



# Turkey's New Nationally Determined Contribution: Stagnation or Breakthrough?

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Alkan Üstün<sup>1</sup>

ORCID: 0000-0002-3616-8193

## Abstract

*Climate change will continue to be at the top of countries' political and social agendas in the coming decades. The steps to be taken in the mitigation and adaptation processes carried out within the scope of combating climate change are presented in countries' nationally determined contributions (NDC). In this study, Turkey's new NDC announced during the COP27 summit is evaluated with regard to the current data. The purpose of the study is to analyze Turkey's new NDC statement, and its potential outcomes based on relevant reports, scientific assessments, projections, and current data. The study mainly highlights the potential benefits of prioritizing the transition to renewable energy and the positive implications of having a concrete timeline for reducing the use of fossil fuels, including coal, if explicitly included in Turkey's NDC statement. The paper's main objective is to discuss the economic, social, and environmental benefits of a bolder decarbonization roadmap and the need for a schedule to phase out fossil fuels. In the study, an array of recent and detailed reports, scientific studies, and statistics were analyzed and the positive outcomes of Turkey's accelerating the process of exiting fossil fuels were discussed.*

**Keywords:** Nationally determined contribution, NDC, climate change, Turkey

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<sup>1</sup> Asst. Prof. Alkan Üstün, Bartın University Faculty of Letters Department of Sociology,  
E-mail: alkanustun@gmail.com



## Türkiye'nin Yeni Ulusal Katkı Beyanı: Atalet mi Atılım mı?

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Alkan Üstün<sup>2</sup>

ORCID: 0000-0002-3616-8193

### Öz

İklim değişikliği olgusu önümüzdeki on yıllarda ülkelerin politik ve sosyal gündemlerinin üst sıralarında yer almaya devam edecektir. İklim değişikliğiyle mücadele kapsamında yürütülen azaltım ve uyum süreçlerinde atılacak adımlar, ülkelerin ulusal katkı beyanlarında (NDC) sunulmaktadır. Bu çalışmada, Türkiye'nin COP27 zirvesi sırasında açıklanmış olduğu yeni ulusal katkı beyanının çeşitli güncel veriler bağlamında bir değerlendirmesi yapılmaktadır. Bu bağlamda çalışmanın amacı, objektif raporlara, bilimsel değerlendirmelere ve güncel verilere dayanarak Türkiye'nin yeni ulusal katkı beyanını ve olası sonuçlarını analiz etmektir. Araştırmada esas olarak, yenilenebilir enerjiye geçişe öncelik verilmesinin potansiyel faydaları ve kömür başta olmak üzere fosil yakıtların kullanımının azaltılmasının olumlu sonuçları vurgulanmaktadır. Türkiye'nin daha iddialı bir ulusal katkı beyanını ortaya koymasının ve karbon emisyonlarını azaltmak için mutlak azaltım yolunu benimsemesinin gerekliliği vurgulanmıştır. Güncellenmiş ve daha cesur bir ulusal katkı beyanı aracılığıyla, uluslararası fonlara artan düzeyde erişebilmenin yanı sıra, çalışmada sunulan bağlamlarda ileriye dönük atılımların temeli oluşturulabilmiş olacaktır. Makale, Türkiye'nin karbonsuzlaşma yol haritasını daha iddialı bir şekilde ortaya koymasının ve fosil yakıtların kullanımını sonlandırmayı belirli bir takvime bağlamasının sunacağı ekonomik, sosyal ve çevresel faydaları ele almaktadır. Bununla birlikte çok sayıda rapor, bilimsel çalışma ve istatistikler analiz edilerek, Türkiye'nin fosil yakıtlardan çıkış sürecini hızlandırmasının olumlu sonuçları tartışılmıştır.

**Anahtar Kelimeler:** Ulusal katkı beyanı, iklim değişikliği, Türkiye

<sup>2</sup> Dr. Öğr. Üyesi Alkan Üstün, Bartın Üniversitesi Edebiyat Fakültesi Sosyoloji Bölümü,

E-posta: alkanustun@gmail.com

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<http://idealkentdergisi.com>

Geliş Tarihi *Received Date*: 29.08.2023 Kabul Tarihi *Accepted Date*: 10.10.2023

## **Introduction**

Climate change continues to dominate the global agenda. The unprecedented escalation in greenhouse gas (hereafter GHG) emissions on the planet as a result of human activity has led to an increase in the frequency, intensity, and duration of marginal weather events (IPCC, 2022). Climate change negatively impacts people, settlements, and infrastructure on a global scale. An ascent in the frequency and intensity of events such as floods, landslides, storms, and droughts has been observed (IPCC, 2014, p. 10). Forest fires, tropical storms, increased heavy rainfall, and rising sea levels are the results of human-induced climate change. Moreover, it is causing irreversible losses to agricultural land, freshwater resources, and coastal and open sea ecosystems. The rise in the frequency and intensity of extreme weather events also poses greater threats to food and water security (IPCC, 2014, p. 12). In this regard, countries need to implement concrete steps firstly reduction of GHG emissions. Taking legal-based measures and implementing mitigation practices are critical in the fight against climate change.

Nationally determined contributions (hereafter NDC) are commitments made by countries participating in the United Nations Framework Convention on Climate Change (UNFCCC) to reduce their GHG emissions and take other climate-related actions. The NDCs are intended to help countries achieve their climate goals and contribute to the global effort to address climate change. Each country's NDC is unique and reflects its circumstances, goals, and capabilities. NDCs can include a range of actions, such as cutting emissions, improving energy efficiency, increasing the use of renewable energy, reducing deforestation, and adapting to the impacts of climate change (UNFCCC, 2022). NDCs are an important part of the UNFCCC's process for addressing climate change, as they provide a framework for countries to set and achieve their own climate goals. The NDCs are intended to be updated and strengthened over time as countries work to reduce their GHG emissions and adapt to the impacts of climate change (UNFCCC, 2022).

The purpose of this study is to analyze Turkey's new NDC statement, and its potential outcomes based on relevant reports, scientific assessments, projections, and current data. The study mainly highlights the potential benefits of prioritizing the transition to renewable energy and the positive implications of having a concrete timeline for reducing the use of fossil fuels, including coal, if explicitly included in Turkey's NDC statement.

To achieve this, the latest evaluations, studies, and reports in the relevant literature have been analyzed. Although some studies are focusing on NDC statements of countries in the literature, it is thought that a current and objective evaluation of Turkey's new NDC statement will contribute to the relevant literature. In conclusion, it is argued that adopting an action path that directly embraces absolute decrease instead of decrease from increase targets in the context of combating climate change will have notable positive outcomes in terms of attracting global financial resources. The potential positive outcomes of defining a concrete and stronger carbon neutralization roadmap are also shared. Lastly, recommendations are presented to decision-makers.

NDC statements contain the noteworthy potential for countries. Turkey should not miss that opportunity and should present a more ambitious and bold commitment to the UNFCCC. The stronger update of the new NDC statement would make a remarkable contribution to the path of Turkey's transition to a green and circular economy.

Methodologically, this research is mainly based on the analysis of secondary data sources. Utilizing this method enables the researcher to gain access to a broad range of data and archival materials used to analyze the various factors and issues surrounding the topic (Creswell, 2009). Furthermore, this approach also allows the researcher to bypass limitations in terms of time and funding (Bryman, 2008; Johnston, 2014). Essentially, efficiently acquiring specific data is crucial for thoroughly examining the research question at hand. In this regard, news related to climate change was monitored daily and national and international media were regularly examined. Academic studies on climate change, just transition, and green and circular economies were reviewed. In addition, reports from numerous international organizations such as IPCC, UNDP, UNEP, and ILO are routinely scanned and critically evaluated. Civil society organizations also have critical roles in shaping the agenda as climate action is implemented by states. Non-governmental organizations can significantly influence the political environment in which climate policies are created and implemented. Additionally, they can contribute to the formulation and execution of climate policies by sharing their specialized knowledge and experience, as well as by advocating for the needs and concerns of disadvantaged groups (IIED, 2012, p. 3). In this context, the assessments, and reports of civil society organizations both located abroad and in Turkey were also carefully monitored.

## **Background**

Human activities have a clear impact on global climate change, and human-generated greenhouse gas (GHG) emissions are at the highest level in history (IPCC, 2021). The fact that the damage global climate system is warming has been established as a definite fact through studies that consider a range of factors together. From the 1950s onwards, most of the observed changes have been unprecedented for tens of thousands of years. The increase in average temperatures, warming of the oceans, decrease in snow and ice, and rise in sea levels are clearly visible (IPCC, 2014). The increasing emission of GHG is causing greater warming in all components of the climate system. However, the likelihood of severe, widespread, and irreversible effects on humanity and ecosystems arising from long-term changes is significantly high (IPCC, 2014). The key to combating climate change is to reduce greenhouse gas emissions significantly and consistently, beyond merely adapting to the fact. The climb in GHG emissions is mainly due to fossil fuels. The burning of fossil fuels and CO<sub>2</sub> emissions from industrial processes contributed 78% to the total escalation in GHG emissions from 1970 to 2010 (IPCC, 2014). Therefore, the gradual termination of fossil fuel use, particularly coal, is critical in the fight against climate change. However, 46% of global GHG emissions and 72% of the electricity sector's emissions are due to coal use (EBC, 2021, p. 11). Coal is a significant contributor to climate change, responsible for nearly half of global GHG emissions. As the negative impacts of climate change become more severe and international efforts to address them increase, the use of coal in the energy sector is being re-evaluated. Many countries, motivated by the Paris Climate Agreement, have set targets to fully phase out coal, often by 2030 or earlier (EBC, 2021, p. 5). This trend is expected to continue when considering the negative consequences of coal use, cost reductions in renewable energy and energy storage, and the need for flexibility in energy markets to lead to a decrease in global coal use.

It has been observed that climate change has led to a rise in both the frequency and severity of extreme weather events, which have caused unprecedented economic and social disruption. For example, in 2022, there were incidences of flooding in Pakistan and China, heatwaves in India and Pakistan, droughts in China and Europe, and multiple tropical cyclones in Asia and America, all of which resulted in profound economic damage, loss of life and

negative health effects. The international aid organization Christian Aid reported that in 2022, there were 10 extreme weather events (including storms, floods, and droughts) that each resulted in at least 3 billion dollars in damages. These events also resulted in thousands of deaths (Christian Aid, 2022). It is also reported that these extreme events caused significant human and environmental damage, mostly in poorer countries. Among them, the floods that hit Pakistan in June displaced 7 million people and resulted in estimated damages of over 30 billion dollars, with only 5.6 billion dollars covered by insurance. Hurricane Ian, which struck the US and Cuba in September, caused 100 billion dollars in damages. The summer heatwave and drought that affected the UK and Europe resulted in losses of 20 billion dollars. These events, including floods, cyclones, and droughts, caused the deaths and displacement of millions of people in regions that have contributed little to the cause of climate change (Christian Aid, 2022).

In a similar vein, according to Callahan & Mankin (2022), extreme heat waves caused approximately 16 trillion dollars in damage to the global economy between 1992 and 2013. While the wealthiest countries lost approximately 1.5% of their per capita gross domestic product (GDP) due to heat waves, poorer countries lost approximately 6.7% of their per capita GDP (Callahan & Mankin, 2022). Inequalities between countries are also prevalent on the issue of climate change. Additionally, the poorer countries often have fewer resources and infrastructure to protect themselves from the impacts of extreme heat, making them more vulnerable to the negative effects of climate change. As a result, inequality between countries is also observed in the realm of climate change. Least developed countries are generally closer to tropical regions where temperatures are mostly higher. These regions experience more heat waves, causing them to become warmer. Although Africa contributes a notably small amount to global GHG emissions, it remains the most vulnerable continent to the effects of climate change. Within the global scale, Sub-Saharan Africa accounts for 95% of rain-fed agriculture. The considerable contribution of agriculture to GDP and employment in this region makes it vulnerable to the effects of climate change, as well as other weather-sensitive industries such as herding and fishing. This vulnerability leads to income losses and increased food insecurity. In 2015, seven out of the ten countries most vulnerable to climate change were located in Africa, with Mozambique, Malawi, Ghana, and Madagascar ranking among the top ten countries most affected by these changes (African Development Bank, 2022). Similarly, IPCC (2014) has underlined the fact that the countries that contribute the least to

and emit the least carbon in climate change are the ones that are most affected by its negative effects.

Besides exacerbating the inequalities, climate change has also negative reflections on the physical and mental health of people due to its destructive effects on the natural and built environment. On the other hand, climate change induces economic losses in many sectors such as agriculture, forestry, fishing, energy, and tourism (IPCC, 2014, p. 13). The rising seas and negative outcomes such as floods, droughts, and food insecurity caused by climate change can trigger forced human mobility. Climate change could also lead to forced human migration from flooding, droughts, and food insecurity caused by rising seas and negative outcomes.

The increasing emission of GHG is causing greater warming in all components of the climate system. However, the likelihood of severe, widespread, and irreversible effects on humanity and ecosystems arising from long-term changes is significantly high (IPCC, 2014). The key to combating climate change is to reduce greenhouse gas emissions significantly and consistently, beyond merely adapting to the fact. The climb in GHG emissions is mainly due to fossil fuels. The burning of fossil fuels and CO<sub>2</sub> emissions from industrial processes have contributed 78% to the total escalation in GHG emissions from 1970 to 2010 (IPCC, 2014). Therefore, the gradual termination of fossil fuel use, particularly coal, is critical in the fight against climate change. However, 46% of global GHG emissions and 72% of the electricity sector's emissions are due to coal use (EBC, 2021, p. 11). Coal is a significant contributor to climate change, responsible for nearly half of the global greenhouse gas emissions. As the negative impacts of climate change become more severe and international efforts to address them increase, the use of coal in the energy sector is being re-evaluated. Many countries, motivated by the Paris Climate Agreement, have set targets to fully phase out coal, often by 2030 or earlier (EBC, 2021, p. 5). This trend is expected to continue when considering the negative consequences of coal use, cost reductions in renewable energy and energy storage, and the need for flexibility in energy markets to lead to a decrease in global coal use.

### **The Impact of Coal Use on Climate Change**

Fossil fuels, which are the main cause of global warming, and greenhouse gases, must be replaced by renewable energy sources to reduce the negative impacts of climate change. In this context, it is necessary to accelerate the tran-

sition to renewable energy sources such as solar, wind, hydro, and geothermal, and to increase the share of renewables in the energy mix (IPCC, 2014). Fossil fuels are a major contributor to GHG emissions which are the main cause of global warming. Thus, to reduce greenhouse gas emissions and mitigate the negative impacts of climate change, it is necessary to take urgent and ambitious action ranging from individuals to governments.

Within this scope, many European countries have ceased using coal for electricity generation. Belgium ended its use of coal in 2016, Sweden in 2020, and Portugal in 2021 (EBC, 2022a). However, numerous European countries have set schedules for phasing out coal gradually. According to these plans, France and Austria will end their use of coal in 2023, the United Kingdom in 2024, Italy, Ireland, and Hungary in 2025, Spain and Slovakia in 2030, Croatia, the Czech Republic, and Slovenia in 2033, and Germany in 2038 (EBC, 2022a).

However, coal demand is increasing mostly due to the growing energy needs of emerging economies in Asia. The Russia-Ukraine war added a new dimension to the energy security phenomenon and exacerbated the situation. In 2022, the coal market experienced significant disruptions, with demand reaching an all-time high of 8 billion tonnes, an increase of 1.2%. In the previous year, it was predicted that global coal demand would reach a new peak in 2022 or 2023. Despite the global energy crisis, the overall outlook remains unchanged due to various factors that cancel each other out. The invasion of Ukraine by Russia has profoundly affected coal trade, prices, and supply-demand patterns. The prices of fossil fuels, particularly natural gas, have significantly increased, leading to a shift away from gas and an increase in demand for more price-competitive options, including coal in some regions. However, the rise in coal prices, the strong adoption of renewable energy sources and energy efficiency, and the slowing of global economic growth are mitigating the increase in overall coal demand. In China, which accounts for 53% of global coal consumption, extended and strict lockdowns due to COVID-19 have impacted economic activity and decreased coal demand (IEA, 2022a, p. 6).

Globally, coal is the second-largest source of energy supply after oil. Contrary to expectations, demand for coal has not decreased and has instead remained at high levels over the past decade. The current energy crisis has led to a temporary increase in coal consumption in some countries due to the high cost of natural gas. The use of coal presents a significant challenge in achieving climate targets, as it is utilized in the majority of countries that have committed to achieving net zero emissions. The International Energy Agen-



cy's report explores strategies for reducing emissions from coal while maintaining affordable and secure energy sources and addressing the impacts on workers and communities (IEA, 2022b, p. 13).

To achieve global climate objectives, it is essential to substantially reduce emissions from coal. All scenarios that aim to avoid severe impacts from climate change involve early and significant cuts in coal-related emissions. Coal is the largest emitter of energy-related CO<sub>2</sub>, accounting for 15 gigatons in 2021, and it is also the leading source of electricity generation, making up 36% in 2021, as well as a significant fuel for industrial use. To effectively address climate change, it is necessary to implement comprehensive, integrated policies that address emissions from all sources, but reducing emissions from coal should be a top priority (IEA, 2022b, p. 13). To reach net zero emissions, it is necessary to reduce emissions from all fossil fuels, including oil and gas. However, a rapid decrease in the use of coal is a crucial aspect of any plan to create a more sustainable energy system. Coal is the fossil fuel with the highest carbon intensity and is responsible for a larger share of global GHG emissions than any other energy source, with 15 gigatons of CO<sub>2</sub> in 2021. Despite its importance, coal is facing increasing competition from cleaner alternatives for power generation. For instance, nearly 75 countries, representing 95% of current global coal consumption, have made commitments to achieve net zero emissions (IEA, 2022b, p. 22).

### **Reliance on Fossil Fuels in Turkey**

In 2022, the breakdown of Turkey's installed electricity capacity by source was 30.5% hydropower, 24.4% natural gas, 21.1% coal, 11.0% wind, 9.0% solar, 1.6% geothermal, and 2.4% from other sources (ETKB, 2022). In the same year, Turkey's electricity production was sourced from coal at 30.9%, natural gas at 33.2%, hydropower at 16.7%, wind at 9.4%, solar at 4.2%, geothermal at 3.2%, and other sources at 2.4% (ETKB, 2022). When coal and natural gas are evaluated together, it is seen that approximately two-thirds of Turkey's electricity production still depends on fossil fuels. While a considerable portion of its energy is derived from fossil fuels, another salient factor is that a significant proportion of these fossil sources are imported.

Turkey imports 60% of its coal, 93% of its oil, and 99% of its natural gas for energy production (ILO, 2022). This situation not only negatively impacts energy security but also makes Turkey vulnerable to fluctuations and shocks in its energy supply. In addition, the amounts paid for the import of fossil fuels

are increasing and have a negative impact on the national budget. Furthermore, the Russia-Ukraine War has triggered significant increases in global energy prices, and there is uncertainty regarding the availability of energy in the coming period. Renewable energy currently accounts for approximately 13% of Turkey's total final energy demand (IICEC, 2022, p. 6). Transitioning to renewable energy sources could make it easier for Turkey to fulfil its climate commitments. Green energy can also provide net economic benefits. Turkey imports 99% of its natural gas and 93% of its oil (World Bank, 2022, p. 5). It is clear that investing in renewable energy not only reduces carbon emissions and air pollution but also significantly decreases energy imports and expenses. In addition, the country's vulnerability to fluctuations or disruptions in the global energy market will decrease too. The national budget could also see a reduction in health costs related to fossil fuel use, in addition to the amounts spent on importing fossil fuels (World Bank, 2022, p. 5).

Another factor to consider in tackling climate change is GHG emissions per capita. Turkey's per capita emissions are below the G20 average (0.69 times) but while per capita total emissions in G20 countries have been decreasing, they increased by 5.7% in Turkey between 2014 and 2019. China and Turkey are the only two G20 countries where per capita emissions have reached higher levels in 2019 than in 2020. According to the "Climate Transparency" report, which assesses the performance of G20 countries in combating climate change, Turkey's per capita carbon emissions are increasing. While such emission rates are decreasing in G20 countries, they increased by 5.7% in Turkey between 2014 and 2019 (Climate Transparency, 2022). In 2021, the countries with the highest increase in per capita energy-related CO<sub>2</sub> emissions compared to 2020 were Brazil (after a 6% decrease between 2019 and 2020, there was a 13% increase), Turkey (after a 1% decrease, there was an 11% increase), and Russia (after a 4% decrease, there was a 10% increase). From the beginning of 2021 to mid-2022, 2.9 GW of additional renewable energy production was approved, but this is still far below Turkey's high potential for renewable energy. Investments in renewable energy, particularly solar and wind, can significantly reduce energy imports and enhance national energy security (Climate Transparency, 2022). Turkey's greenhouse gas emissions (excluding Land Use, Land Use Change, and Forestry - LULUCF) increased from 226 MtCO<sub>2</sub>e/year in 1990 to 514 MtCO<sub>2</sub>e/year in 2019, an increase of 127%. The increase in total emissions was largely due to a continu-

ous increase of about 157% in energy-related emissions and 139% in industrial process emissions; all sectors experienced an increase in emissions over the same period.

Another issue worth considering is the Carbon Border Adjustment Mechanism (hereafter CBAM), which is set to take effect in October 2023, and will allow countries with climate goals in line with the EU to export to the EU. The EU aims to reduce the sale of products with high carbon footprints in trade with countries that have not established a carbon pricing mechanism through CBAM (European Commission, 2022). CBAM which is planned to be implemented at the reporting level in 2023 and practiced as of 2026 under the European Green Deal, will provide economic incentives for countries trading with the European Union to abandon their reliance on coal. In Turkey, policies supporting coal energy have contributed to a 459% increase in coal-based electricity production and a 323% increase in greenhouse gas emissions in the electricity sector from 1990 to 2020. Despite this, the country's current energy plans still include goals of expanding coal mining and increasing domestic coal-based electricity generation, which may not be viable environmentally or economically (EBC, 2021, p. 5). Under the Emissions Trading System (ETS), a mechanism will be established to equalize the carbon price paid for EU products with the carbon price paid for imported goods. This mechanism will require companies importing to the EU to purchase CBAM certificates to cover the difference between the carbon price paid in the country of production and the carbon price in the EU. This will incentivize countries without climate policies to tackle climate change to shift towards combating climate change. CBAM will initially cover sectors including iron, steel, fertilizers, aluminum, cement, electricity, and hydrogen (İklim Haber, 2022). Turkey's largest trading partner is the EU. Therefore, decarbonization plays a key role in maintaining and increasing the competitiveness of Turkish manufactured goods on the EU market in the scope of CBAM. The current trade between Turkey and the EU has experienced a significant increase with the establishment of the Customs Union on December 31, 1995, and reached 178.6 billion dollars in 2021, continuing to be the most important trade partner of the country. Turkey ranked 6th with a 3.6% share of the EU's total exports. In 2021, the EU imported 41.3% of Turkey's exports, amounting to 93 billion dollars, and ranked first in the country's total exports (Ticaret Bakanlığı, 2022). The EU is also ranked first, both in Turkey's exports and imports. In 2021, Turkey imported 85 billion dollars, 31.5% of its total imports of 271 billion dollars, from the EU (Ticaret Bakanlığı, 2022).

## **Turkey's Approach to Climate Change and Its New Nationally Determined Contribution**

The Conference of Parties (COP) is a meeting of countries that are parties to the United Nations Framework Convention on Climate Change (UNFCCC). The countries parties to the Convention are natural members of the COP summit. Each year, the participating countries come together to discuss and make decisions about plans and actions to tackle climate change. Besides, they discuss what can be done at the international level to address climate change. At the COP27 summit, a loss and damage fund was established to help vulnerable countries compensate for losses caused by climate change-related disasters, such as droughts and floods. This fund was positively received by developing economies, particularly small island countries and countries in sub-Saharan Africa, which contribute the least to climate change but are most severely affected by its negative impacts (IPCC, 2014, p. 13). However, the details of the fund's operation have not yet been finalized and will be determined at a future meeting in December 2023 in Dubai. In addition, the COP27 summit upheld the goal of limiting global warming to 1.5 degrees Celsius and encouraged the gradual reduction of coal usage and the discouragement of inefficient fossil fuel use. Moreover, India's proposal to completely phase out fossil fuels did not receive adequate international support.

The 27th Conference of the Parties (COP27) is significant for Turkey as it is an opportunity to announce its new NDC. The country's first Intended Nationally Determined Contribution (INDC) was submitted to the UNFCCC in 2015. This INDC stated that Turkey's projected emissions in 2030 would be 1.175 billion tons, representing a reduction of 21% from the baseline scenario, with a target of 929 million tons per year in 2030 (UNFCCC, 2015).

On the other hand, Turkey ratified the Paris Agreement in October 2021 and pledged to reach net zero emissions by 2053 (İklim Değişikliği Başkanlığı, 2022a). However, Turkey's first contribution statement was submitted in 2015, and it stated that, based on a certain scenario, a reduction in emissions would be achieved by 2030, reaching a yearly emission value of 929 million tons with a 21% decrease from the increase. Another noteworthy step by Turkey was the name commissioned ministry changed its name to "Ministry of Environment, Urbanization and Climate Change" and under this ministry "Presidency for Climate Change" was established. A comprehensive "Climate Council" summit was held in Konya province of Turkey in February 2022. Additionally, efforts about the "Climate Act" are still in progress. Another salient step was the announcement of Turkey's new NDC at the 27th

Conference of the Parties (COP) summit, on 15th of November 2022 (İklim Değişikliği Başkanlığı, 2022b). According to the NDC statement announced by the Minister of Environment, Urbanization, and Climate Change, the emission reduction rate, which was stated as 21% in the first “intended” statement (INDC) from 2015, has been updated to 41% for 2030 (Climate Change Presidency, 2022). The statement also claimed that Turkey, as a developing country, will reach its peak level of emissions in 2038 (İklim Değişikliği Başkanlığı, 2022b). In addition, Turkey has announced that it will apply to host the 31st Conference of the Parties (COP) in 2026 (ÇŞİDB, 2022).

As stated by the TÜİK (Turkish Statistical Institute), Turkey produced 564 million tons of carbon dioxide equivalent emissions in 2021. (TÜİK, 2023). Considering the distribution by sector 71.3% are energy-related emissions are leading. The remaining percentage is made up of 13.3% industrial processes, 12.8% agriculture, and 2.6% waste sector emissions. Moreover, according to the latest updated data, Turkey's carbon emission has increased by 7.7% compared to the previous year. In parallel, the per capita emission in 2021 raised from 6.3 tons to 6.7 tons compared to the previous year (TÜİK, 2023). The target amount to be reached by 2030, according to the reference scenario, has been indicated as 1 billion 175 million tons. On the other hand, the emission reduction target of 21% which was stated in the first INDC of 2015 has been increased to 41% in the new NDC announced in November 2022. As a result, Turkey plans to produce 695 million tons of emissions by 2030. Additionally, the new NDC includes the definition of a peak year, which is set for 2038. This means that Turkey will increase its emissions until this point. It has been stated that from 2038, emissions will no longer represent a reduction from an increase, instead, it will be an absolute decrease (ÇŞİDB, 2022). However, a reduction should be targeted from today for a determined tackle to climate change. Turkey's hesitation is because it is a developing economy and its energy needs are expected to increase, which is understandable. Nevertheless, it is still conceivable that new energy investments should focus on renewable and environmentally friendly alternatives such as solar and wind, rather than fossil fuels such as coal and natural gas. In a nutshell, the new NDC set forth a decrease from an increase in Turkey's emissions, rather than an absolute decrease. However, it actually means an obvious increase. Moreover, if Turkey determines its net zero emissions target in 2053 a reduction of 13% per year must be achieved between 2038 and 2053. This would not only profoundly increase the cost but, more importantly, keep distant Turkey from international financing opportunities.

In Turkey's first INDC submitted in 2015, it was intended to reduce GHG emissions to 929 MtCO<sub>2e</sub>, with a 21% reduction, by 2030 in the absence of any measures to reduce GHG emissions. However, in the newly announced NDC in November 2022, it was stated that in the projection for 2030, Turkey's emissions would rise to 1,175 MtCO<sub>2e</sub>, and with the measures taken, it would be reduced to approximately 700 MtCO<sub>2e</sub>, with a 41% decrease from an increase. This statement implies that emissions will continue to increase in the coming years. Additionally, in the reduction scenario of the new NDC, a 33% increase is foreseen compared to 2020. Moreover, the peak year specified as 2038 indicates an increase of about 47%. To reach the net zero target by 2053, an average annual reduction of 13% must be achieved in the following 15 years between 2038 and 2053. However, it should be noted that Turkey has historically recorded an annual 3% increase in emissions. Therefore, the annual 13% reduction in the period 2038-2053 seems overly optimistic.

According to the Paris Equity Checker (PEC), which evaluates the climate goals of different countries, the current NDCs show how close the world is to global warming goals. The latest map created by the PEC after the 27th Conference of the Parties (COP27) shows that Turkey, China, Iran, Russia, Saudi Arabia, and Vietnam have climate policies that could result in global warming of over 5°C by the end of the century (Paris Equity Check, 2022). Another study also found that Turkey, China, Iran, Russia, Saudi Arabia, and Vietnam still have climate goals that could lead to global warming of over 5°C. The PEC evaluates countries' GHG emission reduction targets in other words their NDCs and its latest assessment asserted that the majority of developed countries still have plans that are far from the 1.5°C warming limit accepted by the United Nations, despite most of them increasing their targets in the past 18 months (Paris Equity Check, 2022).

## Discussion

This section of the article aims to bring together prominent studies in assessing the possible outcomes of Turkey's adoption of a greener perspective. Although many perspectives deal with different aspects of the phenomenon, the ones that stand out and are considered noteworthy are evaluated here.

According to a projection study conducted by Istanbul Policy Center, it is possible to approach net zero emissions by 2050 by abandoning fossil fuels and switching to renewable energy, as well as increasing energy efficiency

and electrification in various sectors (Şahin, 2021, p. 28). In this context, it has been calculated that Turkey can approach the net zero emissions target to a large extent in 2050 by investing in carbon-free green technologies, abandoning coal in electricity production by 2035 and natural gas by 2050, increasing the share of renewable energy sources such as solar, wind, biomass and geothermal in installed electric power capacity to 50% by 2030, and increasing the proportion of electric vehicles among all passenger vehicles to 20% by 2030 (Şahin, 2021, p. 28). In this regard, it is critical to phase out coal in electricity production, end incentives for coal energy, support investments in renewable sources, and provide a smooth transition exit from coal and other fossil fuels without leaving behind workers in relevant sectors (EBC, 2021, p. 11). The abandonment of coal use by 2035 would make it possible to achieve a significantly large reduction of 82.8% in emissions from electricity sources (EBC, 2021, p. 12). On the other hand, after the Carbon Border Adjustment Mechanism, which will come into effect in 2026, Turkey will incur additional costs on the European Union market due to carbon-intensive production and may experience a significant decline in competitiveness. However, it has been stated that it is possible to phase out coal with a 28 billion-dollar investment in zero-emission renewable energy by 2028 (EBC, 2021, p. 13). In addition, if coal use is terminated by 2035 and replaced with renewable energy sources, the localization rate of the energy source can increase up to 73.6%. This will also result in a positive outcome in terms of energy supply security. In addition, the environmental and public health costs caused by coal use will also be prevented.

Similarly, as stated in a study conducted by NGOs working on climate-related issues, it is realistic and possible for Turkey to achieve its goal of reducing emissions by 35% in 2030. It has been asserted that this can be achieved by taking the following steps: ending coal-based electricity production by 2030, increasing the share of renewable energy sources in electricity production to 75%, increasing the share of electric vehicles to at least 20% for passenger cars and at least 10% for passenger and cargo transport vehicles, enhancing energy efficiency, electrification, and direct use of renewable energy in industry, services, and agriculture, ending the use of coal and fossil fuels in buildings, and switching to electric heating on a large scale (2030 İklim Hedefi, 2022).

In another research, it is claimed that a significant contribution can be made to the transition to renewable energy by establishing solar power plants on the existing fields of thermal power plants in Turkey. Accordingly, the

scenario of closing 22 coal-fired thermal power plants in Turkey and establishing solar power plants at their locations was simulated. There are many examples where solar panels are installed on old thermal power plants, especially on the ash ponds that are no longer usable, in countries such as Canada, the USA, and Germany. Similarly, new solar energy plants can be established at the locations of the 22 coal-fired thermal power plants in Turkey at a cost of approximately 6 billion dollars. 19 GW of electricity can be produced annually in these new solar energy plants and the electricity needs of 6.9 million households can be met annually. In addition, 12.4 million tons of CO<sub>2</sub> emissions can be prevented annually in this case (EBC, 2022b, p. 12). In addition, approximately 40 billion dollars allocated to energy imports between 2010 and 2020 could have been avoided (EBC, 2022b, p. 15).

As reported in a projection study conducted by SEFIA in late 2022, if the total installed power of 19 GW for wind and solar energy in Turkey is increased to 36 GW, the price of electricity would be considerably lower. In addition to reducing energy imports, it will also have a positive impact on inflation. Additionally, greenhouse gas emissions will also be much lower (SEFIA, 2022). The study shows that in Turkey, which has struggled with chronically high inflation if the share of solar and wind increases, the price of electricity on the free market could be lower. Accordingly, the inflation would be 7 points lower. In the scenario where renewable energy production is higher, it is expected that the annual producer price index (PPI) inflation, which was 144.61% as of July 2022, could have been 129.22% and the annual consumer price index (CPI) inflation, which was 79.60%, could have been 72.39%. Increased renewable energy production primarily replaces expensive gas and imported coal production. It was calculated that the country's fuel import bill would decrease by 3.1 billion dollars in 2021 and 3.3 billion dollars in the first half of 2022 (SEFIA, 2022). The reduction of energy imports not only positively impact inflation, but could also lead to a significant decrease in greenhouse gas emissions. This highlights the dual benefits of pursuing such a policy. Fossil fuels, including natural gas, contribute profoundly to consumer price inflation in Turkey. In the past 12 months, electricity prices have increased by 102%, gas prices have increased by 145%, and transport fuel prices (diesel and petrol) have increased by 182%. These price increases in fossil fuels account for about 20% of Turkey's current annual inflation rate of over 80% (Cambridge Econometrics, 2022). To prevent these energy price increases from being passed on to consumers, Turkey has spent 2% of its GDP, or 300 billion Turkish lira, to offset them. New wind and solar energy capacity



is less expensive than natural gas, thus investing in these cost-competitive renewables over the long term would not only lower electricity prices but also reduce households' exposure to volatile global market prices. The high energy costs in Turkey disproportionately affect household budgets, with the poorest 20% of households spending 25% more on energy in 2022 than in 2021, and expecting to spend close to 10% of their income on energy bills in 2022. Investment in renewables and the electrification of transport and heating would allow Turkey to reduce its reliance on energy imports and protect households from volatile fossil fuel prices (Cambridge Econometrics, 2022).

As asserted in the study by the Istanbul International Energy and Climate Center (IIEEC, 2022), in a scenario where investments in renewable energy are prioritized, Turkey's installed power capacity is projected to reach 294 GW in 2050, with the share of renewables in the energy mix reaching 80% in 2040 and 90% in 2050, primarily from solar and wind energy. In this projection, the average annual investment in renewable electricity production is calculated to be 5.5 billion dollars per year over the period until 2050 (IIEEC, 2022, p. 7). In the scenario, where the share of renewable capacity in installed power increases to more than a third in 2040 and more than doubles its current level to reach 86% in 2050, the total share of wind and solar energy in electricity production is also expected to more than triple and reach two-thirds by 2050. In this scenario, significant contributions can be achieved in terms of energy security, clean energy transformation, and related costs, compared to the increase in total electricity investment needs. For example, an annual 800 million dollars investment surplus can lead to annual savings of 2 billion dollars in energy import bills. In addition, an annual emission saving of 6.7 billion dollars can be achieved (IIEEC, 2022, p. 8).

A special report on Turkey by the International Labor Organization (ILO) claims that investing in renewable energy sources rather than coal-fired power plants in new energy investments could be more beneficial in many aspects. This transition towards green energy can not only reduce carbon emissions but also increase GDP and create new job opportunities (ILO, 2022, p. 2). With investments in renewable energy sources until 2030, Turkey could substantially reduce the financial burden of importing fossil fuels. In addition to reducing environmental risks and decreasing carbon emissions, reducing the amount paid for fossil fuels will also have a positive impact on the national budget. Specifically, it is estimated that there will be an increase of 30 to 45 billion Turkish lira per year in GDP in this regard (ILO, 2022, p. 8). Additionally, it is estimated that approximately 8% less carbon can be emitted

annually, and Turkey can approach its goal of achieving net-zero emissions by 2053 on a more realistic path. Another positive impact of choosing renewable sources over coal will be the creation of 300,000 new employment opportunities by 2030 (ILO, 2022, p. 37).

An analysis published by energy think tank Ember, Turkey's reliance on imported fossil fuels for electricity production, which currently accounts for 50% of production, can be reduced to less than 25% by 2030 through the use of wind and solar energy. To achieve this, salient increases in wind and solar capacity are necessities (EMBER, 2022). The study claims that Turkey can halve its reliance on imported energy sources for electricity production by 2030 through the ambitious expansion of wind and solar energy. Turkey, which currently produces 50% of its electricity from imported coal and natural gas, can reduce this to less than 25% within eight years. To achieve this, the share of wind and solar in electricity production must increase to at least one-third of total sources. As of 2021, wind and solar represented 13.6% of electricity production. By 2030, solar capacity in Turkey must reach 40 GW to halve the share of imported fossil fuels. Investing in domestic solar panel production and expanding solar capacity could create tens of thousands of jobs (EMBER, 2022).

Istanbul Policy Center states that an investment of approximately 110 billion dollars until 2030 will enable Turkey to become carbon neutral. The study, which includes the analysis of the electricity, transportation, building, industrial, and other manufacturing sectors, contains cost-benefit analyses for each heading. If the share of renewable sources in electricity production is increased to 69% by 2030, a profit of 1 billion dollars in operating and maintenance costs can be achieved in addition to the 6.4 billion dollars saved in fossil fuel payments (Şahin, Tör, & Kat, 2022, p. 5). The costs of the initial investment in facilities such as solar and wind power plants, the electric grid, transportation infrastructure, and buildings (especially in the context of heating and insulation) are included in the analysis. In addition, the expected decrease in healthcare expenses due to the reduction of fossil fuel use in the industrial and other manufacturing sectors is also considered (Şahin et al., 2022, pp. 6–7). Upon the evaluation of all these factors, it is stated that the total investment amount required for Turkey to reach net zero emissions by 2030 is approximately 110 billion dollars (Şahin et al., 2022, p. 38). Policies that are compatible to reach net-zero emissions have the benefit of providing net benefits that will increase over time, even if the immediate costs outweigh the benefits. “Türkiye Country Climate and Development Report” published by the World Bank in June 2022 shows that the net-zero path will provide Turkey

with a net economic benefit of 15 billion dollars (an average of 2 billion dollars per year) between 2022 and 2030 and that this benefit could reach as high as 146 billion dollars (an average of 8 billion dollars per year) over the long term until 2040 (World Bank, 2022, p. 4).

Recent studies have shown that climate change also has negative impacts on health. Climate change directly affects human health and quality of life by negatively affecting access to clean air, safe drinking water, and nutritious food (WHO, 2022). According to WHO (2022), high-temperature stress, malnutrition, malaria, and diarrhea outbreaks caused by climate change are expected to result in approximately 250,000 deaths per year between 2030 and 2050. It is estimated that the cost of health losses due to climate change will be between 2 and 4 billion dollars annually until 2030. On the other hand, it has been highlighted that the transition from coal to green energy sources will have positive effects on public health. According to a study by HEAL, it is suggested that a total of 102,000 premature deaths and 31,000 premature births could be prevented if Turkey closed its coal plants in 2030 instead of 2050 (HEAL, 2022, p. 5).

In addition to the elements emphasized in the studies evaluated, it is determined that the transition to a green economy and decarbonization will also be effective in bringing international funds to Turkey. In addition, loans and funds to be given to Turkey will be possible with absolute reduction and realistic planning to abandon fossil fuels. At this point, South Africa and Indonesia stand out as current examples.

In November 2021, an agreement was signed between the European Commission and the US and South Africa. South Africa committed in its renewed NDC statement to gradually reduce its coal consumption. Following this new commitment, the European Commission and the US have taken a step towards providing South Africa with remarkable economic financing. With the signed agreement, the first phase of financing will be provided through grants, preferential loans, investments, risk-sharing instruments, and activating the private sector including an 8.5-billion-dollar fund for South Africa (European Commission, 2021, p. 1). South Africa has committed to reducing GHG emissions by half by 2030 and achieving global net zero CO<sub>2</sub> emissions and notably reducing other GHG emissions to limit the impacts of climate change. In addition, South Africa has pledged to transition its energy systems to be carbon-free by 2050, improving efficiency, gradually phasing out coal energy, and expediting the deployment of renewable energy sources (European Commission, 2021, p. 3). Additionally, the agreement also highlights the

importance of a just transition, ensuring that those affected by the transition to renewable energy are protected and that opportunities are available to all communities, without leaving anyone behind. As part of the just transition, programs to reskill and upskill, create employment, and provide the necessary support to the labor force are promoted (European Commission, 2021, p. 3). As part of the agreement, developed countries have pledged to provide a fund of approximately 8.5 billion dollars in the first three to five years to support South Africa's transition away from coal. This is also supplemented by multilateral and bilateral grants, preferential loans, private investment, and technical assistance, as well as long-term engagement, to ensure a just and sustainable transition. The importance of the agreement in fostering cooperation between developed and developing countries on a critical global issue is also highlighted (European Commission, 2021, p. 4).

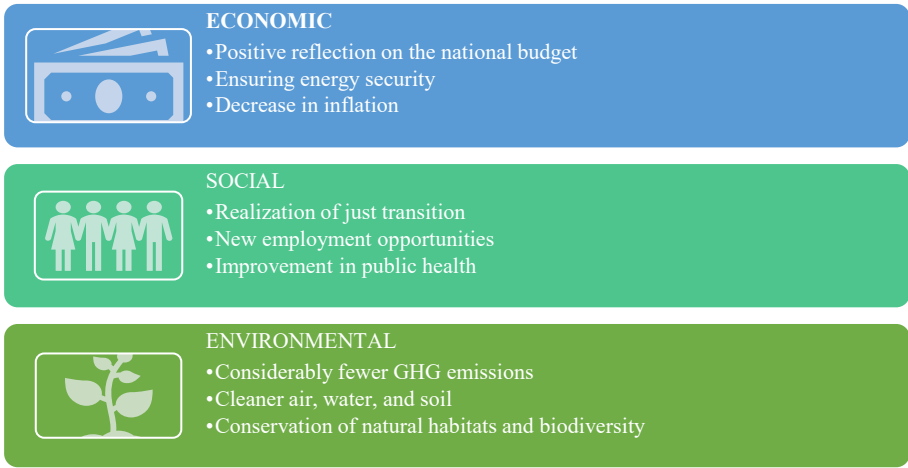
In November 2022, a Joint Statement was signed between Indonesia and the United States, Japan, Canada, the European Union, and the United Kingdom at the G20 Summit held in Bali. Under this agreement, Indonesia is receiving a noteworthy amount of funding from developed economies for its coal exit process, which is tied to a timeline (The White House, 2022, p. 2). The agreement states that Indonesia's carbon emission will peak in 2030 and from this point, net zero emissions will be pursued towards 2050. Total carbon emissions from the energy sector will be capped at 290 million tons in 2030. The agreement also commits Indonesia to gradually reduce its coal consumption and accelerate the closure of coal-fired thermal power plants. At least 34% of energy production in 2030 will come from renewable sources, and a just transition plan is expected for transitioning from coal to renewable energy (The White House, 2022, p. 3). The need for a solid plan to ensure that vulnerable social groups, particularly women and young people, are not negatively affected by the transition process in the coal and related sectors has been emphasized. It has been agreed that the participating states will provide a fund of 20 billion dollars to be provided over the next 3 to 5 years to support Indonesia's transition exit from coal energy, increasing investments in renewable energy, and remarkably reducing emissions (The White House, 2022, p. 4).

## **Conclusion and Recommendations**

Firstly, there is a discrepancy between Turkey's goal of achieving net zero emissions by 2053 and the construction of new thermal power plants. Investments such as the Hunutlu thermal power plant, which began operating its

first unit in the summer of 2022 in Yumurtalık, Adana, undermine the decisive stance that should be taken on the path toward a fossil fuel exit. The facility, jointly implemented by the People's Republic of China, consists of two units with a total capacity of 1,320 MW, each with a capacity of 660 MW, and will use 2.8 million tons of imported coal as fuel per year. The abandonment of coal in energy production is one of the first and most important steps in combating climate change. The initial construction costs of renewable energy plants are decreasing over time. On the other hand, it is a reality that it is much more difficult to find international financing for new energy production facilities that operate on fossil fuels. Locality and nationality can only be made possible by not being dependent on foreign energy sources led by fossil fuels. For this reason, it is critical to gradually abandon imported fossil fuels and to prioritize energy production from renewable sources, especially solar and wind.

Furthermore, commitments to abandon fossil fuels must be clearly stated and steps must be taken boldly. Drawing up a concrete roadmap to a carbon-free future by linking the exit from coal to a specific timetable, as in the examples of South Africa and Indonesia, will also bring international financing and support. In this way, Turkey can benefit much more generously from international fund support than South Africa and Indonesia, as seen in their practices. In addition to significant amounts of credits and grants, technical support will also be available for Turkey. In this context, it will be quite appropriate to designate a new energy roadmap and to revise and resubmit the NDC statement announced on November 15, 2022, in a more ambitious way to the UNFCCC. Turkey, which has abundant renewable energy sources, should not miss the opportunity to transform its energy mix more sustainably. The construction of new coal-fired power plants will only create a dependency on imported fossil fuels, which is not in line with the country's 2053 net zero emissions target. Turkey should prioritize the use of domestic renewable energy sources and escalate the share of renewable energy in the total energy mix. Instead of increasing emissions and then reducing them as stated in newly announced NDC of Turkey, a concrete absolute reduction should be made from now on. The first step to realizing this situation is a planned and rapid transition to renewable energy sources. Additionally, by ending incentives for thermal power plants, preventing the construction of new thermal power plants, and determining a schedule for the exit from fossil fuels in the energy sector, it is possible to achieve absolute reduction, which would mean a decrease in emissions from now on.



**Figure 1.** Positive Outcomes of Adopting a Carbon-Free Roadmap for Turkey (Source: Produced by the author)

A gradual abandonment of fossil fuels in Turkey's energy production will bring notable economic, social, and environmental benefits. As shown in this study, in the light of an array of research, projections, and studies focusing on different aspects of the issue, it can be stated that the concrete shift towards renewable energy through the exit from fossil fuels will have noteworthy positive outputs. In the economic context, renewable energy investments in Turkey, which is 92% dependent on fossil fuels for energy, will also contribute to increasing energy security. In addition, this will have positive reflections on Turkey's competitiveness on a global scale. Both economically and in terms of Turkey's prestige and reputation in the global arena, the use of fully domestic and free resources, especially solar and wind, could also lead to lower energy prices. In particular, the abandonment of fossil fuel imports will have a clear impact on the budget and will contribute to the economy by reducing imports considerably. The drop in energy production costs could also be functional in controlling inflation. The reduction in fossil fuel imports will make a positive contribution to the country's budget and will have a salient economic impact by diminishing imports.

In the environmental context, the transformation of the energy mix in a more sustainable direction will have decisive environmental impacts, such as decreasing air and water pollution, protecting natural habitats and biodiver-

sity, and lessening GHG emissions. One of the prominent results will be diminished emissions. A decrease in emissions plays a fundamental role in establishing the right to live in a cleaner and healthier environment. The lessening of carbon emissions is also essential in fulfilling our responsibility to future generations and leaving behind a healthy and livable environment for the future. Therefore, the social-ethical dimension must not be overlooked. Clean air, water, and soil will form the basis for creating a healthy environment for everyone.

In the social context, the first issue to be mentioned is the employment opportunities that will emerge in new fields. The growing number of workers needed for renewable energy will have a notable contribution to employment. Training a qualified labor force to meet the needs of emerging sectors will be essential. In addition to the revision of existing education programs and the creation of new programs, the provision of vocational training and equipment will also lead to an improvement in the quality of the workforce. The abandonment of fossil fuels will also have noticeable effects on public health. As a result of the decline in air, water, and soil pollution, there will be salient diminishes in many diseases and premature deaths, especially those related to the respiratory tract. On the other hand, this picture will also open the way for a lessening in health expenditures.

The increase in renewable energy sources in the energy mix will also lead to a more balanced distribution of income and will have positive social effects. As the epoch of fossil fuels begins to come to an end, we are entering a new era and the transition to green, clean, and more profitable in the long run, implementation of renewable energy should be followed as a concrete policy and fulfilled without any delay. Lastly, for this transition to be planned equitably, a just transition should be adopted in the planning of the new era.

The previous sections have illustrated the positive aspects of exiting fossil fuels in economic, social, and environmental contexts. Moreover, it has been demonstrated through the examples of South Africa and Indonesia that a program to be developed in this direction will also bring considerable international financial support.

It is harsh to say that the NDC, which was declared at the COP27 Summit in November 2022, is capable of revealing the high potential in the transition process to a green and circular economy in its current situation. Therefore, Turkey should put forward a more ambitious NDC and adopt the absolute reduction path in reducing its carbon emissions. Turkey should not wait for 2038, which is the peak year in terms of GHG emissions, and should take

measures to implement absolute reduction from today and realize its fossil fuel exit agenda with firm steps within a concrete plan. Thus, in addition to attracting international funds, the foundation for forward-looking breakthroughs in the economic, social, and environmental contexts presented above will be laid with an updated bolder NDC.

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## Alkan Üstün

Hacettepe Üniversitesi Sosyoloji Bölümü'nden 2009 yılında, Anadolu Üniversitesi Kamu Yönetimi Bölümü'nden 2011 yılında mezun olmuştur. Millî Eğitim Bakanlığı bursuyla gitmiş olduğu Birleşik Krallık'taki University of Southampton'dan Sosyoloji ve Sosyal Politika Yüksek Lisansını merit derecesiyle 2013'te almıştır. Ankara Yıldırım Beyazıt Üniversitesi Sosyoloji Bölümü'nde "Dünyada Kentsel Dönüşüm Örnekleri: Bulanık Küme İdeal Tip Analizi ile Karşılaştırmalı Vaka İncelemesi" başlıklı teziyle doktorasını tamamlamıştır. Çevre sosyolojisi, iklim değişikliği ve afet sosyolojisi alanlarında çalışmaktadır. Bartın Üniversitesi Edebiyat Fakültesi Sosyoloji Bölümü'nde öğretim üyesi olarak görev yapmaktadır.

*He graduated from Hacettepe University Sociology Department in 2009 and Anadolu University Public Administration Department in 2011. He received his Master's Degree in Sociology and Social Policy from the University of Southampton in the United Kingdom, to which he went with a grant from the Ministry of National Education, in 2013 with a merit degree. He completed his PhD at Ankara Yıldırım Beyazıt University, Department of Sociology with his thesis titled "Urban Regeneration Examples in the World: A Comparative Case Study with Fuzzy Set Ideal Type Analysis". He works in the fields of environmental sociology, climate change and sociology of disaster. He works as a lecturer at Bartın University, Faculty of Letters, Department of Sociology.*

**E-posta:** alkanustun@gmail.com