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A PRELIMINARY ANALYSIS OF THE TURKISH EMISSIONS TRADING SYSTEM

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Introduction

According to the draft carbon market regulation[1] announced in November 2023, the Turkish Emissions Trading System (ETS) will begin in 2025. The first step in establishing an ETS in Türkiye began with the establishment of a Monitoring-Reporting-Verification (MRV) system in 2015. According to the ETS regulation, installations in the electricity, refinery, non-metallic minerals, basic metals, paper, and the chemicals sectors emitting above a certain level of greenhouse gases (GHGs) (> 500 ktCO_2e) will be covered under the new system. As of 2020, 476 installations under the Turkish MRV system emitted 251 MtCO_2e of GHG, which corresponds to 48.2% of total emissions (520 MtCO_2e).[2]

This policy brief aims to highlight possible shortcomings in the Turkish ETS by reviewing the experiences of existing ETS practices globally, specifically of the EU ETS, which shares many common elements with that of Türkiye.

Key Features of the Implemented ETS Initiatives Worldwide

According to the World Bank's Carbon Pricing Dashboard dataset, as of the end of 2023, there are 36 (regional and subnational) ETS initiatives implemented, 3 scheduled, and 22 under consideration.

Table 1 presents the key statistics on the implemented ETS initiatives in order of their share of global emissions covered.

These 36 ETS initiatives cover 8.91 GtCO_2e, which accounts for 17.7% of global emissions.

In terms of the share of global emissions in 2023, the biggest initiative is the Chinese National ETS, which became operational in 2021, that covers 4.5 GtCO_2e (8.9% of global emissions). It is followed by the EU ETS covering 1.4 GtCO_2e, which accounts for 2.7% of global emissions.

Table 1. Key Statistics for 2023 on Implemented ETS Initiatives

Name-Country	Year	Price (USD/ton CO_2e)	Revenue (billion USD)	Sectoral Scope	GHG Emissions Scope (Mt CO_2e)	2023 Share (% Global Emissions)	2023 Share (% Jurisdiction Emissions)
China national ETS	2021	8	0	Electricity	4500	8.92	31
EU ETS	2005	96	42.152	Manufacturing, Electricity, Aviation	1354	2.69	38
Korea ETS	2015	11	0.243	Manufacturing, Electricity, Buildings, Aviation, Public Waste	507	1.01	74
Germany ETS	2021	33	6.963	Buildings, Road Transport	305	0.6	40
Indonesia ETS	2023	N/A	0	Electricity	300	0.6	26
California CaT-USA	2012	30	4.027	Manufacturing, Electricity, Transport, Buildings	279	0.55	74
Guangdong pilot ETS-China	2013	12	0.119	Manufacturing, Aviation	278	0.55	40
Alberta TIER-Canada	2007	48	0.44	all installations with >100 kt CO_2e/year	148	0.29	58
Kazakhstan ETS	2013	1	0	Electricity, Manufacturing	136	0.27	46
Mexico pilot ETS	2020	0	0	Manufacturing, Electricity	280	0.27	40

Table 1. Key Statistics for 2023 on Implemented ETS Initiatives (cont.)

Name-Country	Year	Price (USD/ton CO_2e)	Revenue (billion USD)	Sectoral Scope	GHG Emissions Scope (Mt CO_2e)	2023 Share (% Global Emissions)	2023 Share (% Jurisdiction Emissions)
Fujian pilot ETS-China	2016	5	0.0002	Manufacturing, Aviation	125	0.25	51
Hubei pilot ETS-China	2014	7	0.013	Manufacturing	125	0.25	27
Shanghai pilot ETS-China	2013	9	0.02	Manufacturing, Electricity, Buildings, Transport	107	0.21	36
RGGI-USA	2009	15	1.194	Electricity	83	0.17	14
Tianjin pilot ETS-China	2013	5	0.012	Manufacturing, Buildings	75	0.15	35
Chongqing pilot ETS-China	2014	5	0.012	Manufacturing	73	0.14	51
Quebec CaT-Canada	2013	30	1.338	Manufacturing, Electricity, Transport, Buildings	59	0.12	77
Washington CCA-USA	2023	22	0	Manufacturing, Electricity, Transport, Buildings, Waste	57	0.11	70
New Zealand ETS	2008	34	1.274	Manufacturing, Electricity, Buildings, Aviation, Road Transport, Waste, Forestry	38	0.08	49
Beijing pilot ETS-China	2013	13	0.016	Manufacturing, Electricity, Transport, Buildings	35	0.07	24
Ontario EPS-Canada	2022	48	0	all installations with >50 kt CO_2e/year	38	0.07	25
Austria ETS-China	2022	35	0	Transport, Buildings, Agriculture, Electricity, Manufacturing	32	0.06	40
Shenzhen pilot ETS-China	2013	9	0.004	Manufacturing, Electricity, Buildings, Transport	25	0.05	30
Oregon ETS-USA	2021	0	0	Liquid fuels, Propane, Natural Gas utilities	21	0.04	43
Nova Scotia CaT-Canada	2019	21	0.038	Manufacturing, Electricity, Transport, Heating	13	0.03	87
UK ETS	2021	88	7.592	Manufacturing, Electricity, Aviation	113	0.03	28
Saskatchewan OBPS-Canada	2019	48	0	all installations with >25 kt CO_2e/year	9	0.02	13
Tokyo CaT-Japan	2010	5	0	Manufacturing, Electricity, Buildings, Transport	12	0.02	20
Canada federal OBPS	2019	48	0.086	all installations with >50 kt CO_2e/year	7	0.01	1
New Brunswick ETS-Canada	2021	48	0	all installations with >50 kt CO_2e/year	6	0.01	50
Newfoundland and Labrador PSS-Canada	2019	48	0.0001	all installations with >25 kt CO_2e/year	4	0.01	43
Saitama ETS-Japan	2011	1	0	Manufacturing, Electricity, Buildings	7	0.01	17
Switzerland ETS	2008	94	0.047	Manufacturing, Electricity, Aviation	5	0.01	11
BC GGIRCA-Canada	2016	18	0	LNG facilities	0	0	0
Massachusetts ETS-USA	2018	12	0.054	Electricity	5	0	8
Montenegro ETS	2022	N/A	0	Manufacturing, Electricity	N/A	N/A	N/A
Total			**65.6**		**9160.9**	**17.7**	**-**

Source: Carbon Pricing Dashboard, The World Bank.

The price of allowances ranges between USD 1 (Saitama ETS-Japan) and USD 96 (EU ETS), with an average price of USD 2 in 2023. Initiatives, overall, generate USD 65.6 billion in revenue, with the EU ETS topping the list with USD 42.2 billion.

As can be observed from Table 1, sectoral coverage varies significantly across initiatives. The EU, Korea, and New Zealand ETSs top the list in terms of sector coverage.

An Analysis of the Turkish Emissions Trading System

Türkiye took the first step in establishing a domestic ETS by instituting a MRV system in 2015. According to the regulation, installations above determined sizes in electricity, iron-steel, aluminum, cement, glass, ceramics, lime, mineral wool, paper, refinery products, and chemicals sectors are required to report their emissions to the Turkish Ministry of Environment, Urbanization, and Climate Change. In terms of sectoral and product coverages, Turkish MRV matches almost one-to-one with the EU ETS, except in aviation.

According to officials, the pilot phase of the Turkish ETS will start on October 15, 2024 with the announcement of national allowance allocations. Following a two-year transition period, the first implementation phase will start on October 15, 2026.

Note that Turkish MRV categorizes installations under three groups: Category A includes installations with emissions lower than 50 $ktCO_2e$; Category B installations with emissions between 50 and 500 $ktCO_2e$; and Category C installations with emissions higher than 500 $ktCO_2e$.

Table 2 presents key statistics for the Turkish MRV system.

Table 2. Key Statistics on the Turkish MRV System in 2020

	Category A		Category B		Category C		Total	
Activity	**Emissions ($MtCO_2e$)**	**Number**	**Emissions ($MtCO_2e$)**	**Number**	**Emissions ($MtCO_2e$)**	**Number**	**Emissions ($MtCO_2e$)**	**Number**
Non-Ferrous Metals	0.0	0	0.7	9	0.2	1	0.9	10
Plaster	0.2	9	0.0	0	0.0	0	0.2	9
Aluminum	0.1	5	0.1	2	0.6	1	0.9	8
Glass	0.2	7	2.1	12	0.0	0	2.4	19
Cement	0.0	0	1.3	4	66.3	53	67.6	57
Lime	0.0	3	2.2	22	0.5	1	2.8	26
Ceramics	0.5	27	1.7	17	0.3	1	2.5	45
Bricks	0.6	86	0.1	3	0.3	1	1.0	90
Mineral Wool	0.1	6	0.1	3	0.0	0	0.2	9
Iron	0.3	18	2.1	21	0.0	0	2.4	39
Pig Iron-Steel	0.1	7	2.3	11	30.0	6	32.3	24
Electricity	0.1	5	1.6	14	116.3	49	118.0	68
Paper	0.6	30	1.5	14	0.7	2	2.8	46
Chemicals	0.2	11	0.9	3	7.9	7	9.0	21
Refinery Products	0.0	0	0.1	1	7.6	4	7.6	5
Total	**3.0**	**214**	**16.7**	**136**	**230.7**	**126**	**250.5**	**476**
% of MRV Emissions	**1.2**		**6.7**		**92.1**		**100**	
% of Total Emissions	**0.6**		**3.2**		**44.4**		**48.2**	

Source: Turkish Ministry of Environment, Urbanization and Climate Change

By 2020, the Turkish MRV covered 476 installations, of which 214 belonged to Category A, 136 belonged to Category B, and 126 belonged to Category C.

In 2020, Türkiye emitted 520 $MtCO_2e$, and the Turkish MRV covered 48.2% of it (251 $MtCO_2e$). Category A, Category B, and Category C installations emitted 1.2%, 6.7%, and 92.1% of emissions covered under the Turkish MRV, respectively.

It was announced that the Turkish ETS will cover only Category C installations during the pilot phase. While Category C installations make up the majority of emissions, note that if only Category C installations would be covered, then GHGs emissions of installations producing plaster, glass, mineral wool, and iron would not be accounted for (as of 2020).[3]

Table 3 presents the average emissions of installations covered under the Turkish MRV and the EU ETS.

As can be seen from Table 3, the Turkish MRV categorization (which only covers Category C installations) led to the exclusion of installations producing plaster, glass, mineral wool, and iron. However, when compared with EU ETS coverage, there seems to be room for including more installations under the Turkish MRV. For example, average installation emissions in plaster production under the EU ETS is 29.8 $ktCO_2e$, which is very close to 23.5$ktCO_2e$ of Category A installations under the Turkish MRV. This is also the case for glass and iron production. The EU ETS glass and iron installation average is 53.7 and 77.8 $ktCO_2e$, respectively, which are even well below the average emissions of installations under Category B in the Turkish MRV.

Table 3. Average Installation Emissions under the Turkish MRV and EU ETS ($ktCO_2e$)

	Turkish MRV			EU ETS
Activity	**Category A**	**Category B**	**Category C**	
Non-Ferrous Metals	None	73.9	241.8	87.1
Plaster	23.5	None	None	29.8
Aluminum	23.6	49.1	637.6	145.2
Glass	30.3	178.9	None	53.7
Cement	None	323.7	1250.5	475.3
Lime	14.7	99.4	541.3	121.9
Ceramics, Bricks	10.3	92.7	268.1	19.4
Mineral Wool	16.9	42.2	None	43.4
Iron	17.3	98.3	None	77.8
Pig Iron-Steel	8.0	208.5	4992.0	495.9
Electricity	11.3	114.0	2374.3	154.0
Paper	19.2	105.3	370.6	33.7
Chemicals	17.4	294.1	1129.6	139.0
Refinery Products	None	54.4	1890.1	1044.5

Source: Turkish Ministry of Environment, Urbanization and Climate Change; EU ETS data viewer

Installation coverage under the Turkish MRV and eventually the Turkish ETS can only be extended by revising the rules employed in installation categorization. In this regard, the EU ETS installation categorization rules may help. Table 4 below presents the conditions employed in installation selection under the EU ETS.

It was announced that the Turkish MRV will employ a single criterion to determine the scope of installations: that is, installations emitting more than 500 $ktCO_2e$ will be covered under the Turkish ETS. However, the EU ETS has long employed a more detailed set of criteria specifically designed for each activity, as shown in Table 4. Using single emission-based criterion may lead to biased installation selection.

How Is the Turkish ETS Expected to Function?

One of the most important elements of ETS is the determination of the cap. The cap sets the upper boundary for permissible greenhouse gas (GHG) emissions within a scheme, essentially determining the total number of allowances (emissions budget) allocated to covered entities. An absolute cap ensures that emissions remain below a specified limit, guaranteeing a predetermined environmental outcome.

The pricing of allowances is influenced by factors like the quantity of available allowances under the cap, the ease of emissions reduction for installations, and variables such as consumption patterns and drivers of economic growth. These

Table 4. Categories of Activities to which the ETS Directive Applies

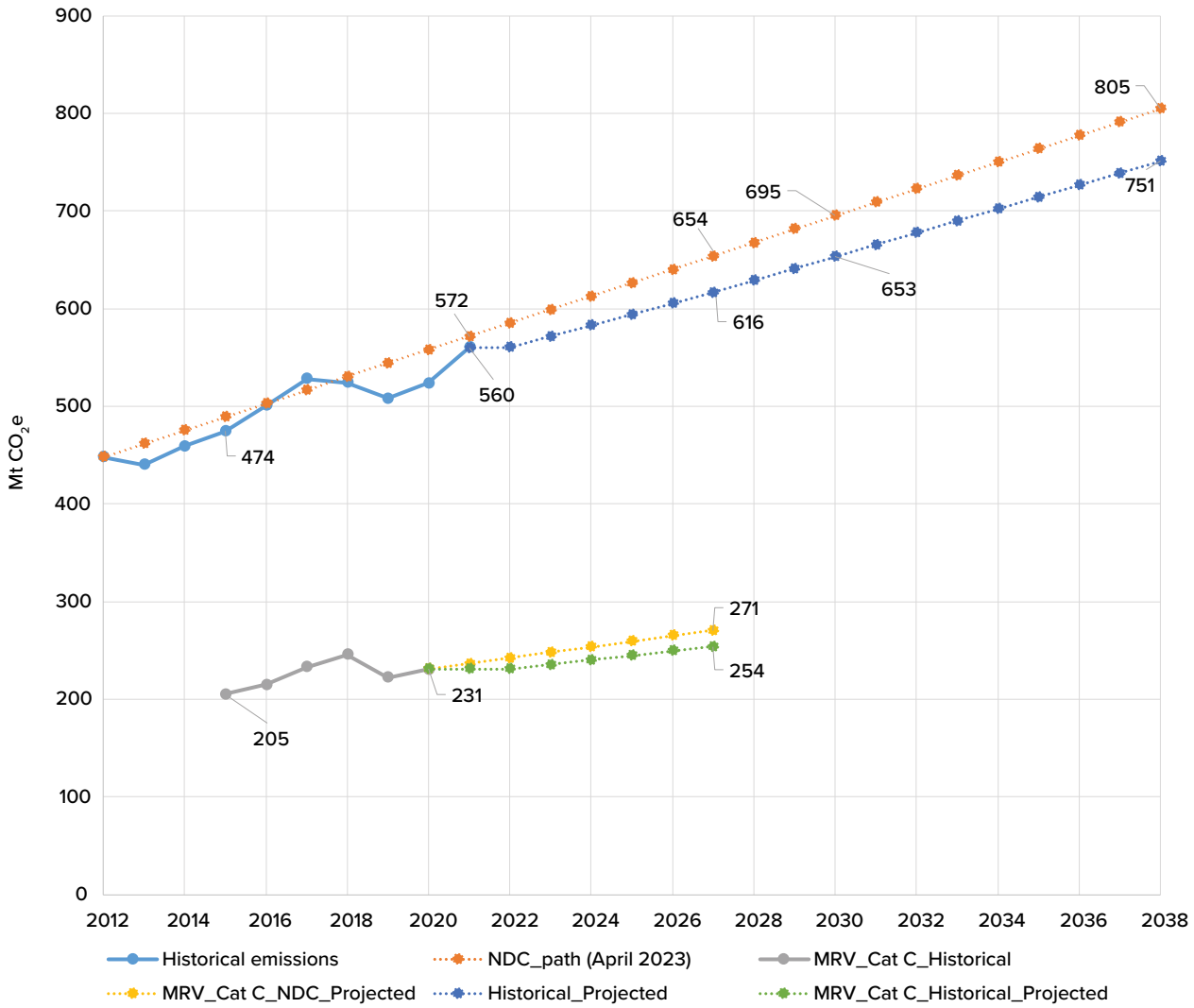
Activity	Category C-Turkish MRV	EU ETS
Non-Ferrous Metals	emissions >500 $ktCO_2e$/year	combustion units with a total rated thermal input > 20 MW
Plaster	emissions >500 $ktCO_2e$/year	combustion units with a total rated thermal input > 20 MW
Aluminum	emissions >500 $ktCO_2e$/year	combustion units with a total rated thermal input > 20 MW
Glass	emissions >500 $ktCO_2e$/year	melting capacity > 20 tons/day
Cement	emissions >500 $ktCO_2e$/year	rotary kilns > 500 tons/day; other furnaces > 50 tons/day
Lime	emissions >500 $ktCO_2e$/year	rotary kilns or other furnaces > 50 tons/day
Ceramics, Bricks	emissions >500 $ktCO_2e$/year	production capacity > 75 tons/day
Mineral Wool	emissions >500 $ktCO_2e$/year	melting capacity > 20 tons/day
Iron	emissions >500 $ktCO_2e$/year	combustion units with a total rated thermal input > 20 MW
Pig Iron-Steel	emissions >500 $ktCO_2e$/year	capacity > 2.5 tons/hour
Electricity	emissions >500 $ktCO_2e$/year	combustion units with a total rated thermal input > 20 MW
Paper	emissions >500 $ktCO_2e$/year	capacity > 20 tons/day
Chemicals	emissions >500 $ktCO_2e$/year	carbon black combustion units with a total rated thermal input > 20 MW; etc.
Refinery Products	emissions >500 $ktCO_2e$/year	combustion units with a total rated thermal input > 20 MW

Source: Turkish Ministry of Environment, Urbanization and Climate Change, EU ETS Regulatory Guidance for Installations (https://climate.ec.europa.eu/system/files/2016-11/guidance_interpretation_en.pdf)

elements must be considered when formulating a cap. While the carbon price is affected by these factors as well, a generous emissions budget tends to result in a surplus market and a lower allowance price, diminishing incentives for emissions reduction. Conversely, a relatively stringent emissions budget, or a "tight cap," implies a restricted supply of allowances, creating a market shortfall, leading to a higher allowance price, and providing a stronger fiscal motivation for emissions reduction. Hence, determining the cap trajectory accurately is important for an effective functioning of an ETS.

Turkish authorities announced that the cap will increase (not decrease) along with the projected emissions under the announced NDC in April 2023.[4]

Figure 1. Historical and Projected GHG Emissions in Türkiye ($MtCO_2e$)



Source: Climate Action Tracker; Turkish Ministry of Environment, Urbanization and Climate Change; author's calculatio

According to the Turkish NDC, Turkish emissions will reach 1,178 Mt CO_2e by 2030 under the Business-as-Usual (BaU) scenario (not shown in Figure 1). However, as can be seen from Figure 1, Turkish authorities pledged to limit emissions to 695 MtCO_2e in 2030, which corresponds to a 41% decrease from BaU.

The Turkish NDC projects that emissions will peak in 2038 without stating a specific figure. Assuming that the trend continues from 2030 onward, one can project that the peak emissions level would be 805 MtCO_2e in 2038.

Historical emissions, however, reveal a different path. Between 1990 and 2021, Turkish emissions grew, on average, by 11.2 MtCO_2e annually. If this historical trend continues in the future, Turkish emissions will reach 653 MtCO_2e in 2030 and 751 MtCO_2e in 2038, both well below the levels reflected in the NDC.

The Turkish MRV began operations in 2015. Category C installations emitted, on average, 44.2% of total emissions. In 2020, Turkish emissions reached 524 MtCO_2e, and 231 Mt of them were covered under the MRV Category C, to which the Turkish ETS will apply.

If the cap increases along with the NDC path (as announced officially), it is expected to reach 271 MtCO_2e in 2027 (the year the transition period of the Turkish ETS will end). However, if the cap increases along with the historical path, it is expected to reach 254 MtCO_2e (see the evolution of MRV_CatC_Historical_Projected in Figure 1). That means by 2027, when the transition phase of Turkish ETS ends, there is a risk that installations can get 17 million units (271–254) more allowances for free, which are not needed to cover their emissions.

Note that the oversupply (or surplus) of allowances under the first phase of the EU ETS had driven down the allowance prices near zero in 2008.[5] Note also that the oversupply of free allowances may lead to windfall profit for installations earned from selling excess allowances and by passing through carbon costs (that have not been actually incurred) to end consumers. In 2016, CE Delft calculated that between 2008 and 2015, industrial companies in the EU ETS received excess allowances worth over EUR 7.5 billion and earned another EUR 16.7 billion by passing on part of the costs of freely obtained allowances.[6]

It is important to consider that the transition phase of the Turkish ETS ends in 2027, after when some installations (mainly thermal power plants) are required to buy allowances from the market. Our calculations indicate that there will be an oversupply of 17 million allowances. This would drive down carbon prices and lead to windfall profits for some sectors (i.e., EUR 170 million if the carbon price is 10 EUR/tCO_2e), which would disincentivize decarbonization efforts.

How would Turkish ETS avoid these outcomes?

For any ETS to function effectively, first of all, the cap should be binding. Secondly, the free allocation of allowances should be kept to a minimum. It is clear that increasing the cap in the Turkish ETS can hardly satisfy the first condition, and the generous allocation of allowances could, ironically, reward carbon-intensive installations rather than incentivizing them to decarbonize. In short, the Turkish NDC must be revised to reflect actual and expected trends in GHGs emissions.

How Should the Cap Evolve under the Turkish ETS?

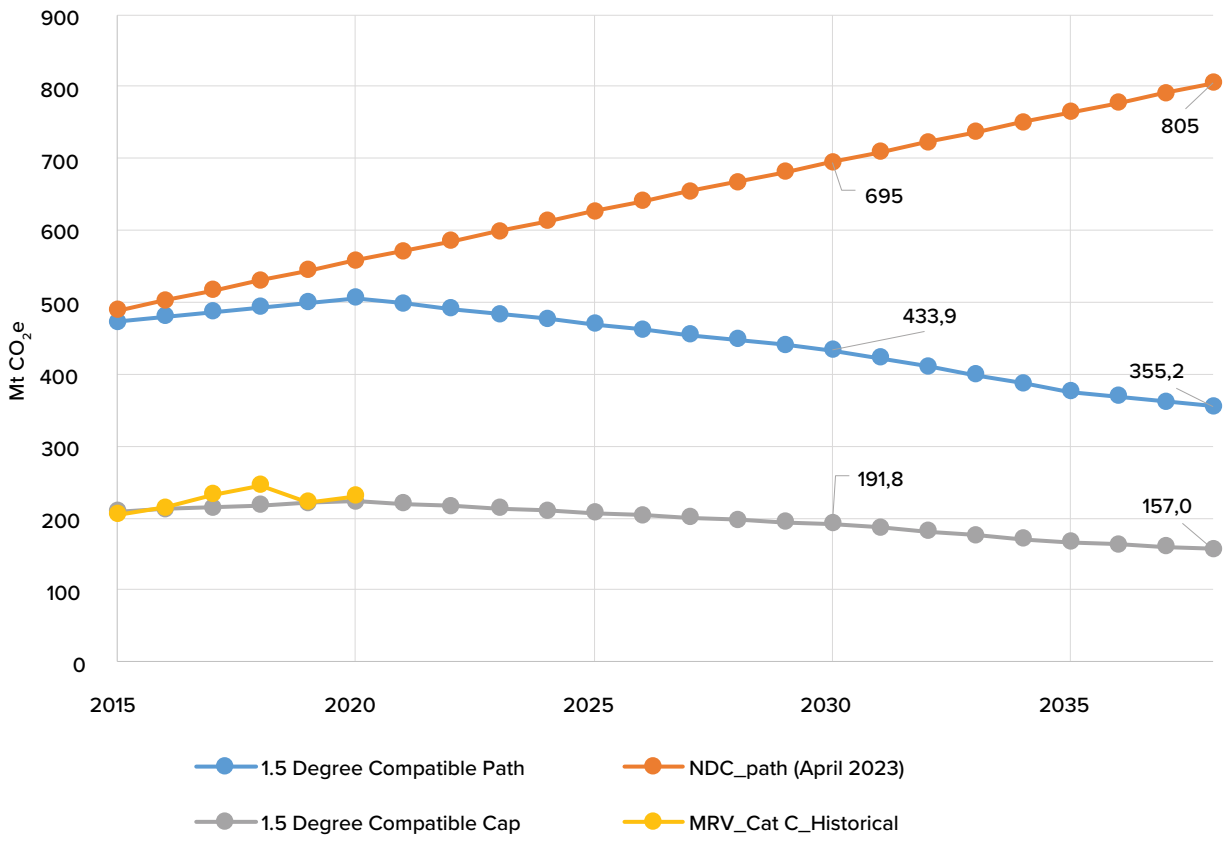
According to the Climate Action Tracker,[7] an independent scientific project that tracks government climate action, a 1.5-degree compatible and fair emission level in Türkiye is calculated to be 433.9 $MtCO_2e$ in 2030 (as opposed to 695 $MtCO_2e$ announced in the NDC).

Assuming that the MRV Category C installations, those are expected to be covered under the Turkish ETS, would continue to emit on average 44.2% of total emissions, one can find the "1.5-Degree Compatible Cap" for Türkiye as presented in Figure 2.

According to the calculation, the cap will be reduced to 191.8 Mt and to 157 $MtCO_2e$ in 2030 and 2038, respectively.

The absolute reduction in the cap would ensure a positive carbon price in the Turkish ETS market.

Figure 2. NDC and 1.5-Degree Compatible Paths



Source: Climate Action Tracker; Turkish Ministry of Environment, Urbanization and Climate Change; author's calculation

Concluding Remarks

ETS is gaining ground worldwide as an effective method to limit GHGs. As of 2023, there are 36 implemented, 22 under consideration, and three scheduled ETS initiatives worldwide.

Türkiye is one of the countries considering a domestic ETS, to be effective in 2025. Türkiye's efforts to establish an ETS started in 2015 by instituting a MRV system that covered installations in electricity, refinery products, non-metallic minerals, iron-steel, aluminum, paper, and chemicals, almost the same coverage as the EU ETS, except aviation.

The scope of the installations, however, is rather limited due to the criterion announced to be employed. According to officials, only Category C installations emitting more than 500 $ktCO_2$/year will be included under the Turkish ETS. However, historical MRV data reveals that if this is the case, then no installations producing plaster, glass, mineral wool, and iron would be covered. Applying the EU ETS installation selection criteria, which is specifically designed for each activity, may solve this problem.

Another important issue is the size of the cap. The EU ETS experience reveals that effective carbon prices are formed only when allowances are scarce. In other words, the oversupply of allowances would drive down carbon prices to zero and render the ETS ineffective.

Türkiye has not officially determined the cap yet but rather announced that it will be determined along with the emissions under the NDC submitted in April 2023. However, the Turkish NDC has been criticized for being unsatisfactory. First of all, actual emissions since 2012 have been systematically lower than the projected emissions under the NDC, except in 2017. Secondly, according to the Climate Action Tracker methodology, it is neither aligned with the 1.5- nor the 2-degree path.

Contrary to the growing emissions path under the Turkish NDC, the Climate Action Tracker's "fair" and "1.5-degree compatible" path require an absolute reduction in emissions to 433.9 $MtCO_2e$ (as opposed to 695 $MtCO_2e$) in 2030. Furthermore, if MRV Category C installations continue to emit 44.2% of total emissions in the future, this indicates that the cap should be reduced to 191.8 $MtCO_2e$ in 2030 from 231 $MtCO_2e$ in 2020. Otherwise, our calculations show that using the NDC path would lead to at least an oversupply of 17 million allowances in 2027, which would drive down carbon prices in Türkiye to zero and reward some installations/sectors with unjustified windfall profits.

It should be acknowledged that ETS is not the only tool to decarbonize economies. Existing and new companion policies can help improve the effectiveness of carbon markets (complementary policies), duplicate incentives provided by carbon markets (overlapping policies), or in some cases, counteract incentives in carbon markets (countervailing policies).[8] The fossil fuel subsidies, tax breaks, and special treatment offered to some industries in Türkiye can be viewed as counterproductive policies risking the effectiveness of ETS in Türkiye.

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Notes

1 | "Karbon Piyasalarının İşletilmesine İlişkin Yönetmelik Taslağının Görüşe Açılması," T.C. Enerji Piyasası Düzenleme Kurumu, accessed February 15, 2024, https://www.epdk.gov.tr/Detay/Icerik/4-13184/karbon-piyasalarinin-isletilmesine-iliskin-yonetm.

2 | Note that the calculations made in this brief are based on the available data and are subject to change with the availability of more recent data and details of the upcoming ETS.

3 | Note that these figures reflect the situation as of 2020 (the latest year for which data is available) and that installation coverage will different when the Turkish ETS starts in 2025.

4 | "Republic of Türkiye Updated First Nationally Determined Contribution," UNFCCC, accessed February 15, 2024, https://unfccc.int/sites/default/files/NDC/2023-04/T%C3%9CRK%C4%B0YE_UPDATED%20 1st%20NDC_EN.pdf.

5 | Helena Taueuber and Matt Smith, "EU emissions: has the ETS been a success?" Frontier economics, accessed February 15, 2024, https://www.frontier-economics.com/uk/en/news-and-articles/articles/article-i20084-eu-emissions-has-the-ets-been-a-success/.

6 | Sander de Bruyn, Ellen Schep, Sofia Cherif, and Thomas Huigen, Calculation of additional profits of sectors and firms from the EU ETS 2008-2015 (Delft: CE Delft, December 2016), https://ce.nl/wp-content/uploads/2021/03/CE_Delft_7K42_Calculation_additional_profits_EU_ETS_FINAL.pdf.

7 | "Türkiye," Climate Action Tracker, last updated May 12, 2023, https://climateactiontracker.org/countries/turkey/.

8 | Emissions Trading in Practice: A Handbook on Design and Implementation, Second Edition (Washington, DC: The World Bank, 2021), https://icapcarbonaction.com/system/files/document/ets-handbook-2020_finalweb.pdf.

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The Istanbul Policy Center–Sabancı University–Stiftung Mercator Initiative aims to strengthen the academic, political, and social ties between Turkey and Germany as well as Turkey and Europe. The Initiative is based on the premise that the acquisition of knowledge and the exchange of people and ideas are preconditions for meeting the challenges of an increasingly globalized world in the 21st century. The Initiative focuses on two areas of cooperation, EU/German-Turkish relations and climate change, which are of essential importance for the future of Turkey and Germany within a larger European and global context.

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