RESEARCH PAPER:

CLIMATE DIVIDEND IN THE ENVIRONMENT OF EMISSIONS TRADING IN THE SLOVAK REPUBLIC

Prepared for: Martin Hojsík MEP

Author: Jan Svoboda,
Association for International Affairs, Czech Republic

Reviewer: Mgr. Richard Filcak, MSc. PhD., Institute for Forecasting,
Centre of Social and Psychological Sciences, Slovak Academy of Sciences

Progresívne Slovensko

renew europe.

For valuable comments and coordination I am thankful to Ing. Ladislav Hegyi,
my advisor and environmentalist.

List of abbreviations:

ACER – Agency for the Cooperation of Energy Regulators
CBAM – Carbon Border Adjustment Mechanism
CHP – combined heat and power

CO_2 – carbon dioxide
EEA – European Environment Agency
ETS – Emissions Trading System
EC – European Commission
ESD – Effort Sharing Decision
ESR – Effort Sharing Regulation
EU – European Union
EUA – European Union Allowance
EU ETS – European Emissions Trading System
GDP – gross domestic product
GHG – Greenhouse Gas

$ktCO_2eq$ – kiloton of CO_2 equivalent
LRF – linear reduction factor
MEP – Member of the European Parliament
MS – Member State
MSR – Market Stability Reserve

$MtCO_2eq$ – megaton of CO_2 equivalent
NECP – National Energy and Climate Plan

tCO_2eq – ton of CO_2 equivalent
TNAC – Total Number of Allowances in Circulation
TTF – Title Transfer Facility
WAM – With Additional Measures
WEM – With Existing Measures

FOREWORD

Climate Crisis has become a key defining issue of our generation. To limit global warming to a maximum of 1.5 degrees Celsius requires a fast reduction in emissions of greenhouse gases (GHG). As the European Union, we took the way of pricing GHG via a trading system, attempting to use the market forces as a crucial tool to reduce emissions. While imperfect with many loopholes, the Emission Trading System (ETS) has contributed substantially to a reduction of Union's GHG emissions. As the ETS keeps evolving and broadening other areas, it is highly relevant to consider social and societal implications of carbon pricing.

Climate Justice has become a crucial ingredient in addressing the Climate Crisis. Justice in its wider sense is one of the cornerstones of liberal democracy. Addressing Climate Crisis in a socially and societally just way is essential to preserve both the fabric of our European society as well as our European values.

Climate dividend is therefore more than a Climate Cheque to every resident. It is based on the profound conviction that just like sovereignty of the Union and its Member states comes from people, so the rights to emissions are linked to people. Therefore it is not only socially just to give a large share of the revenue from sale of GHG emissions back to people, but it is also deeply rooted in our European values to do so.

I chose to look at Slovakia not only because it is my home country; it is also a Central European country facing the challenges of the Green transition, yet not fully utilizing its opportunities. It is a country that is facing social problems - energy poverty being one of the big ones. Addressing the challenges of a green transition in a just way that is beneficial for climate might be an inspiration for others in Europe and elsewhere.

Climate Cheque in the pocket of everyone will not be the panacea. But I hope that it can significantly contribute to addressing Climate Crisis in a just way.

Martin Hojsík
Member of European Parliament
Progresívne Slovensko
Renew Europe

EXECUTIVE SUMMARY:

A climate dividend is a redistribution strategy that returns revenues from carbon taxation straight back to consumers as they are often directly impacted by price increases. While the idea of climate dividend is relatively new, “many climate scientists and economists alike say it is the fairest and most effective way of getting to zero carbon.” Indeed, a carbon dividend scheme has many advantages as it addresses energy poverty and income inequality while incentivizing low-carbon investment. The tool also requires relatively low governmental involvement. Furthermore, a climate dividend is a kind of policy that is appealing to consumers and would gather both public and political support. Generally, financial programme support such as grants is less visible to citizens and its association with carbon pricing is less evident. Climate dividend is a transparent and simple tool that ensures vulnerable households are compensated for increased costs related to carbon pricing.

Since its inception in 2005, the European Emissions Trading System, or EU ETS has come through numerous reforms. As part of the ‘Fit for 55’ climate package presented by the European Commission in summer 2021, the EU ETS should undergo significant changes yet again as major sectorial extension is expected. The maritime sector will be included into the EU ETS from 2023 onwards and a proposal to set up a separate ETS for the buildings and the transport sectors by 2025 is on the table too. While these changes are an answer to the Green Deal and related toughening of emission targets such as the new binding target “of a reduction of net GHG emissions by at least 55% by 2030 compared to 1990”[1], as well as the objective of a climate-neutral EU by 2050, evidence has shown that carbon taxation is often directly passed on to consumers especially when it comes to transport and heating fuels.

From 2015 onwards, the entire proceeds of emission auctions are income for the Environment Fund of the Slovak Republic which uses the collected revenue mainly for programmes and activities related to pollution reduction as well as waste and wastewater management. With the potential sectorial extension to buildings and transport, many fear that vulnerable households will disproportionately pay the price as these sectors are directly consumer-facing. Indeed, low-income households spend the highest proportion of their income on heating and transport. Based on projections, by 2025, the size of the Slovak EU ETS II should be around 13.35 $MtCO_2$eq.

Increasing auctioning revenues from EU ETS provide a great opportunity to fund the green transition and help the EU achieve its ambitious climate targets. Between 2021 and 2030, the total revenue for Slovakia from the sale of EUAs is estimated at €12,4 billion. As people’s living costs will surely increase as a result of carbon taxation, it is crucial they will get something in return.

The proposal of the study for a carbon dividend scheme in Slovakia suggests distributing 40% of auctioning proceeds to all Slovak residents as all residing households in Slovakia will be affected by price increases. In 2026, available funds for the scheme would amount to around €693 million which would translate to around €127 per person per year. In order to be an efficient tool without additional demands on governmental capacities, a climate dividend for Slovakia should not include any distributional criteria. It should be uniform and distribute a share of auctioning revenues equally between all residents, including children. Most importantly, as most vulnerable households in Slovakia are family households with three or more children, the tool would support families while decreasing risks of energy poverty.

[1] European Council, “Council adopts new climate law”, June 2021

ZHRNUTIE

Klimatická dividenda je stratégia prerozdeľovania, ktorá vracia príjmy zo spoplatnenia emisií skleníkových plynov priamo obyvateľom, keďže tí sú priamo ovplyvnení zvýšením cien. Zatiaľ čo myšlienka klimatickej dividendy je relatívne nová, „mnohí klimatickí vedci a ekonómovia tvrdia, že je to najspravodlivejší a najefektívnejší spôsob, ako dosiahnuť klimatickú neutralitu“. Systém uhlíkovej dividendy má skutočne veľa výhod, pretože prispieva k riešeniu energetickej chudoby, nerovnosti príjmov a zároveň stimuluje nízkouhlíkové investície. Tento nástroj si tiež vyžaduje relatívne nízke zapojenie vlády. Okrem toho je klimatická dividenda druhom politiky, ktorá je príťažlivá pre spotrebiteľov a získala by verejnú aj politickú podporu. Vo všeobecnosti sú cielené grantové programy pre občanov menej viditeľné, pre niektorých aj ťažšie dostupné a ich spojenie so spoplatnením emisií skleníkových plynov menej zrejmé. Klimatická dividenda je transparentným a jednoduchým nástrojom, ktorý zaisťuje, že zraniteľné domácnosti budú kompenzované za zvýšené náklady súvisiace so spoplatňovaním uhlíka.

Od svojho založenia v roku 2005 prešiel Európsky systém obchodovania s emisiami (EU ETS) mnohými reformami. V rámci klimatického balíka „Fit for 55“, ktorý Európska komisia predstavila v lete 2021, by mal EÚ ETS opäť prejsť významnými zmenami a očakáva sa veľké sektorové rozšírenie. Námorný sektor bude zahrnutý do EU ETS od roku 2023 a na stole je aj návrh na vytvorenie samostatného ETS pre sektory budov a dopravy do roku 2025. Zatiaľ čo tieto zmeny sú odpoveďou na Európsku zelenú dohodu a súvisiace sprísnenie emisných cieľov, akým je nový záväzný cieľ „zníženia čistých emisií skleníkových plynov do roku 2030 aspoň o 55 % v porovnaní s rokom 1990“, ako aj cieľ klimatickej neutrality EÚ do roku 2050, dôkazy ukazujú, že zdaňovanie resp. spoplatňovanie uhlíka sa spravidla priamo prenáša na spotrebiteľov, najmä pokiaľ ide o dopravu a vykurovanie.

Od roku 2015 je celý výťažok emisných aukcií príjmom Environmentálneho fondu SR, ktorý vyzbieraný výnos využíva aj na programy a aktivity súvisiace so znižovaním znečistenia prostredia, odpadovým hospodárstvom, odpadovými vodami atď. S potenciálnym sektorovým rozšírením na budovy a dopravu sa mnohí obávajú, že zraniteľné domácnosti budú ekonomicky zaťažené neúmerne, keďže tieto sektory majú priamy kontakt so spotrebiteľmi. Nízkopríjmové domácnosti totiž míňajú často najvyššiu časť svojich príjmov na vykurovanie a dopravu. Aj bez zahrnutia vykurovania a dopravy by podľa projekcií do roku 2025 malo byť množstvo emisií skleníkových plynov pokrytých slovenským EU ETS II okolo 13,35 Mt CO2ekv.

Zvyšovanie príjmov z aukcií EU ETS poskytuje skvelú príležitosť na financovanie zeleného prechodu ku klimatickej neutralite a pomoc v úsilí EÚ dosiahnuť ambiciózne klimatické ciele. V rokoch 2021 až 2030 sa celkový príjem z predaja emisných povoleniek pre Slovensko odhaduje na 12,4 miliárd eur. Keďže sa životné náklady ľudí v dôsledku tohto spoplatnenia uhlíka do istej miery zvýšia, je dôležité, aby za to dostali niečo naspäť.

Štúdia o uhlíkovej dividende na Slovensku navrhuje rozdeliť 40 % výnosov z aukcií medzi všetkých obyvateľov SR, keďže všetky slovenské domácnosti budú ovplyvnené možným zvýšením cien. Uprostred obdobia do roku 2030 - v roku 2026 - by dostupné finančné prostriedky pre tento systém predstavovali približne 693 miliónov EUR ročne, čo by predstavovalo približne 127 EUR na osobu a rok. Aby klimatická dividenda pre Slovensko bola efektívnym nástrojom bez dodatočných nárokov na vládne kapacity, nemala by obsahovať žiadne distribučné kritériá. Mala by byť jednotná a mala by rozdeliť podiel z príjmov z aukcií rovnomerne medzi všetkých obyvateľov vrátane detí. Najdôležitejšie je, že keďže najzraniteľnejšími domácnosťami na Slovensku sú rodinné domácnosti s tromi a viac deťmi, nástroj by podporil rodiny a zároveň znížil riziko energetickej chudoby.

INTRODUCTION:

The EU ETS, or European Emissions Trading System provides a EU-wide cap on the total amount of greenhouse gas emissions that can be emitted by the installations covered by the system. Currently, there are "more than 15 000 stationary installations reporting under the EU emission trading system, as well as 1500 aircraft operators"[2] in the 27 EU Member States plus Iceland, Liechtenstein and Norway[3], covering in total just under half of EU's GHG emissions. It is one of the main policy instruments towards achieving the EU's GHG emission reduction targets. Between 2005 and 2019, installations covered by the EU ETS reduced emissions by about 35%[4] in total. Moreover, emissions in the main sectors covered – power, heat generation and energy-intensive industrial installations, have been cut by 42.8%[5], proving the EU ETS to be an effective tool in driving emissions reductions. While the overall emissions cap is fixed and reduced over time so that the amount of total emissions gradually decreases, the price of the emission allowances is set by the market.[6]

Since its inception in 2005, the EU ETS has come a long way. The EU ETS was established with *Phase 1* (2005-2007), a 3-year pilot that distributed almost all emission allowances for free.[7] During *Phase 2* (2008-2012), the proportion of free allocation was decreased and cap on allowances lowered. In addition, the aviation sector was brought into the EU ETS for intra-EU travel. For *Phase 3* (2013-2020), the system was largely reformed as auctioning was set as the default method for allocating allowances, more sector and GHGs were included in the EU ETS, and a single, EU-wide cap on emissions replaced the system of national caps.[8] Also, the Market Stability Reserve, or MSR started operation in 2019, addressing the surplus of EUAs while assuring the system's resilience to both supply and demand shocks.

For the current *Phase 4* (2021-2030), the EU ETS has undergone yet another substantial reform. Firstly, the system has been strengthened further as "emission allowances will decline at an annual rate of 2.2% from 2021 onwards (until 2030), compared to 1.74% currently."[9] A single EU-wide cap for stationary installations for 2021 is set at 1,572 $MtCO_2e$.[10] This translates into a year-on-year reduction of the cap by 43 million allowances.[11] Secondly, major sectorial extension has been achieved as the maritime sector will be included into the EU ETS' scope from 2023 onwards. Also, a proposal to set up a separate ETS for the buildings and the transport sectors by 2025 is on the table. Thirdly, the MSR has been substantially reinforced as "the amount of allowances put in the reserve will double to 24% of the allowances in circulation. The regular feeding rate of 12% will be restored as of 2024."[12] While free allocation will be prolonged for another decade, only sectors identified at the high risk of carbon leakage will be given free allowances. Fourthly, the carbon border adjustment mechanism or CBAM, will be set up in order to avert carbon leakage.[13] Finally, the Modernisation and the Innovation funds are established to help fund the innovation and investment challenges of the transition to a low-carbon economy.[14]

In order to be an efficient and effective policy tool, the EU ETS needs to be regularly updated in the same way like any other regulatory instrument. The most recent reforms of the system are an answer to the Green Deal and

[2] EEA, EU Emissions Trading System (ETS) data viewer, August 2021
[3] Appunn, Kerstine, "Understanding the European Union's Emissions Trading System (EU ETS)", Clean Energy Wire, July 2021
[4] European Commission, EU Emissions Trading System (EU ETS)
[5] European Commission, "Questions and Answers – Emissions Trading – Putting a Price on carbon", July 2021
[6] At the time of writing, the EUA price for most contracts is just under €60.
[7] European Commission, Development of EU ETS (2005-2020)
[8] European Commission, Development of EU ETS (2005-2020)
[9] European Commission, Revision for phase 4 (2021-2030)
[10] In 2005, Phase 1 started with a cap of 2,096 $MtCO_2e$.
[11] International Carbon Action Partnership, EU Emissions Trading System (EU ETS), August 2021
[12] European Commission, Revision for phase 4 (2021-2030)
[13] International Carbon Action Partnership, EU Emissions Trading System (EU ETS), August 2021
[14] European Commission, Revision for phase 4 (2021-2030)

related toughening of emission targets. In summer 2021, the European Council adopted a new climate law, committing to a binding target "of a reduction of net GHG emissions by at least 55% by 2030 compared to 1990"[15] and "setting into legislation the objective of a climate-neutral EU by 2050."[16]

CONTEXT:

At the same time, energy commodity prices have been on the rise. In Europe, gas prices in October 2021 are 400 % more expensive than in April 2021[17]. Power prices have increased by 200 %.[18] The recent surge in energy prices threatens the post-pandemic economic recovery and the nascent green transition. What is more, the EU is worried about disproportionate effects of high prices on vulnerable consumers. Some Member States, notably Poland, have taken this as an opportunity to question the recent climate package 'Fit for 55', calling for the EU "to cancel or delay parts of its plan to tackle climate change, […] warning that if an "excessive burden" is put on consumers, they may reject the EU's climate aims."[19]

While it has been proven that the recent spikes of energy commodity prices (electricity prices in particular) on European markets have been caused mainly by gas shortages[20], combined with a lack of wind on the European continent, it is clear that the 'Fit for 55' legislative package needs to be implemented in a socially sensitive way. The package places the EU ETS at the heart of the EU's decarbonization agenda and it needs to be assured that the most vulnerable will be protected.

The purpose of this paper is to explore the possibility and implications of introducing a climate dividend in Slovakia in the current context of emissions trading within the EU ETS.

1. DESCRIPTION OF THE CURRENT EU ETS

a) Which sectors are included?

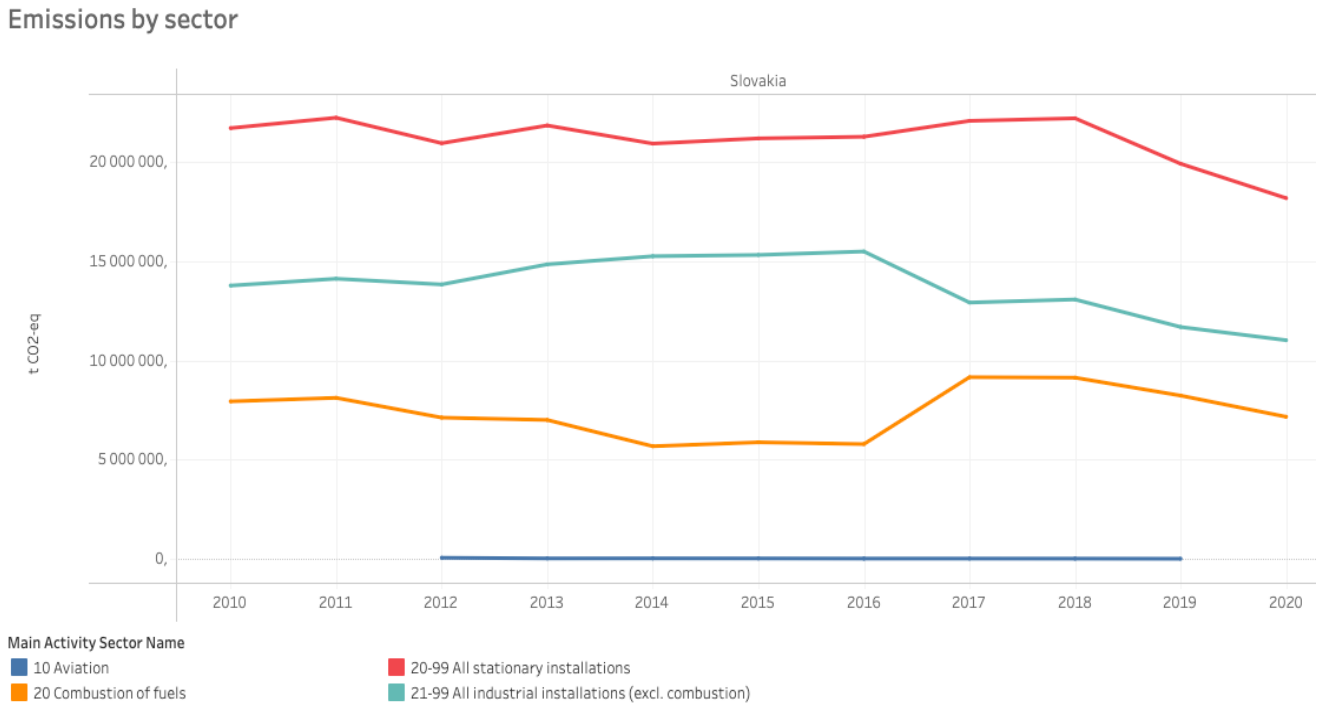
From the start of the EU ETS, mainly power stations and other combustion[21] and energy-intensive industrial installations were covered by the system, including oil refineries, steel works, and production of iron, aluminium, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids and bulk organic chemicals. Gases included in the EU ETS are carbon dioxide (CO_2), nitrous oxide (N_2O) and perfluorocarbons (PFCs).[22]

In Slovakia, between 2010 and 2018, the amount of emissions covered by the EU ETS stayed roughly the same, hovering around 21 and 22 million tCO_2eq. For *Phase 1,* 175 facilities from Slovakia participated in the EU ETS;

[15] European Council, "Council adopts new climate law", June 2021
[16] European Council, "Council adopts new climate law", June 2021
[17] At the TTF, prices have risen from €16 per MWh in January 2021 to €75/MWh by mid-September 2021.
[18] ACER, "Europe's high energy prices: ACER looks at the drivers, outlook and policy considerations", October 2021
[19] Abnett, Kate, "Poland seeks EU climate policy rethink amid high energy prices" Reuters, October 2021
[20] Russian gas supplies are low, facing increased demand. By the end of September, the EU-27 and UK gas stores were 72% full, compared to 94% full at that time in 2020. In June 2021, German onshore and offshore wind were down 20.6% and 16.2% year-on-year, respectively.
[21] With at least 20 MW of thermal rated input.
[22] European Commission, EU Emissions Trading System (EU ETS)

for *Phase 2*, 195 were registered; and about 150 facilities participated in *Phase 3.*[23] For the period between 2021 and 2025, 94 installations are to be covered by the EU ETS.

Figure 1: Emissions covered by the EU ETS in Slovakia, by sector[24]



While historically, the industrial sector was responsible for about two thirds of total emissions and the combustion of fuels for the remaining third, since 2017, both sectors are converging. In 2020, industrial installations were responsible for about 11 $MtCO_2eq$ while combustion for 7,2 $MtCO_2eq$.

b) Free allocation

For *Phase 1* and *Phase 2*, most of the EUAs were allocated for free. The third phase of the EU ETS unified rules for the free allocation of emission allowances, introducing auctions as the main instrument to meet the emissions reduction target. Nevertheless, a significant amount of allowances was freely allocated to industrial installations to address the risk of carbon leakage. "In *Phase 3*, about 43% of the total quantity of available allowances [was] allocated for free, while the share of allowances auctioned by Member States amounted to some 57%."[25] Since 2013, the power generation sector has been subject to 100% auctioning.[26]

[23] Numbers are approximative and based on compliance tables published by the Slovak National Administrator of Union Registry.

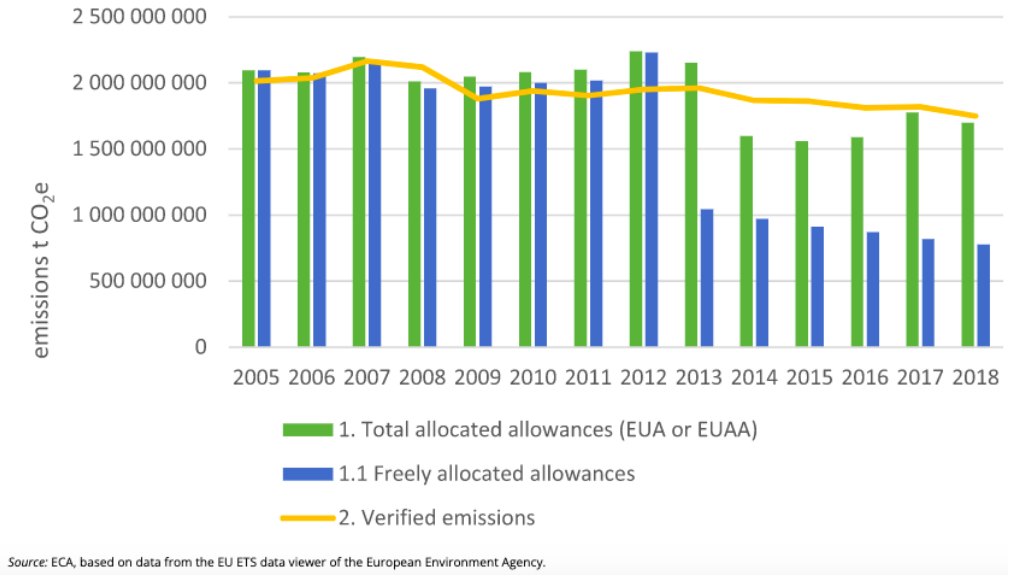
[24] EEA, EU Emissions Trading System (ETS) data viewer

[25] Report from the Commission to the European Parliament and the Council, Report on the functioning of the European carbon market, 2020

[26] European Commission, EU ETS Handbook

For *Phase 4*, the system of free allocation is prolonged for another decade while focusing on sectors at the highest risk of relocating outside of the EU. Manufacturing industries will continue to receive a share of their emission allowances for free beyond 2020. This allocation is based on benchmarks that reward most efficient installations in each sector. A product benchmark is based on the average greenhouse gas emissions of the best performing 10% of the installations producing that product in the EU and EEA-EFTA states. Installations that do not reach the benchmarks will receive fewer allowances than they need. Sectors at risk of carbon leakage can get up to 100% of their required allowances through free allocation. For less exposed sectors, free allocation is foreseen to be phased out after 2026 from a maximum of 30% to 0 at the end of *Phase 4*. Overall, more than 6 billion allowances are expected to be allocated to industry for free until 2030.[27]

Figure 2: Most allowances issued under the EU ETS have been for free[28]



Source: ECA, based on data from the EU ETS data viewer of the European Environment Agency.

Up until 2013, the amount of allocated emissions for Slovakia exceeded the amount of verified emissions as apparent from *Table 1*. Such over-allocation of pollution permits distributed to industry EU-wide was one of the main causes of low emission allowance prices for many years.

[27] European Commission, Revision for phase 4 (2021-2030)

[28] European Court of Auditors, "Special Report: The EU's Emissions Trading System: free allocation of allowances needed better targeting", 2020

Table 1: Allocated allowances and verified emissions in Slovakia[29]

Year	2005	2006	2007	2008	2009	2010	2011
Allocation	30 299 021	30 357 450	30 357 404	32 166 094	32 140 581	32 356 123	32 617 164
Verified emissions	24 892 813	25 200 029	24 153 151	25 336 706	21 595 209	21 698 625	22 222 534

Year	2012	2013	2014	2015	2016	2017	2018
Allocation	33 432 258	16 466 336	15 821 315	15 029 434	14 522 533	13 849 714	13 658 304
Verified emissions	20 932 903	21 829 374	20 918 069	21 181 280	21 264 045	22 063 225	22 193 396

According to the National Allocation Table for Slovakia for the period between 2013 and 2020, the total amount of freely allocated EUAs for *Phase 3* amounted to 115 902 245. This translates on average to around 14,487,781 of freely allocated EUAs per year.

c) Biggest players in the industry

The company that received by far the highest number of free emission allowances was U. S. Steel Košice, s.r.o. with 48,027,349 of freely allocated EUAs over the 8-year period. Second came Slovnaft a.s. with its installation "Rafinéria" receiving 9,028,314 EUAs. CRH (Slovensko) a.s. with its cement factory "Rohožník" and Duslo, a.s. with its installation Šaľa received 6,200,308 and 6,024,110, respectively, between 2013 and 2020.[30]

Other industry installations that were allocated more than one million EUAs over *Phase 3* include (in descending order): Považská cementáreň, a.s. (3,811,095); SMZ, a.s. Jelšava (production of magnesite clinker) (3,509,480); CRH (Slovensko) a.s. (cement factory Turňa nad Bodvou) (3,118,886); Carmeuse Slovakia, s.r.o. (installation in Košice 3,053,340); Cemmac, a.s.(2,244,387); Slovnaft a.s. and its Petrochémia SPC (2,106,757); BUKÓZA ENERGO, a. s. (coal boilers) (2,067,067); Slovalco, a.s. (aluminum production) (2,002,992); OFZ, a.s. (prevádzka Široká) (1,753,558); Carmeuse Slovakia, s.r.o. (installation in Slavec 1,447,417); eustream, a.s. (Kompresorová stanica 01 Veľké Kapušany) (1,406,865); Mondi SCP, a.s (manufacture of pulp and paper) (1,390,261); DOLVAP s.r.o (kilns for the manufacture of lime) (1,235,456); TEKO a.s. (Tepláreň Košice) (1,178,489).[31]

According to the new allocation table for the period between 2021 and 2025, 63,944,340 EUAs in total will be allocated for free.[32] This translates to 12,788,868 EUAs on average per year. For this period, U.S. Steel Košice, s.r.o. comes again first with 32,071,375 EUAs allocated. Slovnaft's "Rafinéria" comes second with 4,878,550 EUAs while CRH (Slovensko) a.s. with its cement factory "Rohožník" is allocated 3,836,120 allowances. There are eight other installations that will receive more than one million EUAs for free.[33]

[29] Compilation of the author, taken from the Integrated National Energy and Climate Plan for 2021 to 2030
[30] National Allocation Table for Slovakia for the period between 2013 and 2020
[31] National Allocation Table for Slovakia for the period between 2013 and 2020
[32] National Allocation Table for Slovakia for the period between 2021 and 2025
[33] National Allocation Table for Slovakia for the period between 2021 and 2025

d) Impact on heating

In total, buildings in the EU are responsible for 40% of energy consumption and 36% of GHG emissions.[34]

This is why with the reform of the EU ETS and the new 'Fit for 55' climate package, the Commission intends to "extend the scheme to cover maritime transport as well as road and building emissions, which would be treated in an additional emissions trading system."[35] To justify the extension, the EC argues that many households still use outdated heating systems that use fossil fuels such as coal and oil. Under the current rules, individual boilers that use fossil fuels do not fall under the scope of EU ETS, whereas bigger (>20 MW) district heating installations do. Firstly, while families in tenant housing have generally no say over where their heat comes from, low income households often cannot afford expensive energy saving solutions. In Slovakia, the majority of those living at risk of energy poverty own the property in which they live: 62% of them own an apartment in their own house and 29% own an apartment in an apartment house.[36] Secondly, this system disadvantages solutions such as district heating and cooling in favour of small-scale fossil fuel use[37] and is the reason why district heating operators advocate for creating a level playing field for heating installation not currently covered by the EU ETS, be it by updating the Energy taxation directive or by extending the EU ETS.

Slovakia has an extensive centralised heat supply system currently covering around 54% of the overall demand for heat. In 2015, approximately 1.8 million citizens (35% of the total population) were served by district heating. While 54% of heat in district heating is generated by cogeneration, heat production comes mostly from natural gas (55%) and biomass (27%).[38] District heating solutions in the country will be further reinforced, indicated by the recent €1bn support (approved by the EC) for combined heat and power projects which will be connected to district heating networks in the country.[39] Also, other private players such as Engie[40], or the Green Economy Financing Facility[41] are both investing in district heating in the country.

While in most EU Member States, district heating operators have to pay for their emissions, some EU Member States have also implemented a separate CO_2 tax which covers small-scale actors.

[34] European Commission, "In focus: Energy efficiency in buildings", February 2021

[35] Simon, Frédéric, "LEAKED: The EU's carbon market reform proposal", EURACTIV, July 2021

[36] Dokupilová, Gerbery, Filčák, "Energetická chudoba na Slovensku 2020: Od analýz k odporúčaniam pre verejné politiky", June 2020

[37] Celsius, "Framing the possibilities: EU legislative framework for District Heating", May 2020

[38] Euroheat & Power, District Energy in Slovakia, May 2017

[39] Energy Live News, "EU approves Slovakia's €1bn support for combined heat and power projects", March 2021

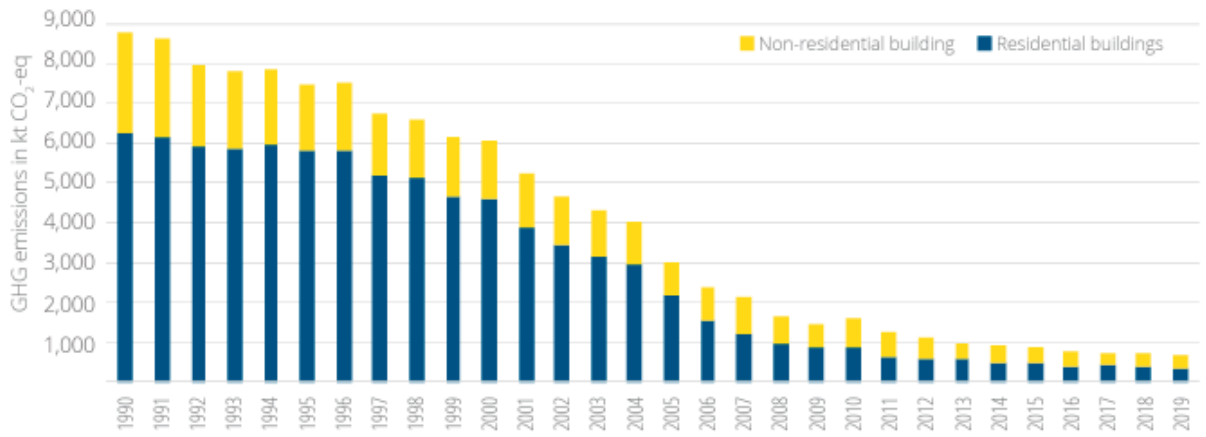
[40] Engie, "The ENGIE Group starts operation of the district heating network in the Bratislava city district – Nove Mesto", September 2019

[41] GEFF, "Improved district heating service in the Slovak Republic"

Case study: A CO_2 tax in Sweden

Instituted in 1991, Sweden's carbon tax was one of the first in the world, second only to Finland's carbon tax, and remains a cornerstone of Swedish climate policy. It covers 40% of country's GHG emissions as certain industries are either exempt or subject to the generally lower-rate EU ETS. Others are not subject to any type of carbon taxation. Sweden levies the highest carbon tax rate in the world, at SEK 1,190 (EUR 118) per metric ton of CO_2. The tax is primarily levied on fossil fuels used for heating purposes and motor fuels. Between 1990 and 2018, Sweden decreased its GHG emissions by 27 %. The heating of buildings now accounts only for 3% of Sweden's GHG emissions. High-enough CO_2 tax in combination with increased energy prices led to a country-wide phase out of oil boilers. "Between 1994 and 2020, the number of heat pumps increased from less than 5 thousand to 1.2 million. In other words, in 2020 60% of all single-family buildings were equipped with a heat pump." At the same time, the Swedish annual renovation rate is not significantly higher than the EU average while the rate of deep renovations is even lower. This indicates that while the carbon tax was thus instrumental in triggering a fuel switch, it was not effective in triggering deep retrofitting.

Figure 3: GHG emissions from residential and non-residential buildings in Sweden, 1990-2019[42]



[42] BPIE, "Introducing a carbon price on heating fuels: an effective signal for faster decarbonisation in the buildings sector?", 2021

2. ANALYSIS OF THE TOTAL CURRENT REVENUES AND THEIR USE

According to the EU ETS Directive, "Member States shall determine the use of revenues generated from the auctioning of allowances".[43] At the same time, after the declaration of the Heads of State at the European Council in 2008, all Member States are expected to use at least half of their revenues from EUA auctioning for climate and energy-related purposes. As stipulated in Article 10(3) of the EU ETS Directive, "at least 50% of the revenues generated from the auctioning of allowances […] should be used to combat climate change in the EU and third countries."[44]

a) Revenues from the sale of EUAs

In 2019, total revenue from EUA auctioning EU-wide amounted to €14,6 billion out of which Slovakia received €244,713,510.[45] In 2020, this increased to €16,5 billion EU-wide with Slovakia capturing €242,068,325.[46] In total, cumulative auctioning revenues over *Phase 3* amounted to €69 billion.[47]

Table 2: Revenues generated from the auctioning of emission allowances by Slovakia between 2012 – 2020 (in million EUR)[48]

Year	General	Aviation
2012	12.19	0.00
2013	61.70	0.00
2014	57.59	0.04
2015	84.31	0.20
2016	64.99	0.06
2017	87.01	0.06
2018	229.74	0.18
2019	244.47	0.24
2020	242.07	0.12

[43] European Commission, EU ETS Handbook
[44] European Commission, EU ETS Handbook
[45] EEX, "Emission Spot Primary Market Auction Report 2019", 2019
[46] EEX, "Emission Spot Primary Market Auction Report 2020", 2020
[47] Marcu et al., "2021 State of the EU ETS Report", ERCST, Wegener Center, BloombergNEF and Ecoact, 2021
[48] Compilation of the author, based on the Carbon Report 2020 and EEX data.

b) Use of revenues

From 2015 onwards, the entire proceeds of the auction are income for the Environment Fund of the Slovak Republic.[49] In 2018, the auction share of the Slovak Republic was 14.9 million EUAs.

The mission of the fund is "to provide funding to applicants in the form of grants or loans to support projects aimed at achieving the objectives of the country's environmental policy at the national, regional and local levels."[50]

According to the Annual Report of the Environment Fund from 2020, the total annual income of the fund was €293,912,861 out of which the proceeds from emissions trading from the EU ETS formed €241,826,257[51] – virtually all revenue generated by EUA auctioning in 2020, as attested by EEX market data. The fund's expenditures (excluding financial operations) were budgeted at €105,690,560. This included expenditures related to the fund management and administrative costs totaling €3,715,998 (including €1,645,900 for salaries) and €101,709,082 for funded programmes and activities, out of which the most important were pollution reduction (€20,840,930), wastewater management (€43,001,866) and waste management (€21,458,020).[52]

While between 2013 and 2019, around 78%[53] of all EU revenues from auctioning were used for climate and energy related purposes, according to the EC, "in 2019, all Estonia, Hungary, Latvia, Croatia, Italy, Slovakia and Romania failed to meet the 50% climate spending floor recommended in the ETS directive" with Slovakia spending only 46 % on climate.[54]

During *Phase 4*, revenues from the sale of 2% of EUAs will be made available for the Modernisation Fund while the revenues from at least 450 million allowances will make up the Innovation Fund.[55]

3. THE HEATING AND THE TRANSPORT SECTORS

In 2016, the total GHG emissions in Slovakia attained some 41 $MtCO_2eq$ (without LULUCF). This represented a reduction of 44.5% compared to 1990.[56] Nevertheless, compared to 2015, emissions increased by 0.3%. In both 2017 and 2018, total emissions kept increasing, peaking at 42,4 $MtCO_2eq$ in 2018. In 2019, total emissions decreased to 40,2 MtCO2eq.[57]

[49] Slovak Ministry of Economy, "Integrated National Energy and Climate Plan for 2021 to 2030", December 2019
[50] Environmentálny fond, O nás
[51] Environmentálny fond, "Výročná správa Environmentálneho fondu za rok 2020", 2020
[52] Environmentálny fond, "Výročná správa Environmentálneho fondu za rok 2020", 2020
[53] European Commission, "Auctioning and their use"
[54] Laugier et al., "Fit for 2030: Making EU ETS Revenues work for people and climate", WWF, 2021
[55] Marcu et al., "2021 State of the EU ETS Report", ERCST, Wegener Center, BloombergNEF and Ecoact, 2021
[56] Slovak Ministry of Economy, Integrated National Energy and Climate Plan for 2021 to 2030, December 2019
[57] Eurostat, "Greenhouse gas emissions by source sector (source: EEA)", last updated: August 2021

a) EU ETS II

One of the most important reforms of the EU ETS as presented by the EC, is to extend the scope of the EU carbon trading to include emissions from buildings as well as maritime and road transport. For the buildings and transport sectors, the 'EU Emissions Trading Scheme for Road Transport and Buildings' or EU ETS II, should be formed. The new trading system should be set up by 2025 and its emissions "should be reduced by 43% by 2030 compared to 2005. The amount of allowances to be issued annually will be reduced accordingly: a reduction factor of 5.15 % to 5.43 % per year."[58] Unlike for the industry sector, in the newly established ETS, the buildings and road transport scheme would run under full auctioning.[59] Moreover, "under the commission proposal, member states would retain control over the money, but would be obligated to spend all auction revenues in listed climate- and energy-related areas."[60]

Many are dubious about the inclusion of the transport and the buildings sectors to the EU ETS as both are directly consumer-facing and could worsen energy poverty. In fact, low-income households spend the highest proportion of their income on heating and transport. This is also the segment of society that generally cannot afford the technology shifts that would allow them to evade new punitive pricing on fossil fuels because upfront costs are too high.[61] Furthermore, a study[62] by Cambridge Econometrics[63] concluded the system will fail to reach the 43% emission reduction target in 2030 because the demand for transport and heating fuels is relatively inelastic and thus relatively unresponsive to the price of carbon. Moreover, "widening the single ETS cap to include transport and buildings would push up average spending on gas-fuelled household heating by 30% and increase the cost of fuelling a fossil fuel vehicle by 16% in 2030."[64]

It is clear that for disadvantaged households especially, the revenues raised from the sale of EUAs need to be recycled back. According to Pascal Canfin, MEP and the Chair of the Environment committee of the European Parliament, Europe should not be making a mistake of extending the carbon market to heating and fuel. "We experienced it in France, it gave us the Yellow Vests," Canfin warned.[65]

It seems that the EC is aware of the delicacy of the EU ETS extension to the buildings and the transport sectors as "according to the draft proposal, "at least 50%" of the revenue generated by the transport and buildings ETS would have to be redistributed to low income households."[66] According to Dr. Patrick Graichen, the Executive Director of Agora Energiewende, "100% of revenues from carbon pricing in the heating and transport sectors should flow back to consumers in one way or another"[67], so as to ensure distributional effects are addressed. One way of achieving this would be a targeted investment support for vulnerable households and lower-income Member States. "Delivering the EU's climate target will only be successful if environmental integrity and social justice go hand in hand, in particular in the buildings and transport sectors", Mr. Graichen continued.[68]

[58] Kellermann, Zhou and Göss., "EU "Fit for 55": how it impacts the EU ETS to accelerate emissions reductions", energypost.eu, August 2012

[59] Carbon Brief, Q&A: How 'Fitfor55' reforms will help EU meet its climate goals

[60] Carbon Brief, Q&A: How 'Fitfor55' reforms will help EU meet its climate goals

[61] Keating, Dave, "Fierce battle looms over cars and heat in EU emissions trading", April 2021

[62] Stenning et al., "Decarbonising European transport and heating fuels – Is the EU ETS the right tool?", Cambridge Econometrics, June 2020

[63] The study was supported by the European Climate Foundation.

[64] Liboreiro, Jorge, "Why is the EU's new Emissions Trading System so controversial?", Euronews, August 2021

[65] Simon, Frédéric, "LEAKED: The EU's carbon market reform proposal", EURACTIV, July 2021

[66] Simon, Frédéric, "LEAKED: The EU's carbon market reform proposal", EURACTIV, July 2021

[67] Agora Energiewende, "What EU leaders fail to discuss: Bold choices on Europe's higher 2030 climate ambition", March 2021

[68] Agora Energiewende, "What EU leaders fail to discuss: Bold choices on Europe's higher 2030 climate ambition", March 2021

Furthermore, the EC is planning to set up a Social Climate Fund "to help people pay for energy efficiency upgrades to their homes and greener cars, with €72bn of that coming from the EU budget"[69], while national governments will be expected to match the figure and push the total budget to €144.4 billion. "[The Social Climate Fund] will support investments to tackle energy poverty and to cut bills for vulnerable households and small businesses. So this is real support for those that need it most, while the pricing is effective," said von der Leyen.[70] All in all, a revised version of the EU ETS should help foster both the development of efficient district heating and individual heating solutions, while assuring a socially just transition.

b) Transport

The transport sector generates around 30% of emissions in the EU, a vast majority of which (more than 70%) comes from road transport, such as cars, trucks and buses. What is more, emissions from transport continue to increase, while those from other sectors decrease.[71] According to the EEA, "emissions from the EU's transport increased in 2018 and 2019 and have not followed the EU's general decreasing emissions trend. […] Further action is needed particularly in road transport, [...] as well as aviation and shipping, where transport demand is driving emissions upward in both absolute and relative terms."[72]

In 2018, transportation in Slovakia represented around 18.2% of total emissions, a substantial increase from 1990, both in relative and absolute terms. This translated to 7,92 $MtCO_2$. Out of the total, passenger car transport was responsible for 9.3%, emitting 4,03 Mt of CO_2 per year while freight and bus transport emitted 3,29 Mt of CO_2, or 7.6%.[73] In the same year, trains emitted 93 $ktCO_2eq$, or 0.2% from the total and aviation produced 189 kt of CO_2, representing 0.4%.[74]

In total, road transport that would be included under the current proposal would encompass both freight and passenger road transport. In Slovakia, in 2018, these amounted to 7,34 $MtCO_2$*. *Table 3* shows projections of GHG emissions from transport according to the Slovak NECP, under the WEM scenario.

Table 3: Projections of GHG emissions from the transport sector under the WEM and the WAM scenarios (in $MtCO_2eq$)[75]

Year	2020	2025	2030	2035	2040
Emissions (WEM)	7,77	8,52	8,80	8,78	8,58
Emissions (WAM)	6,88	7,07	7,10	6,91	6,15

[69] Rankin, Jennifer, "What is the EU's plan to tackle global heating – and will it work?", The Guardian, July 2021
[70] Liboreiro, Jorge, "Why is the EU's new Emissions Trading System so controversial?", Euronews, August 2021
[71] Liboreiro, Jorge, "Why is the EU's new Emissions Trading System so controversial?", Euronews, August 2021
[72] EEA, Indicator assessment, "Greenhouse gas emissions from transport in Europe", July 2021
[73] Fakty o klíme, "Emisie skleníkových plynov Slovenska podľa sektorov", 2021
[74] Fakty o klíme, "Emisie skleníkových plynov Slovenska podľa sektorov", 2021
[75] Compilation of the author, based on the "Integrated National Energy and Climate Plan for 2021 to 2030", Slovak Ministry of Economy, December 2019

* The figure includes 0.02 $MtCO_2eq$ emitted by motorcycles (0.05% from the total); source: Fakty o klíme, "Emisie skleníkových plynov Slovenska podľa sektorov", 2021

Based on the current sub-sectoral proportions, by 2025 when the EU ETS II should be established, the amount of emissions that would fall under such ETS from transport is estimated at 7,88 $MtCO_2eq$ and 6,53 $MtCO_2eq$ for WEM and WAM scenario, respectively.

c) Heating

As mentioned earlier, Slovakia has an extensive centralised heat supply system covering around 54% of the overall demand for heat. In 2015, district heating, which is already in the scope of the EU ETS, supplied heat to around 35% of Slovak population.[76] To estimate emissions coming from the heating sector in total under the current proposal, we need to include emissions from centralised heat production too. In 2018, CHPs being the backbone of the centralized heating production were responsible for 2,4 $MtCO_2$, or 5,5 % of the total emissions.[77]

Combustion in households, institutions and agriculture (mainly for heating, cooking and water heating) represented 11,1% of the total, emitting 4.83 $MtCO_2$** in 2018.

Based on projections, there has already been progress made in terms of meeting GHG emission targets under the Effort Sharing Regulation or its predecessor the Effort Sharing Decision, or ESD. The Effort Sharing Regulation, or ESR covers "only GHG emissions not covered by the EU ETS, i.e. transport (excluding aviation), buildings, agriculture (excluding LULUCF) and waste."[78] By 2015, Slovakia managed to reduce its ESR emissions by 23,2% compared to 2005 levels.[79]

EU Member States have different emission targets for the non-EU ETS sector, "based on Member States' relative wealth, measured by GDP per capita."[80] In May 2018, the European Parliament adopted a regulation that translated the non-ETS commitment into binding targets. Slovakia has a target of -12%. In 2005, sectors covered by the ESR stood at 23,137,112 tonnes CO_2eq. By 2025 and 2030, emissions should be reduced to 20,854,886 and 20,360,659 tonnes of CO_2, respectively.[81]

[76] Euroheat & Power, District Energy in Slovakia, May 2017

[77] Fakty o klíme, "Emisie skleníkových plynov Slovenska podľa sektorov", 2021

** The figure also includes 0,37 MtCO2eq (0.84 % from the total) from fuel combustion in agriculture, forestry and fishing; source: Fakty o klíme, "Emisie skleníkových plynov Slovenska podľa sektorov", 2021

[78] Slovak Ministry of Economy, Integrated National Energy and Climate Plan for 2021 to 2030, December 2019

[79] Slovak Ministry of Economy, Integrated National Energy and Climate Plan for 2021 to 2030, December 2019

[80] European Commission, "Effort sharing: Member States' emission targets"

[81] Commission Decision (EU) 2020/2126 of 16 December 2020 (EUR-Lex – 32020D2126), Official Journal of the EU

Estimation of the Slovak EU ETS II

To estimate the total amount of emissions under the EU ETS II in 2025, we need to add both emissions from road transport and emissions coming from combustion in buildings. For that purpose, a WEM projection for emissions from transport will be used. For combustion of fuels in households, institutions and agriculture, as there are no projections for this very sector, only for ESR as a whole, the same figure as for 2018 is considered.

2025:

A...road transport

B...combustion in households and in commercial and institutional sectors

C...size of the Slovak EU ETS II (in *$MtCO_2$*eq)

*A = 8,52 $MtCO_2$*eq*

B = *4.83 $MtCO_2$*eq***

C = A + B

C = 13.35 *$MtCO_2$*eq*,***

This estimation is roughly in line with the total ESR emissions in the Slovak NECP. The NECP sets ESR emissions from 2016 at 19,77 $MtCO_2$eq. In 2018, agriculture in Slovakia was responsible for 2,75 $MtCO_2$eq (6,3% of total emissions) while waste emitted 1,68 $MtCO_2$eq (3,9% of the total).[82]

[82] Fakty o klíme, "Emisie skleníkových plynov Slovenska podľa sektorov", 2021

Model revenues from EU ETS II

Since October 2020, the EUA price has been hitting record highs practically every month. In 2019, many expected prices to rise to the €45-55 range only by 2025 and still in April 2021, the average forecast for prices in 2023 was €56.20, representing a 22% increase from average price forecasts for 2022.[83] However, prices reached €50 already in summer 2021, breaking the record high of €64.69 in September of the same year. At the time of writing, the EUA price for the December 2021 contract is at €58.57.[84]

With the price of €60 per tonne of CO_2 at the set up of the EU ETS II in 2025, the revenue from the sale of emission allowances from road transportation and combustion in households and in commercial and institutional sectors would come at €800 million, or more than three times the revenue Slovakia receives from the sale of EUAs from the EU ETS (I) now.

p...EUA price (2025: estimation)

n...estimated number of emissions from the EU ETS II

R...estimated revenue from the EU ETS II in 2025

p...€60

n... 13.35 *Mt*CO_2eq**

R = p*n

R = €801 million

[83] Twindale, Susanna, "Analysts raise EU carbon price forecasts as tougher climate targets loom", Reuters, April 2021

[84] Sandbag, Carbon price viewer, viewed on 25th October 2021

MODEL REVENUES FROM THE EU ETS UNTIL 2030

The EUA price is still expected to grow, depending on the implementation of the Green New Deal. An expected price of €80 or even €100 per ton of CO_2 by 2030 is not uncommon.[85] If we set EUA price in 2021 at €60 per tonne of CO_2, we need to set an annual price increase of around 5,85% to arrive at €100 by 2030. *Figure 4* shows the historical clearing price of allowances from 2013 to June 2020.

Figure 4: Clearing price for general allowances auctions from 2013 to 30 June 2020[86]

___ Auction Clearing Price

Source: EEX

[85] Independent Commodity Intelligence Services, "The EUA market", November 2020

[86] Report from the Commission to the European Parliament and the Council, Report on the functioning of the European carbon market, 2020

Table 4: Estimation of price increase of EUAs between 2021 and 2030

Year	EUA price (EUR)
2021	60
2022	63.5
2023	67.2
2024	71.1
2025	75.3
2026	79.7
2027	84.3
2028	89.3
2029	94.5
2030	100.0

During the third trading period that is between 2013 and 2020, Slovakia received on average 14,487,781 freely allocated EUAs per year. The total number of surrendered allowances in the same period was 167,056,322 which translates to about 20,882,040 of surrendered EUAs per year. According to the new National Allocation Table, the number of free allocations for Slovakia between 2021 and 2025 should be 63,944,340, or 12,788,868 freely allocated EUAs per year.[87]

a) Historical sales of emission allowances

Around 10 million European Union emission allowances were sold by Slovakia in 2020. The average price for that year was around €24.4. This was much less than in the pre-pandemic 2017 and 2018 when about 15 million and 14,5 million EUAs were sold, respectively, as apparent from *Table 5*. While it is anyone's guess to estimate the number of sold allowances by Slovakia in the years to come, for this modeling exercise, the same number of sold EUAs as in 2020 will be assumed for the following reasons.

As the number of emission allowances auctioned by Slovakia in 2020 was affected by economic recession, the modeled revenues will represent a rather conservative estimate which will be helpful not to overestimate the available amount for climate dividend, the ultimate objective of the study. However, it is possible that in 2021 especially, the number of sold EUAs will decline again. At the time of writing, Slovakia auctioned around 4,706,589 EUAs with an average price of about €51.4 per allowance.[88] While it might take more time for annual figures for sold EUAs to increase towards the highs of 2017 and 2018, taking climate targets and industrial innovations into account, the estimate should be rather representative over the total modeled period (2021-2030).

[87] National Allocation Table for Slovakia for the period between 2021 and 2025

[88] Calculations by the author; based on primary market auction reports by EEX.

Table 5: Revenue and sold EUAs by Slovakia between 2017 and 2020[89]

Year	Revenue (€)	Sold EUAs	Average auction price (€)
2017	87,064,470	15,099,737	5.80
2018	227,313,715	14,581,500	15.67
2019	244,713,510	9,573,000	24.72
2020	238,607,285	9,972,500	24.37

b) Modeled revenue 2021 – 2025

Table 6: Modeled revenue from EU ETS between 2021 and 2025

Year	Revenue (€)	EUA price (€)	EUAs sold[90]
2021	598,350,000	60	9972500
2022	633,293,640	63.5	9972500
2023	670,277,989	67.2	9972500
2024	709,422,223	71.1	9972500
2025	750,852,481	75.3	9972500
Total	**3,362,196,333**		

Total auctioning revenue from the sale of EUAs in 2017 amounted to €87,064,470; in 2018 this was €227,313,715. 9,972,500 emission allowances were sold in 2020, returning total revenue of around €238 million. Assuming the number of sold allowances in the EU ETS will stay the same during the next five years, a modeled revenue between 2021 and 2025 is €3,362,196,333.

According to the Auctioning regulation, "adopted in accordance with Article 10(4) of the ETS Directive", Slovakia's auction share during the period 2021-2030 of the EU ETS will be 1,602124134%.[91] *Figure 5* shows the linear reduction factor or LRF between 2005 and 2030. In *Table 7*, we can see the EU-wide emission cap for the EU ETS and the respective relative share of emission allowances for Slovakia. With the linear reduction factor or LRF of 2.2%, corresponding to an annual reduction of exactly 43,003,515 emission allowances[92], *Table 8* shows Slovakia's absolute EUA share between 2021 and 2030, which effectively limits the total amount of emission allowances that Slovakia can sell on the EU ETS market.

[89] Calculations by the author; based on primary market auction reports by EEX.
[90] The same number of EUAs sold as in 2020 (9,972,500) is assumed.
[91] Commission Decision (EU) 2020/2166 of 17 December 2020 (EUR-Lex – 32020D2166), Official Journal of the EU
[92] European Commission, Emissions Cap and Allowances

Figure 5: Cap reduction with increase of the Linear Reduction Factor to 2.2% as of 2021[93]

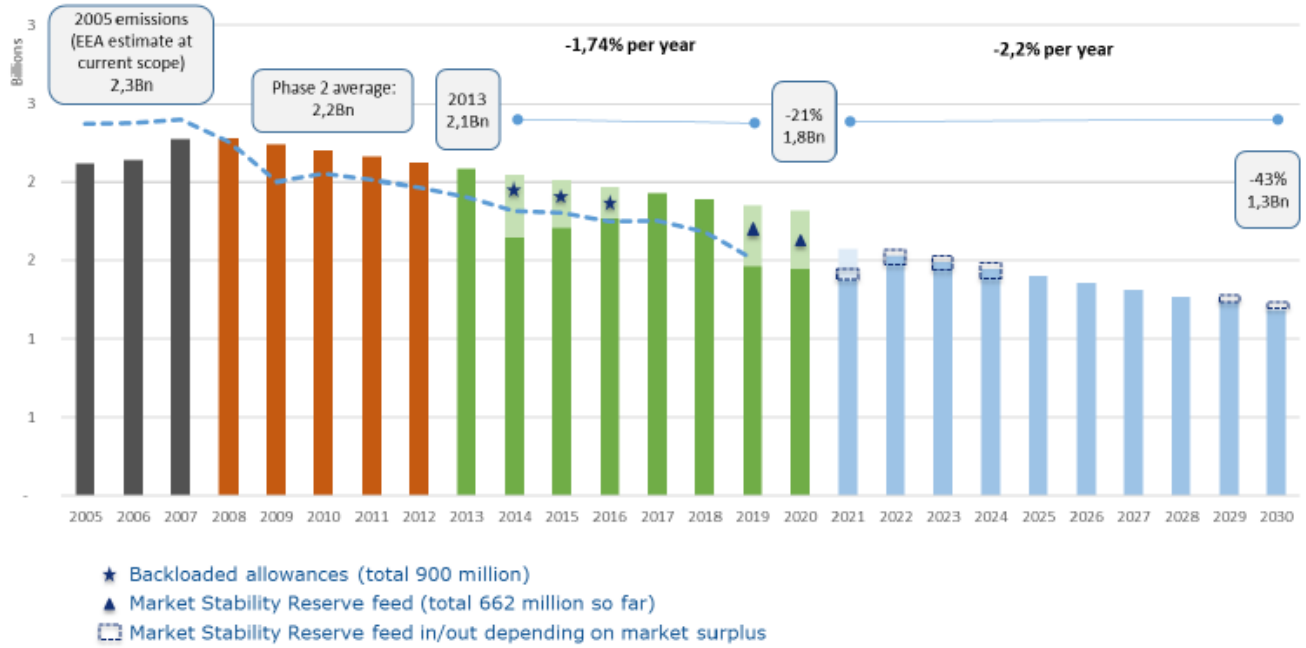


Table 7: EU-wide emission cap and Slovakia's share of emission allowances in 2021

EU-wide cap (2021)	1572	$MtCO_2eq$
Slovakia's share (2021 – 2030)	1.602124134	%
Slovakia's share (2021)	25.18	$MtCO_2eq$
LRF	2.2	%

[93] Report from the Commission to the European Parliament and the Council, Report on the functioning of the European carbon market, 2020

Table 8: EU-wide cap and Slovakia's share of emission allowances (2021 – 2030):

Year	EU-wide cap	Slovakia's share
2021	1,571,583,007	25,178,711
2022	1,528,579,492	24,489,741
2023	1,485,575,977	23,800,771
2024	1,442,572,462	23,111,802
2025	1,399,568,947	22,422,832
2026	1,356,565,432	21,733,862
2027	1,313,561,917	21,044,892
2028	1,270,558,402	20,355,923
2029	1,227,554,887	19,666,953
2030	1,184,551,372	18,977,983

c) Modeled revenue 2025 – 2030

After 2025, a new emission trading system for the transport and the buildings sector should be introduced. Earlier, the size of the Slovak EU ETS II was estimated at 13.35 $MtCO_2eq$. In order to estimate revenues from sale of EUAs for Slovakia after 2025, the new trading system must be added to the estimation. Again, assuming Slovakia will sell the same number of EUAs between 2025 and 2030 as in 2020, modeling the sale of 13,350,000 EUAs on the EU ETS II would surpass the EUAs available for Slovakia under the Auctioning regulation. For the purpose of this exercise, it is assumed Slovakia will make use of the maximum number of EUAs it has available for sale hence the number of allowances sold in EU ETS II would equal the difference between its allocated number of EUAs and the number of EUAs sold in EU ETS I. Also, end of free allocation is not taken into account as the system of freely allocated emission allowances will be prolonged for another decade with a complete phase out planned for the end of *Phase 4*, that is by 2030.[94] The aim of this study is to model auctioning revenues until the same year and thus the end of free allocation should not affect results of the exercise.

[94] European Commission, Climate Action, Allocation to industrial installations

Table 9: Estimated revenue from EU ETS I between 2025 and 2030:

Year	Revenue (€)	EUA price (€)	EUAs sold
2026	794,808,250	79.7	9972500
2027	840,681,750	84.3	9972500
2028	890,544,250	89.3	9972500
2029	942,401,250	94.5	9972500
2030	997,250,000	100.0	9972500
Total	**4,465,685,500**		

Table 10: Estimated revenue from EU ETS II between 2025 and 2030

Year	Revenue (€)	EUA price (€)	EUAs sold
2026	937,380,566	79.7	11,761,362
2027	933,402,687	84.3	11,072,392
2028	927,239,656	89.3	10,383,423
2029	916,125,818	94.5	9,694,453
2030	900,548,341	100	9,005,483
Total	**4,614,697,067**		

d) Modeled revenue 2021 – 2030

E...revenue from EU ETS I between 2021 and 2025

E2...revenue from EU ETS I between 2026 and 2030

F...revenue from EU ETS II between 2026 and 2030

R...estimated revenue from the EU ETS I and II between 2021 and 2030

R = E + E2 + F

R = 3,362,196,333 + 4,465,685,500 + 4,614,697,067

R = 12,442,578,900

The total revenue for Slovakia from the sale of EUAs between 2021 and 2030 is estimated at €12,4 billion.

4. CLIMATE DIVIDEND

The idea of climate dividend is relatively new. Still, "many climate scientists and economists alike say it is the fairest and most effective way of getting to zero carbon."[95] A climate dividend is a redistribution strategy that puts a price on carbon emissions, and as consumers are often directly impacted by price increases, then returns the proceeds straight to people[96], assuring an inclusive and socially just transition since "costs and benefits that come with the introduction of a carbon price are unevenly distributed across different groups in society."[97]

According to a 2020 study by Cambridge Econometrics, which modeled the impact of introducing a linked carbon price into the road transport and building sectors[98], among others, without a demand response, the price of gas for household heating increases in 2030 by 6%. Assuming a certain price elasticity, the study estimated the total increase in household heating expenditure across the low-income deciles is reduced to less than 5%. In the analysis of the road transport sector, the study found that "the addition of carbon pricing to fossil fuels increases the costs of refuelling by an average of 3% […], however the reduction in demand results in an increase in expenditure on transport fuels of 2%."[99] As demonstrated by the study, lower-income households specifically are at highest risk of being adversely impacted by carbon taxing as they "have tight constraints on their expenditure, and therefore are less likely than a typical consumer to have the financial capital to purchase a low-carbon

[95] Citizen's Climate Lobby, Carbon Fee and Dividend

[96] Boyce, James, "Carbon Dividends: A Win-Win for People and for the Climate", Scientific American, August 2021

[97] Santikarn et al., "The use of auction revenue from emissions trading systems: delivering environmental, economic, and social benefits", ICAP, 2019

[98] Methodology: "In the first scenario assessed, we took baseline projections of ETS allowance prices, i.e. the allowance price required to limit emissions in current ETS sectors to the 2030 and 2050 targets outlined in Table 2.1, and introduced them as a carbon price in the road transport and buildings sector."; Source: Stenning et al., "Decarbonising European transport and heating fuels – Is the EU ETS the right tool?", Cambridge Econometrics, June 2020

[99] Stenning et al., "Decarbonising European transport and heating fuels – Is the EU ETS the right tool?", Cambridge Econometrics, June 2020

technology; or are more likely to be in rented accommodation, and therefore not able to explicitly choose low-carbon technologies (which are typically more expensive up-front purchases)".[100]

For those reasons, lower income households are clearly in need to be protected from these impacts. Auctioning revenue is an important tool to achieve a fairer distribution and to protect vulnerable groups from potentially negative effects and the introduction of a carbon dividend would assure alleviation of additional costs for vulnerable households linked to the price of carbon.

a) Climate dividend around the world

Climate or carbon dividend, as a policy tool of redistributing revenues from carbon taxes, has already been implemented in several places around the world. For example, British Columbia in Canada has been operating a system where the revenue is returned to citizens not as dividend payments but via reductions in payroll taxes and other measures. Though a less transparent way of returning the revenue, British Columbia's carbon tax shift has, according to a World Bank blog post, been "an environmental and economic success."[101]

Around half of the RGGI States[102] provide some sort of direct bill assistance to households. In 2016, over 800,000 households benefited from these programs. Some states target the assistance specifically at low-income households while other states provide a general credit on consumers' electricity bills.[103]

California is required by law "to direct at least 25% of its revenue to benefit disadvantaged and low-income communities. […] In practice this means that California's climate programs and policies that are funded by the auctioning revenue also aim to improve the lives of people in these communities."[104]

In 2018, the Policy Exchange, a UK-based policy think-tank published a report, suggesting implementing an independent carbon tax with dividends in the UK "that are returned directly to the public in an annual lump sum, to lock in political and public support for fighting climate change."[105] The report was supported by former public figures[106] who wrote in the foreword that "in our drive to decarbonise the economy, it is important that we take people with us. If carbon taxes are seen to unduly punish that average citizen, they will fail. [Climate dividend] would make a carbon tax both progressive and popular."[107]

Last but not least, as of 2022, a compensation scheme similar to the idea of climate dividend will be established in neighboring Austria as part of the recent tax reform. While the reform includes a decrease in both corporate and income tax rates, starting on 1st July 2022, Austrians will have to pay €30 per ton of CO_2, which will likely be added

[100] Stenning et al., "Decarbonising European transport and heating fuels – Is the EU ETS the right tool?", Cambridge Econometrics, June 2020

[101] Citizen's Climate Lobby, Carbon Fee and Dividend

[102] The Regional Greenhouse Gas Initiative (RGGI) is a cooperative, market-based effort among the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, Vermont, and Virginia to cap and reduce CO2 emissions from the power sector. It represents the first cap-and-invest regional initiative implemented in the United States.

[103] Santikarn et al., "The use of auction revenue from emissions trading systems: delivering environmental, economic, and social benefits", ICAP, 2019

[104] Santikarn et al., "The use of auction revenue from emissions trading systems: delivering environmental, economic, and social benefits", ICAP, 2019

[105] Rooney et al., "The Future of Carbon Pricing: Implementing an independent carbon tax with dividends in the UK", Policy Exchange, July 2018

[106] Former Labour Chancellor Alastair Darling and former Conservative Foreign Secretary William Hague.

[107] Rooney et al., "The Future of Carbon Pricing: Implementing an independent carbon tax with dividends in the UK", Policy Exchange, July 2018

to consumer bills by companies. The cost will rise up to €55 per ton by 2025.[108] In order to offset the costs incurred on households and related to price increase in heating and transportation, every adult will be eligible to a "climate bonus" of €100 per year for urban dwellers and up to €200 per year for people living in rural areas, to compensate for lack of public transport.[109] While the scheme should compensate for household costs related to the transfer to cleaner sources of energy, its design is very similar to the one of climate dividend.

Several studies showed that carbon taxes are more than often passed on to consumers especially when it comes to transport and heating fuels. There is substantial evidence[110] on the relationship between gasoline taxes and retail prices and in the case of the California ETS, for instance, full pass through of GHG emission price to end-use consumers is assumed.[111] That is also why a higher carbon tax should go hand in hand with a compensation scheme for households as in the case of Austria.

b) Potential and expected benefits

A) Social benefits: Addressing energy poverty and income inequality

At its core, a climate dividend is a form of financial support for low-income households to compensate for higher energy prices. Vulnerable families in particular will be better off, collecting more in climate dividend than they pay out in increased energy costs. Affluent families who consume more would be able to pay for increased costs related to higher energy and transport prices. According to analyses by the US Treasury, Columbia University, and other research centers, returning carbon tax revenues in the form of equal dividends to every individual provides net financial benefits to roughly two-thirds of Americans, while still motivating them to reduce their carbon footprint.[112] Indeed, most households would be better off. Moreover, economist James Boyce stated in his 'The case for Carbon Dividends' that "carbon dividends would help to mitigate the problem of wide and rising income inequality."[113]

B) Economic benefits: Incentivizing low-carbon investment

With the introduction of a climate dividend, the spending power of households is increased. According to a US Treasury study, "dividends from a $50-per-ton carbon tax would raise the net income of the bottom tenth of income earners by nearly 9 %".[114] Not only are families protected from the effect of higher energy prices, but they are also incentivized to invest in low-carbon technologies and reduce their carbon emissions related to heating and transportation since the less they pay in higher energy and transport prices, the better-off they will be with the introduction of a climate dividend.

Furthermore, it is rather a complex task to design a sensible climate policy, supporting households to compensate for prices related to carbon taxation. Most grants are fixed and do not respond to the market price of EUAs. A climate dividend would be designed as a percentage of revenues coming from the auctioning of emission allowances. In other words, as the EUA market is rather volatile, if households would pay more in heating and

[108] Oshin Olafimihan, "Austria to revise carbon tax to include 'climate bonus' for residents", The Hill, October 2021

[109] Reuters, "Austria adopts carbon pricing in tax overhaul", October 2021

[110] Evidence for the US: Marion and Muehlegger (2011); Davis and Kilian (2011); and Li, Linn, & Muehlegger (2014), Evidence for Europe: Meyler (2009); source: Pollitt, Dolphin, "Feasibility and impacts of EU ETS scope extension – road transport and buildings", CERRE, December 2020

[111] Borenstein, Bushnell, Wolak, & Zaragoza-Watkins (2019); source: Pollitt, Dolphin, "Feasibility and impacts of EU ETS scope extension – road transport and buildings", CERRE, December 2020

[112] Hansen and Marshall, "A carbon tax is key to addressing the climate crisis — and carbon dividends could get Congress to support one", The Boston Globe, September 2021

[113] Hansen and Marshall, "A carbon tax is key to addressing the climate crisis — and carbon dividends could get Congress to support one", The Boston Globe, September 2021

[114] Hansen and Marshall, "A carbon tax is key to addressing the climate crisis — and carbon dividends could get Congress to support one", The Boston Globe, September 2021

ansport costs, they would get more in the form of a climate dividend. If the price of EUAs would decline, so would the revenues from their auctioning and households would get less money in compensation.

C) Governance benefits: Universality, transparency

Universal approach of a climate dividend scheme has numerous advantages. Firstly, this design does not exclude any individuals and thus assures wide population coverage. Secondly, the fact that everyone would benefit from the scheme equally may also increase public and political support for this policy tool. Thirdly, the universality and the simplicity of the tool makes the scheme easy to administer for the state. Crucially, it is thus more a transparent and credible tool with clear compliance obligations for those it covers. In addition, the simplicity makes the tool easier for other countries to follow, especially those lacking the resources and institutions to implement a more complex approach.[115] Put shortly, recycling revenues to residents in this way is done in a fair and transparent manner.

At the same time, universality may fail to adequately protect the most vulnerable households and those facing systemic disadvantages such as housing conditions and geographic location as it treats all residents equally. And regional perspectives are extremely important in the case of Slovakia. According to the research of Dokoupilová, Gerbery and Filčák, "the highest number of people at the risk of energy poverty is found in the Prešov (23.8%), the Nitra (20.1%) and the Košice regions (19%)."[116] For those reasons, some researchers argue for a non-universal approach, suggesting that those who bear a disproportionate burden from the carbon tax should benefit the most, as proposed by Josh Burke in his commentary[117]. While this would render the mechanism somewhat more complex, this design would ensure that vulnerable households such as single parent families would be well protected.

In order to preserve the equality aspect of the carbon dividend scheme and assure that family households are most supported at the same time, the suggested approach for Slovakia is to implement a climate dividend uniformly across the Slovak territory, with children receiving the same dividend amount as adult residents. As in Slovakia, "the largest poverty risks are faced by households with three or more children, single parents with young children and individuals over the age of 65"[118], this would ensure that family households are best protected from the risks of energy poverty.

D) Policy benefits: Public support

Climate dividend is a kind of policy that is appealing to consumers and would gather a society-wide support as the policy returns revenues from the EU ETS to households. In times of increasing energy prices, be it because of green policies and the price of emission allowances or not, it is important not to lose public support for the green agenda. In the opposite case, policies such as the European Green Deal could be opposed by populists with many arguments against further increase of emission targets and the implementation of more policy instruments.

Generally, financial programme support such as grants for investing revenues in green alternatives is less visible to citizens and its association with carbon pricing is less evident. Enacted direct climate dividend changes people's perception of the policy, being the best way to maintain the support of voters for ambitious carbon pricing.[119]

[115] Citizens' Climate Europe, "Carbon Fee and Dividend in the European Union", July 2020

[116] Dokupilová, Gerbery, Filčák, "Energetická chudoba na Slovensku 2020: Od analýz k odporúčaniam pre verejné politiky", June 2020

[117] Burke Josh, "Why carbon dividends are having a moment", The Grantham Research Institute on Climate Change and the Environment, LSE, August 2021

[118] The Slovak Spectator, "Hundreds of thousands in Slovakia have income below poverty line", October 2021

[119] Citizens' Climate Europe, "Carbon Fee and Dividend in the European Union", July 2020

British Columbia committed to a Carbon Tax with revenue recycling in 2008 and although initially a hard political sell, ultimately public support for the tax grew to about 65%.[120]

Few if any climate policies would immediately support vulnerable households, address income inequality while still motivating families to decrease their carbon footprint and invest in low-carbon technologies. "It can provide a strong, long-term price signal to drive investment in decarbonisation, while at the same time protecting consumers and building political support for the policy."[121] At the same time, the tool requires relatively low governmental involvement.

c) Climate dividend proposal for Slovakia

1) Proportional distribution of revenues from EU ETS auctioning

A) Direct dividend payments – 40%

40% of auctioning revenues would be distributed equally between all Slovak residents including children, in the form of direct dividend to protect vulnerable households and avert energy poverty. **In 2026, this would amount to around €693 million for available redistribution which would translate to around €127 per person per year**,[122] or €31.75 that beneficiaries would receive on a quarterly basis. Should the allocation be increased to 45% with proportional decrease for energy efficiency programmes, by 2026, the available amount for redistribution in the form of direct dividend would increase to about €780 million, or around €143 per person per annum.

In order to be an efficient tool without additional demands on governmental capacities, a climate dividend for Slovakia should not include any distributional criteria. It should be uniform and distribute auctioning revenues equally between all residents, including children. Such a universal approach has many advantages such as transparency, simplicity and related cheaper administrative costs as no complicated checks for criteria are required. Most importantly, as most vulnerable households in Slovakia are family households with three or more children, the tool would address risks of energy poverty.

Revenues equal to 40% of EUA sales would be deposited in a new wealth fund with the Ministry of Labour, Social Affairs and Family of the Slovak Republic or the Ministry of Environment, which would transparently use those resources to pay out dividends and to cover the operating costs of the dividend programme.[123] Dividend payments would need to be exempt from any taxes, and they would not be counted as income for any means-tested benefits. This is particularly important as it would prevent households from losing eligibility for other benefits.[124]

Table 11 shows the modeled dividend amount between 2022 and 2030. Since the EU ETS II is to be launched only in 2025, direct dividend payments would rise over €100 per person only after 2025. The average amount of direct dividend for Slovakia between 2022 and 2030 is €96.

[120] Harrison, Kathryn, "The Political Economy of British Columbia's Carbon Tax",
OECD Environment Working Papers No. 63, 2013; taken from: Citizens' Climate Initiative, "Carbon Dividend"
[121] Citizens' Climate Europe, "Carbon Fee and Dividend in the European Union", July 2020
[122] Population of Slovakia assumed at 5,458,827 (2020); The World Bank Data
[123] Burke, Josh, "Why carbon dividends are having a moment", The Grantham Research Institute on Climate Change and the Environment, LSE, August 2021
[124] Burke, Josh, "Why carbon dividends are having a moment", The Grantham Research Institute on Climate Change and the Environment, LSE, August 2021

Table 11: Modeled direct dividend for Slovakia between 2022 and 2030

Year	Total Revenue (€)	Dividend allocation(€)	Dividend (€)
2022	633,293,640	253,317,456	46
2023	670,277,989	268,111,195	49
2024	709,422,223	283,768,889	52
2025	750,852,481	300,340,992	55
2026	1,732,188,816	692,875,526	127
2027	1,774,084,437	709,633,775	130
2028	1,817,783,906	727,113,562	133
2029	1,858,527,068	743,410,827	136
2030	1,897,798,341	759,119,336	139
Total	**11,844,228,900**	**Average**	**96**

B) The Environment Fund of the Slovak Republic – 10 %

Proceeds going to the Environment Fund of the Slovak Republic could be lowered to only 10% of the total auctioning revenues. In 2020, the total annual income of the fund was €293,912,861 while revenues from the sale of EUAs was €241,826,257. In 2026, 10% of auctioned revenues would amount to €173,218,881. However, as attested by the fund's annual report, total expenditures in 2020 were budgeted at €105,690,560; suggesting even lower percentage of revenue allocated would not hamper the Fund's activities.

In order to comply with the EU ETS Directive and spend "at least 50% of revenues generated from auctioning of allowances"[125] on energy and climate, half of allocated revenues for the Environmental Fund, that is 5% from the total, should be earmarked and spent on energy and climate purposes. Compliance with the Directive would be assured even in the case when compensations for industrial installations are not allowed to be counted to the 50% 'energy and climate' target. The other 5% could be spent freely on other activities and programmes of the Fund such as pollution reduction as well as waste and wastewater management.

C) Energy efficiency programmes – 20 %

Energy efficiency programmes are among the most beneficial in terms of emission reductions on one hand, and on the other can deliver significant energy bill savings for participating households and businesses. Projects like

[125] Directive 2003/87/EC of the European Parliament and of the Council

* Population of Slovakia assumed at 5,458,827 (2020); The World Bank Data

home retrofitting also generate jobs in the housing and construction sectors.[126] For that reason, up to 20% of auctioning revenues could be allocated to energy efficiency programmes. Between 2013 and 2015, energy efficiency was the second category in terms of revenue expenditure among all EU Member States. In 2017, around 21% of total revenues across the EU were invested in energy efficiency programmes.[127] Both France and the Czech Republic have successfully[128] implemented energy efficiency measures in households while Bulgaria focuses on energy saving measures in public buildings.[129]

D) Renewable energy programme – 15 %

Up to 15% of the revenues generated from the auctioning of allowances could be allocated to a programme dedicated to deployment of renewable energy systems in households in order to provide financial support to families aiming at decreasing their electricity bills while decentralizing power generation.

E) Green Innovations Fund – 10 %

A Green Innovations Fund could be allocated 10% of EU ETS revenues to foster creation of green jobs and promote green innovations in the Slovak industry. Following the example of the funding provided by Norway grants, activities of the fund would "support new innovative technologies and services that improve the environment and sustainable growth".[130] The fund could be set up with the Research Agency of the Slovak Republic. The 10% would be part of the "at least 50%" climate and energy earmarked revenues as the EU ETS directive mentions financing "research and development in energy efficiency and clean technologies" as one of possible areas for the 'climate and energy' expenditures.

F) Compensations for industrial installations – 5 %

Up to 5% of revenues could be used as compensation payments to energy-intensive industries at risk for carbon leakage. These are permitted to count as an energy- and climate-related purpose under EU rules but this might be subject to legislative change as this decreases the beneficiaries' motivation to reduce their energy consumption.[131] Suggested redistribution structure would also respect the Article 10(3) of the EU ETS Directive which stipulates that "at least 50% of the revenues generated from the auctioning of allowances […] should be used to combat climate change in the EU and third countries."[132] Although 40% would be provided as a direct dividend to be used by consumers as they please, 60% of revenues would qualify as climate or energy-related expenditures.

2) Relation to the Social and Climate Fund

As part of the 'Fit for 55' climate package, the Commission proposes to introduce the Social Climate Fund, to address any social impacts that arise from the extension of emissions trading to the building and road transport

[126] Santikarn et al., "The use of auction revenue from emissions trading systems: delivering environmental, economic, and social benefits", ICAP, 2019

[127] Wiese et al., "The strategic use of auctioning revenues to foster energy efficiency: status quo and potential within the European Union Emissions Trading System", Energy Efficiency (Springer), September 2020

[128] Sunderland, Louise, "Learning from the Czech Republic on using EU ETS revenues for residential renovations", RAP, September 2019

[129] Santikarn et al., "The use of auction revenue from emissions trading systems: delivering environmental, economic, and social benefits", ICAP, 2019

[130] Norway in Slovakia, "Focus on Green Innovation in Slovakia through EEA and Norway Grants", December 2017

[131] Wiese et al., "The strategic use of auctioning revenues to foster energy efficiency: status quo and potential within the European Union Emissions Trading System", Energy Efficiency (Springer), September 2020

[132] European Commission, EU ETS Handbook

sectors.[133] The Social Climate Fund, financed by the EU budget, will use an amount equivalent to 25% of the expected revenues of emissions trading for building and road transport fuels, providing €72.2bn for the period between 2025 and 2032. This will be doubled by national match funding of 50% taking the fund to €144.4bn.[134] According to the current proposal by the Commission, "the Fund shall provide support to Member States, so that they could finance a coherent set of measures, including temporary direct income support, and investments considered necessary to meet the climate targets of the Union and, in particular ensuring affordable and sustainable heating, cooling, and mobility."[135] Every Member State should put forward a Social and Climate Plan which "shall contain a coherent set of measures [...] to address the impact of carbon pricing on vulnerable households […] and transport users in order to ensure affordable heating, cooling and mobility while accompanying and accelerating necessary measures to meet the climate targets of the Union."[136]

Direct climate dividend is a way to ensure vulnerable households are compensated for increased costs related to carbon pricing. Should the proposed dividend scheme be included in the Social and Climate Plan for Slovakia, available funds for redistribution could be even higher than the modeled result. Nevertheless, as the dividend does not accelerate measures to meet the climate targets of the EU even though it protects vulnerable households from the impact of carbon pricing, it would likely not be eligible to be included in the Social and Climate Plan.

[133] European Commission, Climate Action, Social Climate Fund

[134] Feore, Catherine, "€145bn Social Climate Fund to help poorer households with transition", EU Reporter, July 2021

[135] European Commission, Proposal for a Regulation of the European Parliament and of the Council establishing a Social Climate Fund

[136] European Commission, Proposal for a Regulation of the European Parliament and of the Council establishing a Social Climate Fund

CONCLUSION:

Increasing auctioning revenues from EU ETS provide a great opportunity to fund the green transition and help the EU achieve its ambitious climate targets. Evidence has shown that carbon taxes are often directly passed on to consumers especially when it comes to transport and heating fuels. As people's living costs will surely increase as a result of carbon taxation, it is crucial they will get something in return. Otherwise, green policies in Europe can be severely undermined. Carbon dividend serves as a great policy tool to protect vulnerable households while being a fair, practical and an "elegant solution in its simplicity, transparent in its accessibility to public scrutiny and clear in its signals and benefits."[137] The study showed that significant revenues from the European Emissions Trading System will be generated because of the increasing EUA price. The proposed scheme of returning at least 40% of auctioning proceeds to households would assure that most vulnerable families are protected from increasing prices related to carbon taxation while incentivizing low-carbon investment.

List of figures:

List of tables:

[137] Citizen's Climate Lobby, Carbon Fee and Dividend