducing the Carbon Border Adjustment Mechanism (CBAM) can ease the competitive pressure of the regulated sector. CBAM requires firms to pay extra when

³⁹ YiYii Bai, Samuel J. Okullo, 'Drivers and pass-through of the EU ETS price: Evidence from the power sector' (2023) 123 *Energy Economics* 1, 11 – 12; Critique on price induced technological innovation and on fringe pricing' in Aviel Verbruggen, *Pricing Carbon Emissions: Economic Reality and Utopia* (Routledge, 2020), 83 – 84; Agustín García, María Teresa García-Álvarez, and Blanca Moreno, 'The Impact of EU Allowance Prices on the Stock Market Indices of the European Power Industries: Evidence From the Ongoing EU ETS Phase III' (2021) 34 (3) *Organization & Environment*, 459 – 478, 472 – 473; Maria Carratù, Bruno Chiarini, Paolo Piselli, (n 6), 9.

⁴⁰ Johanna Cludius, et al, 'Ex-post investigation of cost pass-through in the EU ETS – an analysis for six industry sectors' (2020) 91 *Energy Economics* 1, 6 – 7.

⁴¹ Eugenie Joltreau, Katrin Sommerfeld, 'Why does emissions trading under the EU Emissions Trading System (ETS) not affect firms' competitiveness? Empirical findings from the literature' (2019) 19 (4) *Climate Policy* 453, 464 – 465.

⁴² *ibid*, 464 – 465.

⁴³ Beat Hintermann, 'Market Power in Emission Permit Markets: Theory and Evidence from the EU ETS' (2017) 66 *Environmental and Resource Economic* 89, 109 – 110.

⁴⁴ EU Carbon Permits, <<https://tradingeconomics.com/commodity/carbon>> (accessed 26th August) Cuest.fisioter.2024.53(3):4259-4272 4265



buying goods from third-party countries, which is equivalent to the current allowance price.⁴⁵ EU firms can pass through the cost of the allowance price as long as it does not exceed the third-party countries' product prices. These factors make cost pass-through an appropriate choice from the firms' point of view, as it allows them to maintain their profit while complying with the EU ETS.

The second issue with the reformed EU ETS is the Market Stability Reserve (MSR) function. The reform of the MSR faced with much criticism.⁴⁶ Firstly, the MSR may not work properly in the future. The MSR uses a quantitative approach to determine whether to process or cancel allowances. However, the threshold is fixed, while the TNAC decreases yearly due to the EU ETS's lowered cap.⁴⁷ The MSR cannot take allowances when the TNAC does not exceed the threshold, which hinders the effectiveness of the MSR's cancellation mechanism. When this mechanism is introduced, many allowances in the MSR will be canceled. However, further cancellation would only occur if there was additional MSR intake, which is unlikely.⁴⁸ In scenarios where the EU ETS delivers a low cap but energy innovation is developed, firms can still comply with the strict EU ETS while not buying allowances. The surplus of allowance can occur in this case, but without the intervention of the MSR, as TNAC does not exceed the threshold.⁴⁹ On the other hand, the MSR releases allowances back to the market after a period. Because allowance intake and cancellation do not occur, this release increases the TNAC on the market.⁵⁰ As a result, cumulative allowances in the future can increase due to the increase in allowances.⁵¹

Secondly, the MSR increases the complexity of the EU ETS cap. The pre-reformed EU ETS cap is determined by the emissions from the sectors covered by the EU ETS. Because of the MSR, the cap also relies on allowance surplus and variable aggregator to see whether the MSR will take in allowance, leading to a lower cap.⁵² In other words, the EU ETS has changed from a politically determined one to an endogenous one.⁵³ Adding the MSR to determine the cap causes the European Commission (EC) to lose direct control over the EU ETS cap. The reason is that the MSR relies on TNAC to take allowances. The TNAC is affected by many factors, such as energy innovation, firm production intensity, and other external factors that the EC does not have direct control over. Additionally, losing control over the total EU ETS cap makes policymakers unable to control the cumulative emissions.⁵⁴ This results in uncertain

⁴⁵ Regulation (EU) 2023/956 of the European Parliament and of the Council of 10 May 2023 establishing a carbon border adjustment mechanism [2023] L 139/52, Art. 9 and 21.

⁴⁶ Kenneth Bruninx, Marten Ovaere, 'COVID-19, Green Deal and recovery plan permanently change emissions and prices in EU ETS Phase IV' (2022) 13 *Nature Communications* 1, 6 – 7.

⁴⁷ Theresa Wildgrube, 'Fit for 55? An assessment of the effectiveness of the EU COM's reform proposal for the EU ETS' (2023) 47 *Zeitschrift für Energiewirtschaft* 52, 60 – 64.

⁴⁸ Theresa Wildgrube, (n 47), 64; Osorio Sebastian, 'Reviewing the Market Stability Reserve in light of more ambitious EU ETS emissions targets' (2020) 158 *Energy policy* 1, 27 – 28.

⁴⁹ Osorio Sebastian, (n 48), 27 – 29.

⁵⁰ Theresa Wildgrube, (n 47), 60 – 64.

⁵¹ Reyer Gerlagh, et al, 'An endogenous emissions cap produces a green paradox' (2021) 36 *Economic policy* 485, 504 – 507; Theresa Wildgrube, (n 47), 64.

⁵² Ulrik Beck, Peter K Kruse-Andersen, 'Endogenizing the Cap in a Cap-and-Trade System: Assessing the Agreement on EU ETS Phase 4' (2020) 77 *Environmental & resource economics* 781, 801.

⁵³ Schmidt, 'Puncturing the Waterbed or the New Green Paradox? The Effectiveness of Overlapping Policies in the EU ETS under Perfect Foresight and Myopia' [2020] IDEAS Working Paper Series from RePEc, 17.

⁵⁴ Ulrik Beck, Peter K Kruse-Andersen, (n 52), 801.



effects of the EU ETS in reducing emissions, which can cause the reform to lose track of its 'Fit for 55' target.⁵⁵

The allowance price pass-through risk and the MSR function raised crucial questions about the EU ETS's current effectiveness. Therefore, the EU ETS needs to be revised to minimize those effects.

IV. Conclusions and recommendations

The findings show that the reformed EU ETS is effective in reducing emissions while maintaining economic performance. However, the reformed EU ETS still has some weaknesses, such as the price pass-through and the MSR function.

Regarding cost pass-through, technological innovation can minimize its effects. This can help reduce firms' total allowances, decreasing their need to buy allowances to comply with the EU ETS. On the other hand, firms that decarbonize their production can have competitive advantages over those that do not since they do not have to pass through allowance prices to minimize the cost of buying allowances. This can result in the widespread effect of decarbonization by firms, leading to a better impact on the environment. The cap and allowance allocation is important in increasing the impact of technology innovation by the EU ETS. The present regulations do not require any modifications, as the recent adjustments to the cap and allowance allocation rules have garnered widespread approval in the relevant literature.⁵⁶ Additionally, the lack of empirical evidence makes spotting any issues in the new rules difficult. Future research with more data can precisely justify the new EU ETS cap and allowance allocation rules.

The main issue with the MSR's function is its quantitative approach. Many studies suggest changing it to a price-triggered one.⁵⁷ This suggestion is appropriate for amending the Article 1 (5) and (5a) Decision (EU) 2015/181. The new model triggers allowance intake and cancellation when prices fall below a floor price. The MSR can still take allowances in the future despite the low cap. An allowance surplus will likely cause low prices, triggering the MSR. Then, the MSR will make allowances in this situation and retain the balance in the EU ETS. Additionally, the cancellation effect of the EU ETS can be strengthened. Cancellation can occur without relying on the MSR's allowance intake, which means more allowance can be canceled regardless.⁵⁸ Cancellation is the mechanism that directly contributes to the decrease in the total allowances in the EU ETS emissions. More allowances canceled means less TNAC in the future, reducing the risk of increasing cumulative emissions. Recommending a suitable floor price requires research that contributes solely to this issue, which is not the objective of this research. However, the price approach cannot reduce the uncertainty in the EU ETS as it still relies on external factors to function the MSR.⁵⁹ Some suggest that removing the

⁵⁵ Reyer Gerlagh, et al, (n 51), 504 – 507

⁵⁶ Maria Carratù, Bruno Chiarini, Paolo Piselli, (n 6), 3 – 4; Aleksandar Zaklan, et al, n (20), 298; Aleksandar Zaklan, Jakob Wachsmuth, Vicki Duscha, n (20), 786 – 788; Robert C. Pietzcker, Sebastian Osorio, Renato Rodrigues, (n 20), 116925 – 116926.

⁵⁷ Ulrik Beck, Peter K Kruse-Andersen, (n 52), 807; Kenneth Bruninx, Marten Ovaere, (n 46), 7; Reyer Gerlagh, et al, (n 51), 505; Osorio Sebastian, (n 48), 29; Reyer Gerlagh et al, 'Shifting concerns for the EU ETS: are carbon prices becoming too high?' (2022) 17 Environmental Research 1, 5.

⁵⁸ Reyer Gerlagh, et al, (n 51), 505.

⁵⁹ Ulrik Beck, Peter K Kruse-Andersen, (n 52), 806; Reyer Gerlagh, et al (n 51), 506.



endogenous EU ETS cap should be considered.⁶⁰ However, emissions are still unstable even if the EC controls the EU ETS cap directly. The endogenous cap still does well in creating the scarcity of allowance in the EU ETS and reducing total emissions, which means it is still appropriate to keep it.

This research still has some weaknesses that need to be addressed further. Firstly, the research cannot suggest a specific rule. This is mainly because the main concerns of the EU ETS are technical issues, which require knowledge outside of the law to issue a specific rule. Secondly, most findings are assumptions due to the lack of data and literature, hindering its characteristic as socio-legal research. Even though there is data from the reports and other research, it only shows the reform's partial success. To confirm its effectiveness requires more time and persuasive data. However, this research still successfully concludes the importance of energy innovation for the effectiveness of the EU ETS while showing that the empirical literature on the reformed EU ETS is lacking. Additionally, this research raises the possibility of future research in determining the specific price for triggering the MSR and precisely justifying the effect of the reformed EU ETS.

⁶⁰ Ulrik Beck, Peter K Kruse-Andersen, (n 52), 807.
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