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Türkiye'S EMISSIONS TRADING SYSTEM

A PRELIMINARY ANALYSIS

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Entrance

According to the draft "Regulation on the Operation of Carbon Markets" dated November 2023 , the Turkish Emissions Trading System (ETS) will be implemented in 2025. The process of establishing an ETS in Turkey began in 2015 with the establishment of a Monitoring-Reporting-Verification (IRD) system. According to the regulation, facilities in the electricity, refining, non-metallic minerals, base metals, paper, and chemical sectors that emit above a certain threshold level (> 100 ktCO2e) are covered. As of 2020, 476 facilities under the Turkey IRD system emitted 251 MtCO2e of greenhouse gases, which corresponds to 48.2% of the total 520 MtCO2e emissions.

This policy brief aims to identify potential problem areas and possible solutions in the Turkish Electronic Trade System (ETS), drawing on experiences from existing ETS systems worldwide, particularly the EU ETS, which share many similarities.

ETS Applied Worldwide Key Characteristics of Their Ventures

According to the World Bank's Carbon Pricing Dashboard dataset, as of the end of 2023, there are 36 (regional and sub-national) ETS initiatives in operation worldwide, 3 in the planning stage, and 22 under evaluation.

Table 1 presents key statistics on currently implemented ETS initiatives, ranked by their share of global emissions. The 36 ETS initiatives mentioned cover 8.91 GtCO2e , equivalent to 17.7% of global emissions . As of 2023, the largest initiative in terms of share of global emissions is the China National ETS, which became operational in 2021 and covers 4.5 GtCO2e, or 8.9% of global emissions. It is followed by the EU ETS, which accounts for 1.4 GtCO2e, or 2.7% of global emissions.

Table 1. Basic Statistics of Implemented ETS Initiatives as of 2023

Name-Country	Year	Price (US$/ton CO2e)	Income (billion US$)	Sector Scope	Emission Scope (MtCO2e)	2023 Pay (% Global) (emissions)	2023 Share (% Country/Region (emissions)
China National ETS	2021	8	0	Electric	4500	8.92	31
EU ETS	2005	96	42.152	Manufacturing, Electrical, Aviation	1354	2.69	38
Korean ETS	2015	11	0.243	Manufacturing, Electricity, Buildings, Aviation, Public Sector, Waste	507	1.01	74
Germany ETS	2021	33	6.963	Buildings, Road Transport	305	0.6	40
Indonesia ETS	2023	N/A	0	Electric	300	0.6	26
California CaT-USA	2012	30	4.027	Manufacturing, Electricity, Transportation, 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 for all facilities above 100 kt CO2e/year		148	0.29	58
Kazakhstan ETS	2013	1	0	Electricity, Manufacturing	136	0.27	46
Mexican pilot ETS	2020	0	0	Manufacturing, Electrical	280	0.27	40
Fujian pilot ETS-China	2016	5	0.0002	Manufacturing, Aviation	125	0.25	51

Table 1. Basic Statistics of Implemented ETS Initiatives as of 2023 (continued)

Name-Country	Year	Price (US$/ton CO2e)	Income (billion US$)	Sector Scope	Emission Scope (MtCO2e)	2023 Pay (% Global) (emissions)	2023 Share (% Country/Region (emissions)
Hubei pilot ETS-China	2014	7	0.013	Manufacturing	125	0.25	27
Shanghai pilot ETS-China	2013	9	0.02	Manufacturing, Electricity, Buildings, Transportation	107	0.21	36
RGGI-USA	2009	15	1.194	Electric	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, Transportation, Buildings	59	0.12	77
Washington CCA-USA	2023	22	0	Manufacturing, Electricity, Transportation, Buildings, Waste	57	0.11	70
New Zealand ETS	2008	34	1.274	Manufacturing, Electricity, Buildings, Aviation, Road Transportation, Waste, Forestry	38	0.08	49
Beijing pilot ETS-China	2013	13	0.016	Manufacturing, Electricity, Transportation, Buildings	35	0.07	24
Ontario EPS-Canada	2022	48	0	All facilities exceeding 50 kt CO2e/year	38	0.07	25
Austria ETS-China	2022	35	0	Transportation, Buildings, Agriculture, Electricity, Manufacturing	32	0.06	40
Shenzhen pilot ETS-China	2013	9	0.004	Manufacturing, Electricity, Buildings, Transportation	25	0.05	30
Oregon ETS-USA	2021	0	0	Liquid fuels, propane, natural gas distribution companies	21	0.04	43
Nova Scotia CaT-Canada	2019	21	0.038	Manufacturing, Electricity, Transportation, Warming	13	0.03	87
UK ETS	2021	88	7.592	Manufacturing, Electrical, Aviation	113	0.03	28
Saskatchewan OBPS-Canada 2019		48	0	All facilities exceeding 25 kt CO2e/year:	9	0.02	13
Tokyo CaT - Japan	2010	5	0	Manufacturing, Electricity, Buildings, Transportation	12	0.02	20
Canadian federal OBPS	2019	48	0.086 All facilities exceeding 50 kt CO2e/year All		7	0.01	1
New Brunswick ETS-Canada 2021		48	0	facilities exceeding 50 kt CO2e/year	6	0.01	50
Newfoundland and Labrador PSS-Canada	2019	48	All facilities exceeding 0.0001 25 kt CO2e/year		4	0.01	43
Saitama ETS - Japan	2011	1	0	Manufacturing, Electricity, Buildings	7	0.01	17
Swiss ETS	2008	94	0.047	Manufacturing, Electrical, Aviation	5	0.01	11
BC GGIRCA - Canada	2016	18	0	LNG facilities	0	0	0
Massachusetts ETS-USA	2018	12	0.054	Electric	5	0	8
Montenegro ETS	2022	N/A	0	Manufacturing, Electrical	N/A	N/A	N/A
Total			**65.6**		**9160.9**	**17.7**	**-**

Source: Carbon Pricing Dashboard, The World Bank.

Allocation prices range from $96 (EU ETS) to $1 USD (Saitama ETS-Japan), with an average price of $2 USD in 2023.

While the ventures generated a total of US$65.6 billion in revenue, AB ETS topped the list with US$42.2 billion.

As can be seen from Table 1, sectoral coverage varies considerably among the initiatives. The EU, Korea, and New Zealand ETSs are at the top of the list in terms of sectoral coverage.

Analysis of the Turkish Emissions Trading System

Türkiye took its first step towards designing a domestic Electronic Transaction System (ETS) by establishing an IRD system in 2015. According to the regulation, in the electricity, iron and steel, aluminum, cement, glass, ceramics, lime, mineral wool, paper, refinery products and chemical sectors

Facilities of a certain size are required to report their emissions to the Turkish Ministry of Environment, Urbanization and Climate Change. In terms of sector and product scope, the Turkish IRD system is almost fully compliant with the EU ETS, except for aviation.

According to officials, the pilot phase of Türkiye's Electronic Treasury System (ETS) will begin on October 15, 2024, with the announcement of the national allocation. Following a two-year transition period, the first implementation phase will begin on October 15, 2026.

The Turkish IRD system categorizes facilities into three groups: Category A includes facilities producing emissions below 50 ktCO2e; Category B includes facilities producing emissions between 50 and 500 ktCO2e ; and Category C includes facilities producing emissions above 500 ktCO2e.

Table 2 presents basic statistics regarding facilities in the Turkish IRD system.

Table 2. Basic Statistics of the Turkish IRD System (2020)

	Category A		Category B		Category C		Total	
Activity	Emission (MtCO2e)	Piece	Emission (MtCO2e)	Piece	Emission (MtCO2e)	Piece	Emission (MtCO2e)	Piece
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
Pine	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
Ceramic	0.5	27	1.7	17	0.3	1	2.5	45
Brick	0.6	86	0.1	3	0.3	1	1.0	90
Mineral Fiber	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 and Steel	0.1	7	2.3	11	30.0	6	32.3	24
Electric	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
Chemical	0.2	11	0.9	3	7.9	7	9.0	21
Refinery	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**
% IRD Emission	**1.2**		**6.7**		**92.1**		**100**	
% Total Emissions	**0.6**		**3.2**		**44.4**		**48.2**	

Source: Turkish Ministry of Environment, Urbanization and Climate Change

As of 2020, Türkiye's IRD system has 214 Category A comprised 476 facilities, 136 of which were in Category B and 126 in Category C.

In 2020, Turkey's emissions amounted to 520 MtCO2e, and the Turkish IRD covered 251 MtCO2e, representing 48.2% of this total . Category A, Category B, and Category C facilities shared 1.2%, 6.7%, and 92.1% of the emissions covered by the Turkish IRD, respectively.

It has been announced that only Category C facilities will be covered in the pilot phase of Türkiye ETS. Although Category C facilities account for the majority of emissions, 2020 data shows that no facilities producing gypsum, glass, mineral wool, or iron fall into this category.3

Table 3 presents the average emissions of facilities included in the Türkiye IRD and EU ETS.

As can be seen from Table 3, the Turkish IRD's plant categorization rule leads to the exclusion of plants producing gypsum, glass, mineral wool, and iron. However, compared to the EU ETS plant coverage, there is a possibility of covering more plants under the Turkish IRD. For example, the average plant emission for gypsum production under the EU ETS is 29.8 ktCO2e, which is very close to the average emission of 23.5 ktCO2e for Category A plants, the smallest unit under the Turkish IRD . This is also true for glass and iron production. The average emissions for glass and iron producing plants under the EU ETS are 53.7 and 77.8 ktCO2e respectively , which are even lower than the average emissions of Category B plants under the Turkish IRD.

Table 3. Average emissions (ktCO2e) of facilities under Türkiye IRD and EU ETS

	Türkiye IRD			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
Pine	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 Fiber	16.9	42.2	None	43.4
Iron	17.3	98.3	None	77.8
Pig Iron and Steel	8.0	208.5	4992.0	495.9
Electric	11.3	114.0	2374.3	154.0
Paper	19.2	105.3	370.6	33.7
Chemical	17.4	294.1	1129.6	139.0
Refinery	None	54.4	1890.1	1044.5

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

The scope of facilities under the Turkish IRD and ultimately the Turkish ETS can be expanded by reviewing the rules used in their categorization.
The EU ETS facility categorization rules can be helpful in this regard. Table 4 below presents the conditions used for facility selection under the Turkish IRD and EU ETS.

Turkey's IRD defines a facility's scope as emitting more than 500 ktCO2e.
It uses a single criterion. However, the EU ETS is long-term.

For some time now, a more detailed set of criteria, specifically designed for each activity, has been used, as shown in Table 4. Using a single emission-based criterion would result in an underestimation of the number of facilities.

How will the ETS system work in Türkiye?

One of the most important elements of the ETS is the setting of the cap. The cap sets an upper limit for permitted greenhouse gas (GHG) emissions within a system and essentially determines the total number of permits allocated to the covered entities (emissions budget).
An absolute limit guarantees a predetermined environmental outcome by ensuring emissions remain below a specific threshold.

The price of pollution rights (allocations) is determined by factors such as the amount of allocation available within the boundary, the ease of reducing emissions at facilities, consumption patterns, and economic growth.
These factors should be considered when setting the limit.
Higher than it should be.

Table 4. Facility category criteria subject to ETS regulation.

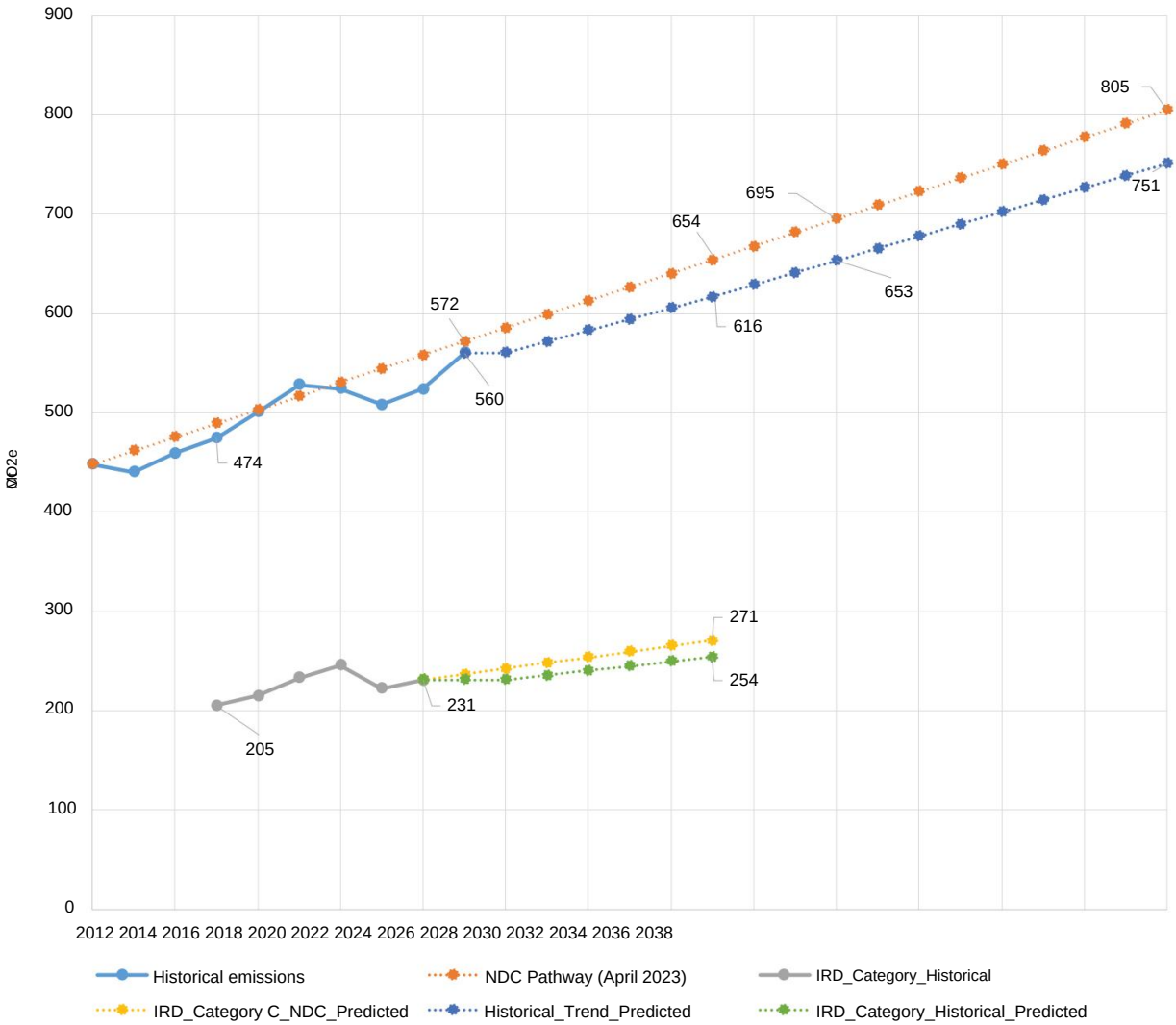
Activity	Category C - Türkiye IRD	EU ETS
Non-ferrous Metals	Facilities with emissions > 500 ktCO2e	Facilities with combustion units that produce a heat input of more than 20 MW.
Plaster	Facilities with emissions > 500 ktCO2e	Facilities with combustion units that produce a heat input of more than 20 MW.
Aluminum	Facilities with emissions > 500 ktCO2e	Facilities with combustion units that produce a heat input of more than 20 MW.
Pine	Facilities with emissions > 500 ktCO2e and smelting capacity >20 tons/day	
Cement	Emissions > 500 ktCO2e for rotary kilns > 500 tons/day; other kilns > 50 tons/day	
Lime	Emissions > 500 ktCO2e from rotary kilns or other furnaces > 50 tons/day	
Ceramics, Bricks	Facilities with emissions > 500 ktCO2e	Production capacity > 75 tons/day
Mineral Fiber	Facilities with emissions > 500 ktCO2e	Melting capacity > 20 tons/day
Iron	Facilities with emissions > 500 ktCO2e	Facilities with combustion units that produce a heat input of more than 20 MW.
Pig Iron and Steel	Facilities with emissions > 500 ktCO2e	Capacity > 2.5 tons/hour
Electric	Facilities with emissions > 500 ktCO2e	Facilities with combustion units that produce a heat input of more than 20 MW.
Paper	Facilities with emissions > 500 ktCO2e	Capacity > 20 tons/day
Chemical	Facilities with emissions > 500 ktCO2e ; facilities with combustion units producing more than 20 MW of heat input for carbon black; etc.	
Refinery	Facilities with emissions > 500 ktCO2e	Facilities with combustion units that produce a heat input of more than 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)

A defined limit would result in a low carbon price, reducing incentives for emission reduction. Conversely, a relatively tight limit implies a scarce allocation supply, creating a supply shortage and leading to a higher carbon price, thus providing a stronger fiscal motivation for emission reduction. Therefore, accurately determining the level of the threshold and the path it will follow in the future (increase/decrease) is crucial for the effective functioning of the ETS.

Türkiye has announced that the limit under the ETS will be increased in line with the emissions projected in the NDC announced in April 2023.4

Figure 1. Historical and Projected Emissions (MtCO2e)



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

According to the NDC announced by Türkiye;

While emissions are projected to reach 1178 MtCO2e in 2030 under the reference scenario (BaU), a commitment has been made to limit them to 695 MtCO2e, as shown in Figure 1. This represents a 41% reduction compared to the reference scenario.

Although the NDC states that emissions will peak in 2038, it does not specify a particular level. However, assuming that the trend between 2015-2030 continues beyond 2030, it can be calculated that the peak emission value will be 805 MtCO2e in 2038.

However, historical emissions have followed a different trajectory compared to the path predicted in the NDC. Between 1990 and 2021, emissions increased by an average of 11.2 MtCO2e per year. If this historical trend continues in the future, emissions will reach 653 MtCO2e in 2030 and 751 MtCO2e in 2038 , which is well below the levels reflected in the NDC.

As mentioned above, Category C facilities under the IRD in Turkey account for an average of 44.2% of total emissions. In 2020, total emissions in Turkey reached 524 million tons of MtCO2e , of which 231 million tons were generated by Category C facilities under the IRD, which are expected to be covered under the Turkish ETS.

Which emissions trajectory (historical or NDC predicted) to use is crucial in determining the limit.

If the limit is increased at the rate predicted by the NDC, it will reach 271 MtCO2e in 2027, when the transition period ends . However, if the limit had increased in line with the historical trend, this value would have been 254 MtCO2e in 2027 (IRD_ in Figure 1). (See the development of KatC_Historical_Trend). This means that in 2027, Türkiye will be under the ETS.

Facilities will actually be able to receive an additional 17 million allocations in return for the emissions they produce.

It should be noted that in the first two phases of the EU ETS, the allocation of more allocations than was actually available reduced the carbon price to almost zero in 2008.5 Another point to consider here is that the surplus allocation created windfall profits for some facilities. This windfall profit is created by selling unused allocations for money on the market and by passing on carbon costs to prices, even though they were not incurred. CE Delft (2016) calculated that between 2008 and 2015, companies in the EU ETS made a total of €7.5 billion in windfall profits by selling excess allocations and a total of €16.7 billion by passing on carbon costs to product prices, even though they were obtained for free.6

How can Türkiye ETS avoid these negative consequences?

For any ETS to function effectively, the threshold must first be binding. Secondly, the level and scope of free allocations should be kept to a minimum. It is clear that increasing the threshold in the Turkish ETS will not meet the first condition. Furthermore, as mentioned above, free allocations could paradoxically reward carbon-intensive facilities and hinder their decarbonization efforts. One way to prevent this is to revise the path envisioned by the Turkish NDC downwards, taking into account future steps and historical developments.

What should be the level and development of the boundary under the ETS in Türkiye?

According to the Climate Action Tracker, which monitors and evaluates countries' efforts to combat climate change , Turkey's 1.5-degree compatible and just emissions level is calculated to be 433.9 MtCO2e in 2030 (compared to the 695 MtCO2e announced in the NDC).

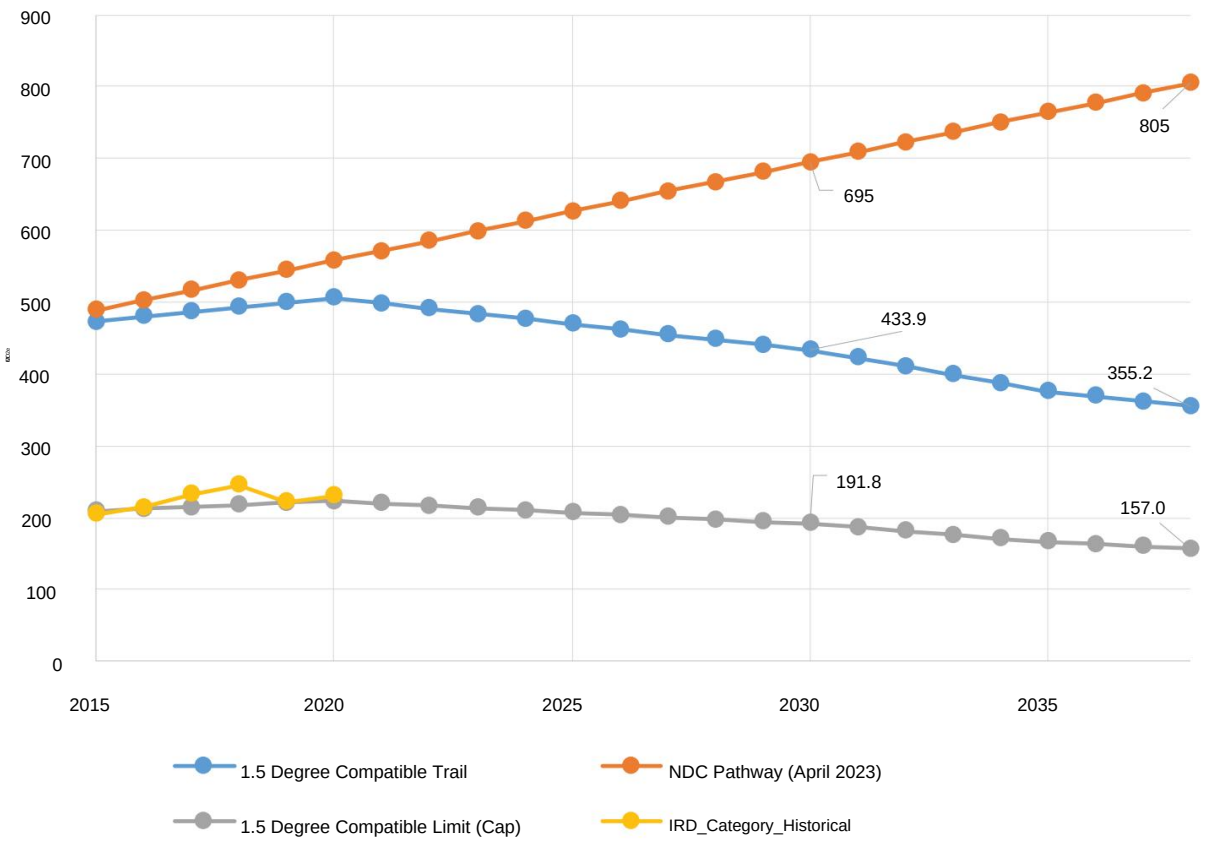
Based on a path compatible with 1.5 degrees and again, the total of IRD Category C facilities

Assuming that emissions will continue to be 44.2%, the "1.5 Degree Compatible Limit" for Türkiye is shown in Figure 2.

Accordingly, the limit needs to be reduced to 191.8 Mt in 2030 and 157 MtCO2e in 2038 .

Instead of raising the threshold, lowering it absolutely could ensure that the carbon price in the Turkish ETS market is at a level that encourages decarbonization.

Figure 2. NDC and 1.5-Degree Compatible Path and Boundaries (Caps)



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

Instead of a result

Electronic Treasury Systems (ETS) are an increasingly accepted practice worldwide in limiting global greenhouse gas emissions. As of 2023, there are 36 implemented, 3 planned, and 22 considered ETS initiatives worldwide, including one in Türkiye.

Turkey plans to launch a local Electronic Trade System (ETS) in 2025. Türkiye's efforts to establish an ETS began in 2015 with the creation of an IRD system covering electricity, refinery products, non-metallic minerals, iron and steel, aluminum, paper, and chemicals. Except for aviation, the sector/product coverage is the same as the EU ETS.

However, the scope of facilities under the IRD remains limited due to the announced criteria. According to the authorities, only Category C facilities emitting more than 500 ktCO2 per year will be included in the ETS. However, an examination of historical IRD data reveals that facilities producing gypsum, glass, mineral wool, and iron will not be covered by the application of this criterion. This problem could be solved by adopting EU ETS facility selection criteria specifically designed for each product.

Another important issue is the level and development of the limit. The EU ETS experience has shown that effective carbon prices only occur when allocations are scarce. In other words, a surplus of free allocations can drive carbon prices down to zero and render the ETS ineffective.

Although Türkiye has not yet officially defined the border, it is mentioned in the NDC presented in April 2023.

Turkey announced that emissions would be increased in parallel with the projected emissions. However, it should not be forgotten that the NDC announced by Türkiye is considered quite inadequate by Turkish and international NGOs and research institutions. Emissions since 2012 have systematically exceeded the emissions projected under the NDC, except for 2017.

The result was low. Additionally, according to the Climate Action Tracker methodology, the path predicted in the NDC is not consistent with either 1.5-degree or 2-degree paths.

In contrast to the rising emissions trajectory in the NDC, the Climate Action Tracker shows “fair” and “1.5 degrees”

The “compliant” path shows that emissions need to be reduced to 433.9 MtCO2e (compared to 695 MtCO2e) in 2030. Based on this, it can be calculated that the limit should be reduced to 231 MtCO2e in 2020 and 191.8 MtCO2e in 2030 .

Based on the NDC path, and assuming emissions follow historical trends, there could be at least a surplus of 17 million tons in 2027. This could lead to carbon prices in Türkiye falling to ineffective levels and result in unfair profit transfers to certain facilities/sectors.

It should be remembered that the ETS is not the only tool that can be used to decarbonize economies. Existing and new regulations can help increase the effectiveness of carbon markets (complementary policies), overlap with incentives provided by carbon markets (conflicting policies), or in some cases reduce the effectiveness of incentives in carbon markets (compensatory policies). Policies such as fossil fuel subsidies and tax advantages risk limiting the effectiveness of the ETS in Türkiye.

[8] Offered to certain sectors in Türkiye

Thanks

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Notes

1 | “Regarding the Operation of Carbon Markets” "Draft Regulation Opened for Public Comments," Republic of Turkey Energy Market Regulatory Authority, accessed February 15, 2024, https://www.epdk.gov.tr/Details/Content/4-13184/ Management-of-the-operation- of-carbon-markets

2 | The calculations in this note are available. This is based on data. Results may change as updated data and ETS regulatory details are released.

3 | The numbers show the situation in 2020. This indicates that the number of facilities covered may change when Türkiye comes into play in ETS 2025.

4 | “Republic of Türkiye Updated First Nationally Determined Contribution,” UNFCCC, accessed 15 February 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 | “Turkey,” 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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About

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The Stiftung Mercator Initiative aims to strengthen academic, political and social ties between Türkiye and Germany, and between Turkey and Europe.
The partnership was founded on the belief that in a globalized world, the exchange of ideas and people is a prerequisite for acquiring knowledge and confronting the challenges of the 21st century.
The initiative, EU-Germany-Turkey Relations and Climate Change, is based on the founding parties' belief that it is important for the future of Türkiye and Germany in the European context and on a global scale.
It focuses on these areas.

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The comments and conclusions made in this article are solely those of the author and do not reflect the official view of the IPM.

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