SUSTAINABLE

DEVELOPMENT

GOAL



CHAPTER 20

COMBATING CLIMATE CHANGE IN TÜRKİYE: INTEGRATION OF MARKET-BASED INSTRUMENTS TO THE ENVIRONMENTAL POLICY

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Abstract

Climate change is regarded as humanity's "code red" warning, posing a significant threat to the planet and negatively impacting various aspects of life. The international community has recognised the urgency of addressing this issue since the 1970s, as evident in the Sustainable Development Goals (SDGs), particularly SDG 13, which emphasises integrating climate change measures into national policies and strategies. Türkiye faces significant impacts from climate change, including droughts, floods, and extreme weather events that strain its natural resources. Despite some efforts in regulations and action plans, the country's greenhouse gas emissions have more than doubled since 1990, driven by rapid industrialisation, urbanisation, and population growth, raising concerns. This chapter aims to discuss the necessary steps within the framework of environmental policy measures in Türkiye to address the urgent action mentioned in the goal. Implementing market-based instruments in Türkiye is being evaluated in line with this objective. The key priority areas for Türkiye's environmental policy and market-based instruments should target the electricity, industry, and transport sectors, major contributors to greenhouse gas emissions. Mitigating emissions requires increasing renewable energy in the electricity sector, improving industrial efficiency, and promoting sustainable transportation practices.

Keywords: Climate Change, Environmental Policy, Emission Trading Scheme, Carbon Tax, SDG13, Türkiye

1. Introduction

Climate change refers to long-term alterations in temperatures and weather patterns. These alterations may occur naturally due to fluctuations in solar activity or significant volcanic eruptions. However, in the 1800s, human activities emerged as the principal cause of climate change, primarily attributable to the combustion of fossil fuels such as coal, oil, and gas. Climate change leads to various destructive outcomes, including but not limited to intense droughts, water scarcity, severe fires, rising sea levels, flooding, melting polar ice, catastrophic storms, and declining biodiversity. According to the sixth assessment report of the IPCC (2021), the sea level is expected to rise 30-60 cm by 2100 under different scenarios. Drought is estimated to displace 700 million people by 2030. As sea levels continue to rise, communities will be compelled to relocate, and prolonged droughts will pose a risk of famine. Consequently, there is an anticipated increase in the number of "*climate refugees*" in the near future.

Climate change can be regarded as humanity's unmistakable "*code red*" warning. Because of its particular importance, it has been near the top of the global agenda since the 70s. The Kyoto Protocol in 1997, which set binding emission reduction targets to the Parties, is a milestone for the worldwide effort to combat climate change. The Paris Agreement, which entered into force in 2016, is another landmark since it is the first legally binding international treaty to limit global warming to below 2 degrees Celsius compared to pre-industrial levels. The agreement requires each Party to prepare nationally determined contributions it intends to achieve. The 2030 Agenda for Sustainable Development, embraced by the United Nations in 2015, places the 17 Sustainable Development Goals (SDGs) at its core. It emphasises the need for immediate and collective efforts from all nations to eradicate poverty, enhance healthcare and education, mitigate inequality, and promote economic progress. Simultaneously, it addresses the urgency of combating climate change and preserving our oceans and forests.

Among the 17 SDGs, SDG 13, namely **Climate Action**, specifically focuses on the imperative of promptly addressing climate change and its consequences. The second target of SDG 13 highlights the significance of integrating climate change measures into national policies, strategies, and planning. The vast environmental economics literature categorises the endeavours to incorporate climate change measures into environmental policy as market-based and non-market-based instruments. The former aims to modify the economic incentive structure to influence actors' behaviour, while the latter imposes specific obligations or implements non-monetary incentives to induce behavioural change. Since the Kyoto Protocol, market-based instruments such as indirect taxation, targeted subsidies or emission trading

schemes (ETS hereafter) have become popular since they provide a flexible and cost-effective means for reaching given policy objectives.

This chapter aims to discuss the necessary steps within the framework of environmental policy measures in Türkiye to address the urgent action mentioned in the goal. Implementing market-based instruments in Türkiye is being evaluated in line with this objective. This chapter focuses on addressing the following questions:

- What is the position of Türkiye on climate change and SDG13.2?
- How should market-based instruments be integrated into environmental policy in Türkiye in order to fulfil SDG13.2?

The rest of the paper is organised as follows: in Section 2, some statistical facts are supplied to properly locate Türkiye in global greenhouse gas emissions. Within the same part, it also summarises Türkiye's distances to SDG13 targets. Section 3 briefly summarises two main market-based environmental policy instruments: tax and ETS. Following this textbook information, Türkiye's approach to environmental policies within the scope of market-based instruments is evaluated in terms of regulations made and actions that should be taken urgently. Section 4 includes the conclusion and recommendations.

2. Türkiye's Position in Climate Change and SDG 13

Türkiye, located in the Mediterranean basin, is among the nations severely impacted by the consequences of climate change. The emergence of recent droughts, floods, and extreme weather events serves as crucial evidence of this, exerting substantial pressure on forest, water and land resources.

While the Kyoto Protocol was ratified in 2009, Türkiye stood alone as the sole country listed in Annex I that did not assume responsibility for digitised emission reduction under the Protocol (Ayhan, 2013). The Paris Agreement was signed in 2016 (with no ratification yet), which undertakes "*up to 21% reduction in Greenhouse Gas (GHG) emissions from the Business as Usual (BAU) level by 2030*" in its Intended Nationally Determined Contribution (INDC) submitted to the United Nations Framework Convention on Climate Change (UNFCCC). According to the second Voluntary National Review (VNR) Report (2019), being responsible for 0.7% of total global GHG emissions, Türkiye declared the need to use international assistance for improving finance, know-how, technology and capacity, including the Green Climate Fund, to achieve the mitigation target outlined in its INDC. The report highlights Türkiye's approach to climate change, emphasising its status as a developing country in the upper

middle-income group and listed in "Annex I" by the UNFCCC, acknowledging its unique circumstances also postulated in the Kyoto Protocol. Based on the "*common but differentiated responsibilities*" principle, Turkish authorities allege that Türkiye had no historical responsibility for GHG emissions, given its per capita ratio of 3.88 tCO_2e, which accounts for less than 1% of the global total. In comparison, the average GHG emissions of Annex I countries stood at 14.37 tCO_2e per capita (The Republic of Türkiye, Ministry of Foreign Affairs website).

The statements made by Turkish authorities regarding total or per capita emission levels are indeed accurate, but they present only one aspect of the situation. According to the World Development Indicators (WDI), Türkiye's contribution to global GHG emissions was merely 1.01% in 2019, with 488.5 million tonnes of CO_2 equivalent. However, it is essential to consider the swift changes in GHG emissions carefully. Substantial population growth (almost 50% increase since 1990) and rapid industrialisation and urbanisation have seen Türkiye's energy demand increase indispensably. Accordingly, GHG emissions in Türkiye have surged by over 2.5 times since 1990. Similar to global patterns, CO_2 comprises the largest share among GHGs[1], accounting for 80% in 2021. Unfortunately, the change in CO_2 emissions between 1990 and 2021 is even more concerning as it nearly tripled, escalating from 151.6 to 452.6 million tonnes (See Figure 1).

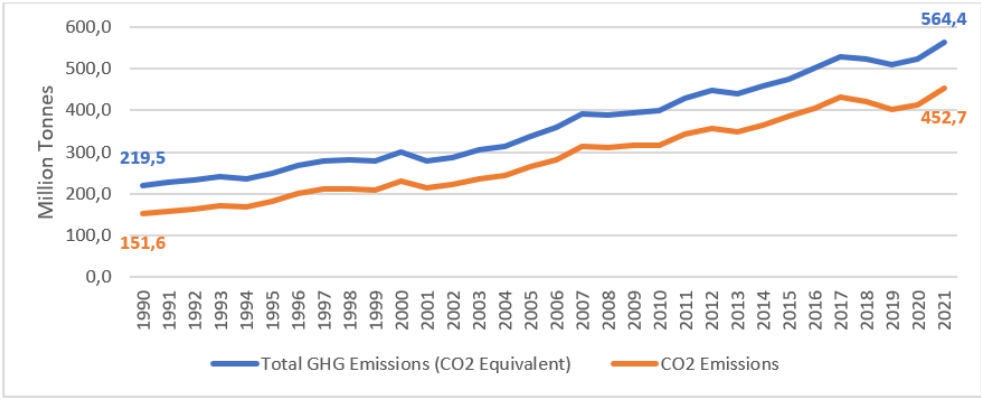


Figure 1. Greenhouse Gas Emission Trend in Turkiye (1990-2021)
Source: TurkStat (2023), Greenhouse Gas Emissions.

1 Greenhouse gases (GHGs) absorb infrared radiation sent by sunlight and trap its heat in the atmosphere, creating a greenhouse effect that results in global warming and climate change. Major GHGs that are counted in international inventories are Carbon dioxide (CO_2), Methane (CH_4), Nitrous oxide (N_2O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulphur hexafluoride (SF_6), Nitrogen trifluoride (NF_3).

The picture becomes more apparent when we compare the changes in GHG emissions in the world, the European Union (EU) and Türkiye. Utilising the most comprehensive available data from the World Development Indicators (WDI), it is evident that Türkiye's GHG emissions have more than doubled since 1990, while global emissions increased by 1.5 times and even decreased by 25% within the EU (Figure 2a). Considering per capita CO_2 emissions, a similar pattern emerges. Between 1990 and 2019, Türkiye experienced an almost twofold increase in per capita CO_2 emissions, contrasting with a slight increase globally and a decreasing trend within the EU. It is crucial to emphasise that Türkiye's per capita CO_2 emissions surpassed the global average in 2016 and have maintained this position since then (Figure 2b).

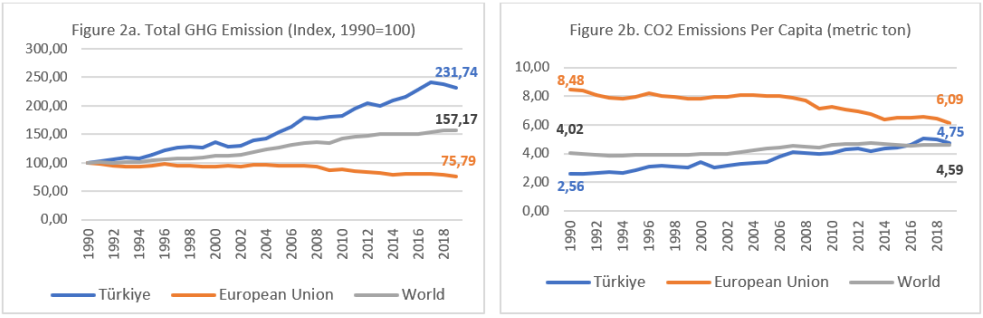


Figure 2. Greenhouse Gas Emissions Trends
Source: TurkStat (2023), Greenhouse Gas Emissions & World Development Indicators

The final part of this subsection will discuss the performance of Türkiye in relation to the SDGs. The OECD report "Measuring Distance to the SDG Targets" (2022) provides OECD countries with a high-level overview of strengths and weaknesses in performance across the SDGs by representing how countries differ from Voluntary National Reviews (VNRs) or other reporting processes and is a good choice for the evaluation. The report adopts a geometric growth model for assessing the direction and pace of recent changes in the context of the SDGs. It models the likelihood of achieving a specific level using Monte Carlo simulations.

The upper part of Table 1 below represents Türkiye's distances to SDG13. A country's distance to the target is measured as the "standardised difference" between a country's current position and the target end value. The country profile of the OECD report (2022) states that Türkiye appears close to meeting targets on education for sustainable development (13.3). Indeed, the lowest distance was recorded in target 13.3. However, it is asserted that there is no progress or moving away from target 13.2, which is the main topic of this paper. As explained in Section 3.2, Türkiye has made some efforts to re-design its environmental policy to integrate climate change measures. However, these efforts, unfortunately, have not been

fruitful yet. Türkiye VNR (2019) informs that the economic losses caused by floods due to climate change are second only to the economic losses resulting from seismic disasters and states that disaster policies will be prioritised to build resilience to climate-related risks. Not surprisingly, the highest distance is recorded in target 13.1, so it is crucial to strengthen the adaptation capacity, especially of those vulnerable to adverse effects of climate change.

OECD (2022) also emphasises the lack of data, particularly for the planet category (including SDG 13), that hinders monitoring changes over time. The Turkish Statistical Institute remarks on its website that among eight indicators of SDG13, only two were reported online, five indicators were still explored, and the remaining was a non-statistical indicator.

Table 1. Türkiye's distances to SDG 13 and recent trends

SDG global target	**Türkiye's Distance to target (s.u.*)**	**Trend Assessment**	**OECD Average distance (s.u.*)**	**OECD Trend Assessment**
13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries	0.92	n.a.	0.73	n.a.
13.2 Integrate climate change measures into national policies, strategies and planning	0.65	No progress or moving away from the SDG target	1.15	Progress has been made, but is insufficient to meet the target
13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	0.46	n.a.	1.04	n.a.
Performance of Türkiye on indicators for SDG 13	**Current value**	**Assessment**	**Trend**	
CO_2 emissions from fossil fuel combustion and cement production (tCO_2/capita)	5.3 (2021)	Major challenges remain	Stagnating	
CO_2 emissions embodied in imports (tCO_2/capita)	0.6 (2018)	Challenges remain	On track or maintaining SDG achievement	
CO_2 emissions embodied in fossil fuel exports (kg/capita)	1.3 (2021)	SDG achieved	Trend information unavailable.	
Carbon Pricing Score at EUR60/tCO_2 (%, worst 0–100 best)	23.6 (2018)	Major challenges remain	Stagnating	

(*) The standardised measurement unit (s.u.) is the standard deviation observed among OECD countries in the reference year.
Source: OECD (2022) & UN Sustainable Development Report (2023)

The lower part of Table 1 represents the performance of Türkiye on indicators defined in the Sustainable Development Report. Unlike the Sustainable Development goal indicators, these only focus on target 13.2. It could be propounded that integrating climate change mea-

sures into national policies, strategies, and planning is at the heart of climate action. According to the latest Sustainable Development Report (2023), the statistical performance index of Türkiye is 87%, and the missing data is only 2%. The significant challenges specified in the report that Türkiye faces were CO_2 emissions from fossil fuel combustion and cement production and Carbon Pricing Score.

The indicator "*CO_2 emissions from fossil fuel combustion and cement production*" measures emissions from the combustion and oxidation of fossil fuels and cement production by excluding emissions from fuels used for international aviation and maritime transport. Based on Turkstat data, Türkiye fulfilled 64% of its electricity production using fossil fuels in 2021. 31% of this ratio belongs to coal. Moreover, despite its substantial renewable energy potential, the proportion of fossil fuels in energy production witnessed a 4.6-point increase from 1990 to 2021. VNR (2019) states that the share of renewable energy in Türkiye's electricity production is aimed to be increased to a 30% level by 2023. The share of renewable energy in electricity generation was recorded as 35.8% in 2021 by Turkstat data, casting doubts on the accuracy of setting targets.

The Carbon Pricing Score (CPS) measures the extent to which countries have attained the goal of pricing all energy-related carbon emissions at specific benchmark values for carbon costs. The more progress a country has made towards a specified benchmark value, the higher the CPS. In Türkiye, neither a specific carbon tax nor a mandatory carbon market is implied. So, the value in the indicator is derived only from the voluntary carbon market. According to data provided by MidSEFF, Türkiye is the third-largest host country in terms of registered projects (288 as of 2020) and represents the largest seller of voluntary carbon credits in the region. Despite its low score in CPS, the achievements recorded in voluntary carbon markets give positive signals that an ETS should be at the centre of the environmental policy in Türkiye.

3. Integration of Market-Based Instruments into the Environmental Policy in Türkiye

3.1. Market-Based Instruments

The environmental economics literature categorises the endeavours to incorporate climate change measures into environmental policy as market-based and non-market-based instruments. The former aims to modify the economic incentive structure to influence actors' behaviour, while the latter imposes specific obligations or implements non-monetary incentives to induce behavioural change. There is a growing consensus among economists that

market-based instruments, such as green taxes and emission trading schemes, offer a more cost-effective means of achieving the objective of reducing GHG emissions compared to non-market-based instruments (also known as command-and-control policies) when determining the optimal policy option to combat climate change. Figure 3 illustrates the rising enthusiasm for market-based instruments. The adoption of carbon pricing mechanisms has notably surged since 1990, when Finland pioneered the world's first carbon tax. In 2005, merely nine carbon pricing mechanisms were in effect globally; however, this figure grew to 73 in 2023 (Figure 3a). Approximately 23 per cent of global greenhouse gas emissions are now encompassed by carbon pricing instruments, like carbon taxes and emissions trading systems (Figure 3b).

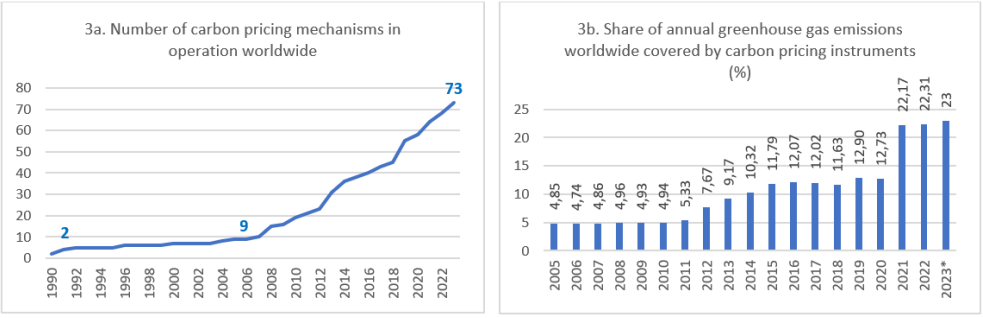


Figure 3. Growing Interest in the Market-Based Instruments
(*) As of April 1, 2023

Source: 3a. World Bank. (May 31, 2023). Number of carbon pricing mechanisms in operation worldwide from 1990 to 2023 [Graph]. In Statista. Retrieved July 31, 2023, from https://www.statista.com/statistics/483565/planned-and-implemented-carbon-pricing-instruments-worldwide/ 3b. World Bank. (March 31, 2023). Share of annual greenhouse gas emissions worldwide covered by carbon pricing instruments from 2005 to 2023 [Graph]. In Statista. Retrieved July 31, 2023, from https://www.statista.com/statistics/1327043/global-ghg-emissions-covered-by-carbon-instruments/

OECD (2001) defines an environmental tax as "*if the tax base is a physical unit (or a proxy for it) of something which has a proven specific negative impact on the environment when used or released."* Environmental taxes intend to fill the gap between the private and social costs of production and consumption by internalising the externalities. The environmental taxes based on the chosen tax base can be divided into three groups: (i) taxes levied on end products that generate pollution, like automobiles, (ii) taxes imposed on goods commonly used as inputs in polluting activities, such as fuel, and (iii) taxes imposed on pollutants present in inputs, such as CO_2 found in the combustion of fuel. Environmental taxes can have two favourable impacts: fiscal, i.e., they raise budget revenue and, as expected, environmental. These two impacts are inversely related, and the elasticity of supply and demand determines which impact will dominate. In strictly targeted taxes, since demand will be relatively more

elastic (mostly because of the substitutability), the environmental impact is expected to be more significant than the broadly targeted taxes. Environmental taxes can have regressive effects, disproportionately affecting low-income households compared to wealthier ones. This impact becomes even more severe when the taxed good is considered a necessity item with limited alternative options.

In an emission trading scheme (ETS), the public authority establishes a market where the environment is treated as a waste sink or issues pollution allowances that grant companies the ability to trade the rights to emit pollutants within acceptable limits. The allowances can be traded as any other commodity in the market. This mechanism aims to guarantee that a particular level of pollution is achieved at the lowest possible cost to society while also ensuring that the environment is only impacted within its capacity to tolerate such effects. The purpose of this instrument is twofold: to ensure that a predetermined level of pollution is achieved at the lowest possible cost to society and to ensure that the environment is not subjected to more pollution than it can withstand. The governing authority allocates a fixed quantity of permits, each representing authorisation to release a specific amount of pollutants.

Gulbrandsen et al. (2019) propose eight features to design an *effective* (brings about a higher and more stable carbon price, with subsequent reductions in emissions) and *efficient* (achieves such reductions at minimal, or at least lower, costs) ETS for the GHG emissions: (i) **Type of system:** While the *cap-and-trade system* is based on the distribution of predetermined (the cap) allowances, the *baseline-and-credit system* does not have a predetermined ceiling and distributes allowances ex-post. (ii) **Ambition level:** The level of the cap is not only the primary indicator of the scarcity of allowances created but also determines the carbon price and the incentive effects of the ETS. (iii) **Sectors, gases, and emissions covered**. (iv) **Allocation mechanism:** Public authority may distribute the allowances via auctioning, free of charge (grandfathering), or by specifying some type of benchmarking. (v) **External offsetting and linking:** It includes whether the system allows for linking up to the external outreach to similar (national/international) systems. (vi) **Monitoring, reporting and verification (MRV) and enforcement:** It refers to the rules and institutions for MRV tasks and the case of non-compliance. (vii) **Price or quantity-focused management mechanisms:** It concerns the rules (or possible institutions established) to stabilise the carbon price. (viii) Revenue earmarking: If allowances are distributed via auctioning, earmarking the auctioning revenues for which activities or sectors must be determined.

3.2. Türkiye's Approach to Market-Based Instruments

Türkiye first introduced the concept of sustainable development into the 7th Development Plan in 1996, following the 1992 Rio Conference, and, during the past quarter century, consistently emphasised its commitment to work for a sustainable world. In the relevant section of the Plan, it was stated that "*Economic instruments will be used to integrate environmental policies with economic and social policies. In the management of environment, an appropriate combination of instructive and incentive measures will be used*" (p.204). It can be seen as the first official reference to economic instruments of the environmental policy in Türkiye. However, the following plan (8th Development Plan) regretfully admitted that *"Environment policies could not be integrated with economic and social policies while economic means could not be sufficiently used"* (p.212). Afterwards, in each of the following plans, the scope and content for the environmental issues steadily increased, the importance of the environmental problems was accepted, and legal regulations and policy recommendations were made regularly. Anyway, as Özekan (2020) and Gökçe et al. (2021) clearly stated, the good intentions in the development plans are hardly realised. Table 2 below represents the legal documents that regulate or make projections about GHG emissions in Türkiye.

Table 2. Regulations in place relevant to the Market-Based Instruments in Türkiye

Document, Regulation and Projects	Detail	Date
İstanbul International Finance Centre Strategy and Action Plan	**Action 33:** Establishment of the carbon market in Turkey (2012-2015)	2009
Communiqué on GHG Emission Reduction Projects Registry	**Article 1:** This communiqué regulates the procedures and principles regarding registration of the projects, which are developed to limit, reduce GHGs and increase carbon sink areas to combat climate change.	2011
Climate Change Action Plan	**Action Y4.1:** Effective negotiations for Turkey's favourable participation in the existing regional and global carbon markets until 2013.	2012
	Action Y4.2: By 2015, work towards the establishment of a carbon market in Turkey	
Türkiye Climate Change Adaptation Strategy and Action Plan	'It has been planned through these activities to determine the economic values of protective and environmental services […] to evaluate more rationally the economic value of carbon captured by the forests through its offer to the markets.' (p.40)	2012
Energy Efficiency Strategy Document	**SA-07/SH-05:** To create additional sustainable finance (of public resources) for energy efficiency and renewable energy projects, capacity building for developing infrastructure of the carbon market. Carbon stock exchange in Turkey will be completed within 18 months of the date of issue of this document.	2012

Table 2. Continued		
Regulation on Monitoring GHG Emissions	**Article 1:** This regulation embodies the procedures and principles regarding monitoring, reporting, and verification of GHG emissions that are born from the actions defined in Annex 1 of the regulation. The regulation covers the following GHGs: CO_2, CH_4, N_2O, HFCs, PFCs, SF_6.	2012 (revised in 2014)
Communiqué on Voluntary Carbon Market Project Registry	**Article 1:** The purpose of this Communiqué is to regulate the procedures and principles regarding the registration of projects that provide greenhouse gas emission reductions and are developed to obtain carbon certificates.	2014
Communiqué on Verification of GHG Emission Reports and Authorisation of Verifying Institutions	**Article 1:** This communiqué defines features of the verifying institutions that audit GHG emission reports in the framework of the Regulation on Monitoring, Reporting and Verification (MRV) of GHG Emissions.	2015
Communiqué on Verification of GHG Emission Reports and Accreditation of Verifying Institutions	**Article 1:** The purpose of this Communiqué is to determine the procedures and principles regarding the verification of GHG reports and the qualifications and accreditation procedures of the verification bodies that will carry out these procedures.	2017
Regulation on Fluorinated Greenhouse Gases	**Article 1:** The purpose of this regulation is to control emissions from fluorinated GHGs and to regulate the procedures and principles regarding the use of fluorinated greenhouse gases listed in the Kyoto Protocol to the UNFCCC, to which Turkey is a party, and products or equipment containing fluorinated greenhouse gases.	2018 (Revised in 2022)
Regulation on the Monitoring of Greenhouse Gas Emissions from Aviation Activities	**Article 1:** The purpose of this Communiqué is to determine the procedures and principles regarding the verification of GHG reports and the qualifications and accreditation procedures of the verification bodies that will carry out these procedures.	2022
Source: Based on Turhan and Gündoğan (2019, p. 520), revised and updated by the author.		

The one and only environmental tax implemented in Türkiye is the "environmental cleaning tax", which is imposed on households, workplaces, and other buildings based on water consumption. In the energy sector, certain taxation measures are designed to support Türkiye's energy objectives rather than strictly for environmental purposes. Many of these energy taxes are collected through the special consumption tax[2] (SCT). Some renewable energy sources, such as bioethanol in gasoline and biodiesel, receive exemptions from the SCT. Furthermore, renewable power generators are eligible for various license exemptions and fee reductions (IEA, 2021).

Türkiye does not have a carbon tax and does not operate a mandatory ETS for CO_2 or any other GHG. However, within the last decade, some efforts at the Ministerial level to establish

2 In Turkish: Özel Tüketim Vergisi (ÖTV)

a carbon market in Türkiye have been remarkable. In their critical study, Turhan and Gündoğan (2019) claim that the adoption of the monitoring, reporting, and verification (MRV) regulation through a ministerial communiqué in 2015 (see Table 2) was a clear signal that Türkiye was preparing to put emissions trading to the centre of its climate policies. Indeed, Türkiye initiated in 2013 the "Partnership of Market Readiness (PMR)" project carried out with funding from the World Bank. The technical assistance project, which lasted approximately seven years, examined the impact of carbon pricing mechanisms on the economy, budget and sectors in the light of analytical assessments and suggested that the most appropriate market-based mechanism for Türkiye's policy priorities and local context would be the ETS. Carbon pricing and ETS were also discussed at Türkiye's first Climate Council, organised by the Ministry of Environment, Climate and Urbanization in 2022. Establishing an ETS in Türkiye, pilot implementation of ETS in 2024, and transforming existing taxes into carbon taxes are among the recommendations taken at the Council.

Moreover, the "Carbon Market Implementation Partnership-PMI" project was launched with the World Bank in 2022, and a Gap Analysis Report was prepared to identify gaps and needs. In line with the PMR's Roadmap (Neelis et al., 2016), which proposes that "*although the existing environmental law does already make a reference to carbon markets, new primary legislation would be needed to establish an ETS in Turkiye*" (p.8), a draft of the Climate Change Law was leaked to the media at the end of 2022. The draft clearly defines an ETS for Türkiye. However, after that, the draft was most likely shelved due to the change in the political atmosphere and elections in the country.

Based on the GHG statistics and trends in Türkiye, it is obvious there is an urgent need for action. With the support of the growing literature and global popularity, it can be proposed that market-based instruments should be the head of environmental policy. The first step in this aim is to specify a set of priority sector and market-based instrument combinations. In the PMR Assessment Report (Johnson et al., 2017), five potential sectors were determined for the implication of market-based instruments by considering their emissions size, growth, the relevance of other policies and abatement potential to derive a qualitative prioritisation. These sectors are (i) Electricity, (ii) Industry, (iii) Waste, (iv) Transport and (v) Buildings. Figure 3 below represents the distribution and trend of CO_2 emissions in Türkiye by sector. As we can see from the figure, priority areas in Türkiye for the environmental policy and especially market-based instruments should be electricity, industry and transport.

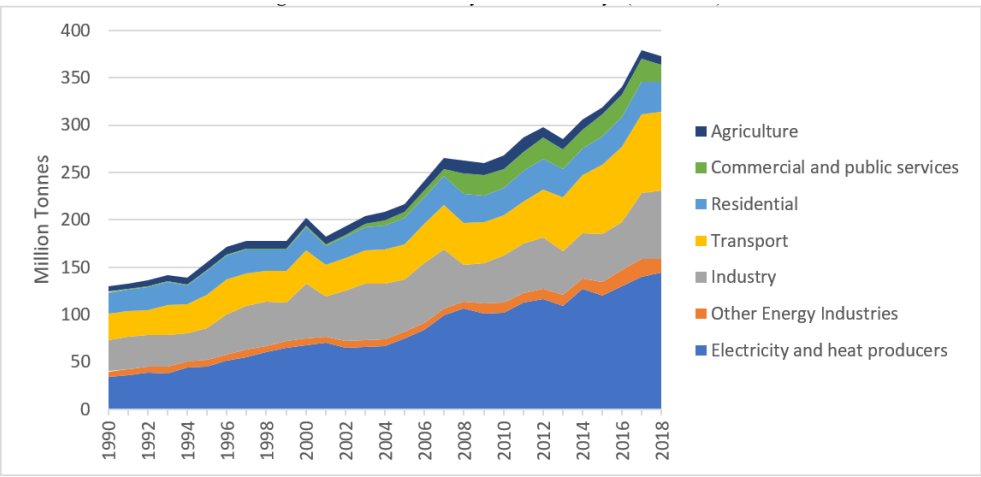


Figure 4. CO_2 emissions by Sector in Türkiye (1990-2018)
Source: International Energy Agency Statistics

Electricity generation is the largest single sector in terms of emissions, and it also has high growth in emissions. In 2018, the sector was responsible for 38% of CO_2 emissions, and the growth rate was 323.53% between 1990 and 2018. Because the liberalisation process in the electricity market has continued since 1982 (Dinçel, 2021), it could be suitable for market-based instruments. The country's high potential for further renewable development must also be emphasized.

The industry is a significant sector in terms of emissions, with a share of 19.30% in 2018. However, the sector's growth rate was 118% between 1990 and 2018. The PMR Assessment Report (Johnson et al., 2017) states that emissions and opportunities for abatement may vary by industrial sector. Still, high policy priority on efficiency and clean production improvements is inevitable.

The transport sector is also notable for its extensive and also fast-growing emissions. Its share in CO_2 emissions in 2018 was 22.25% and almost tripled between 1990 and 2018 (an increase of 196.43%). In line with global data, the highest share of CO_2 emissions from the transport sector belongs to road transport. According to IEA data, as of 2018, 67 million tons (81%) of the 83 million tons of CO_2 emitted by the transportation sector was caused by road transportation. As mentioned earlier, there are some significant fuel tax policies that can affect the industry. However, these taxes were not designed as environmental taxes, so the sector must be prioritised.

4. Conclusion

The issue of climate change is of utmost importance and has been a prominent concern on the global agenda for decades since it poses a significant threat to the planet and impacts various aspects of life. The combustion of fossil fuels and human activities have emerged as the primary causes of climate change, leading to various destructive outcomes such as droughts, water scarcity, rising sea levels, and declining biodiversity. The global community recognises the urgency of addressing climate change, which has been a priority on the international agenda since the 70s. The Sustainable Development Goals (SDGs), with SDG 13 specifically focusing on Climate Action, emphasise the need for integrating climate change measures into national policies and strategies.

Türkiye is significantly impacted by the consequences of climate change, facing challenges such as droughts, floods, and extreme weather events that put immense pressure on its natural resources and emphasise its commitment to sustainable development and climate action on all occasions. The country's carbon emissions have more than doubled since 1990, driven by rapid industrialisation, urbanisation, and population growth. While it has made some efforts regarding regulations and action plans, the rapid growth in greenhouse gas emissions is a cause for concern.

To address the urgent action required for climate change and fulfil Sustainable Development Goal 13.2 (integrating climate change measures into national policies), Türkiye must put on its agenda applying market-based instruments in its environmental policies. Market-based instruments, such as carbon taxes and emission trading schemes (ETS), are effective and cost-efficient tools for reducing emissions in many countries. Türkiye has shown interest in establishing an ETS and has explored the possibility of implementing carbon pricing mechanisms. However, concrete steps and legislation are yet to be realised.

The priority areas for Türkiye's environmental policy and market-based instruments should focus on the electricity, industry, and transport sectors, which contribute significantly to greenhouse gas emissions. Increasing the share of renewable energy sources in the electricity sector, improving industrial efficiency, and promoting sustainable transportation practices are crucial steps to mitigate emissions. Combating climate change is a global imperative, and Türkiye must take urgent and decisive actions to align its environmental policies with the goals of SDG 13. By enacting necessary legislation and embracing market-based instruments, Türkiye can contribute significantly to the global fight against climate change and safeguard its future and that of the planet. Strengthening climate action, enhancing monitoring and reporting of emissions, and accelerating the transition to cleaner energy sources should be top priorities for the country.

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