THE BANKS ASSOCIATION OF TÜRKİYE

Green Transition and Carbon Border Adjustment Mechanism Assessment Report

Executive Summary

TSKB

escarus
TSKB Sustainability Consultancy

EXECUTIVE SUMMARY

Standing out as one of the biggest environmental and economic threats of today's world, anthropogenic climate change causes various problems, some of which are predictable and some are not, and these problems require all sectors to change their business models. From this point of view, all nations and companies continue to take concrete steps.

Defined as making all processes for products and services cleaner and more environmentally friendly, green transformation is a concept that calls for aligning the global economy with sustainability, environmental management principles and inclusiveness. Green transformation can only be realized if economic growth and social welfare are reshaped in a way that stays within the natural limits of the planet. With the fight against climate change at its core, green transformation aims to reduce greenhouse gas emissions, combat pollution and protect natural habitats by boosting energy and resource efficiency, phasing out fossil fuels and adopting sustainable production practices. This multidimensional and comprehensive shift aims to change the socio-technological structure of the way people live and work, encouraging innovation in all areas of society. The successful implementation of green transformation strategies requires comprehensive governance frameworks, innovative policies and the active participation of all segments of society.

Following the United Nations Framework Convention on Climate Change (UNFCCC), a global call to action inviting countries to reduce greenhouse gas emissions and develop strategies for adaptation to the climate change, concrete steps towards green transformation are taken and the ensuing efforts have increased over the years. Recognized as one of the key drivers of green transformation, the **Paris Agreement**, which was signed in **2015** at COP21, entered into force a year later and was ratified by 197 signatory countries, has established the framework of movement to combat the climate change for the post-2020 period and inspired the international and collective effort towards a green future. Considered as an important milestone in the acceptance of the concept of green transformation, the Paris Agreement is also based on the UNFCCC. Setting the framework for the post-2020 movement to tackle climate change and aiming to keep the global temperature rise below 2°C compared to pre-industrial times and, if possible, limit it to 1.5°C, the Agreement inspires international and collective efforts towards a green future.

The concept of green transformation was recognized at the level of governments and societies with the European Green Deal (EGD) launched in 2019. Also known as the European Union's (EU) green transformation strategy, the EGD is a critical corpus that translates climate and environmental challenges into opportunities across all policy areas and sets out the EU's roadmap for green transformation. Representing a strategic stage in the green transformation, the EGD sets an example not only for the EU but also for other nations and regions that need to take steps in this direction. The EGD aims to transform the EU into a carbon neutral continent by 2050 and a fair and prosperous society with a modern and competitive economy largely independent of resource use.

The first example of an emissions trading system (ETS), one of the carbon pricing mechanisms that facilitates emission reductions while directly contributing to economic efficiency, is the EU ETS, which became operational in 2005 and builds upon the principle of "cap-and-trade". Within the framework of climate change targets strengthened after the EGD, important steps are being taken and additional regulations are being implemented for green transformation, such as expanding the EU ETS, strengthening energy efficiency, increasing the use of renewable energy and preventing carbon leakage. One of the most prominent among these regulations has been **the Carbon Border Adjustment Mechanism** (CBAM), which closely concerns the private sector and EU importers. CBAM was developed to reduce emissions from products imported into the EU and to prevent competitive disadvantages against countries with less stringent environmental regulations and seeks the following objectives.

- Promoting equal opportunities between the EU and its trading partners,
- Preventing carbon leakage by preventing companies from relocating to countries with less stringent environmental regulations,
- Protecting EU companies investing in green technologies,
- Encouraging increased climate ambition in other countries,
- Encouraging the implementation of carbon market policies in non-EU countries (to keep revenues within the producer countries),
- Generating revenue that can be used to support climate policies in the EU or other countries,
- Designing a structure to replace free allowances under the EU ETS.

Designed as a system to complement the EU ETS, CBAM will require producers to reduce their emission intensity, boost investments in energy efficiency and renewable energy, and ultimately become part of the green transformation process to stay ahead of the competition. CBAM is also a critical development that could affect the foreign trade balance of countries like Türkiye, whose economy is based on the export of product groups that require high amounts of energy in their manufacturing processes and generate high carbon emissions from raw materials. This brings about risks such as increased costs and reduced competitiveness of Turkish origin products exported to countries/regions where mechanisms similar to CBAM are in place, particularly the EU. To manage its foreign trade with the EU in a sustainable manner, it is very important for Türkiye to establish its own domestic legislation by strictly following CBAM and other related regulations, and to set its climate policies for transition to a green economy and reducing its emissions in line with CBAM. Turkish companies need to review their business processes and draw up decarbonization roadmaps, including the targets they can achieve in the short term. Emission mitigation measures for the sectors covered by CBAM are briefly summarized as follows. Details of sectoral analyses and emission mitigation options are presented in Chapter 5.

Steel Industry:

- Reduction technologies for coke production (coke dry quenching, coal moisture control, super coke oven, high pressure ammonia liquor aspiration system, hydrogen production, etc.)
- Reduction technologies for coke production (separation of raw materials in pellets, granulation enhancing equipment, biomass, heat recovery, high efficiency (COG) multi-slit burner firing furnace, waste gas treatment, exhaust gas treatment, etc.).
- Reduction technologies for peak production in blast oxygen furnaces (turbine with overpressure recovery, improved blast oxygen furnace charge distribution, PCI system, fuel injection, heat recovery, biochar utilization, etc.).
- Reduction technologies for the DRI process (direct reduction processes MIDREX®, FASTMET®, Aumelt Ausiron®, HIsmelt®, CCF, DIOS and COREX, FINEX, HyREX processes, Tmk3 iron production process, etc.).
- Reduction technologies for BOFs (use of exhaust gas as fuel, heat recovery from BOF exhaust gas, automation studies, BOF bottom mixing, HBI/DRI consumption, etc.)
- Reduction technologies for EAF (high temperature continuous scrap preheating EAF, medium temperature batch scrap preheating EAF, high efficiency oxy-fuel burner/lances, EBT, slag optimization, bottom gas injection mixing, polymer injection technology, heat recovery, low NOx regenerative burner system for ladle preheating, etc.).
- Reduction technologies for the casting process (castrip technology, thin slab casting - near-net shape casting etc.)
- Reduction technologies for rolling annealing furnaces (process control, low NOx regenerative burner system, high temperature recuperators, fiber block for insulation, oxygen enrichment, etc.)
- Reduction technologies for rolling and finishing (casting and rolling mill integration, hot charging, etc.)
- Other technologies (use of drives for inverter (VVF) electric motors, energy monitoring and management systems, cogeneration, compressed air distribution pressure optimization management, power recovery with steam turbine installation in steam pressure reduction line, etc.).
- CC-CCUS technologies
- Hydrogen-based DRI technology

Cement industry:

- Transition to alternative fuel sources (ensuring process conditions suitable for waste incineration, use of WDF, waste crushing and waste to fuel plants for biomass and ELT, MBT plants, domestic WDF production, sludge drying plants, etc.).
- Use of alternative raw materials, taking into account the requirements of industrial symbiosis
- Reducing the clinker ratio to be used in cement
- Production of alternative products to clinker, including calcined clay
- Increasing energy efficiency in auxiliary facilities and in all production processes, including raw meal grinding mills, kilns, crushers and cooling systems
- Transition to emerging technologies
- CCUS technologies
- Electrification and hydrogen use

Aluminum industry:

- Energy efficiency practices in melting furnaces (burner selection and positioning, control of air/fuel ratio, control of furnace internal pressure and prevention of air leaks, utilization of waste heat, process control systems, etc.)
- Improving energy efficiency in alumina production and developing technologies for the use of improved raw materials and processes
- Switching to electric boilers, hydrogen boilers and solar-powered boilers in milling processes in primary aluminum production
- Development of hydrogen and electric calciners
- Integrating CCUS technologies into conventional carbon anodes or using inert anodes for melting
- Switching to different furnace types in secondary aluminum processes
- Development and integration of innovative processes in aluminum production
- Scrap sorting, efficiency increase in secondary aluminum production
- Energy efficiency in semi-finished product processing
- Increased productivity in aluminum piece casting
- Optimization, energy input, efficiency and waste management

Electricity generation:

- Renewable energy
- Digitalization
- Energy storage
- Electrification

Fertilizer industry:

- Combination of optimized oxidation reactor with highly efficient primary catalysts (primary technologies)
- Adding a second catalyst to the design in addition to the primary catalysts (secondary technologies)
- Installation of a separate reactor enabling the treatment of residual gas before it leaves the production process (tertiary technologies)
- Use of alternative raw materials and fuels
- Green ammonia production
- Meeting the heat energy demand in certain units and equipment with heat pump/electrification technology instead of natural gas
- Increasing fertilizer use efficiency and increasing the use of organic and organomineral fertilizers
- Energy efficiency, renewable energy and electrification

One of the issues that should not be disregarded in green transformation and CBAM is the place and importance of SMEs in the value chain. Considering the reporting obligations imposed by CBAM currently focusing on a limited number of sectors and companies, and emission reduction efforts under green transformation, SMEs, which have an important place in the value chain, are also exposed to indirect impacts. Therefore, it is desirable to integrate into processes the SMEs that are in close supply relations with emission-intensive sectors, especially CBAM sectors, or export products and to expand awareness and capacity building efforts to SMEs.

Green transformation presents many opportunities but also some challenges. In addition to the strengths and potential opportunities, the challenges and risks that institutions and organizations in the CBAM sectors may face in implementing the ETS and CBAM are summarized below.

Risks and Opportunities Associated with Climate Change, ETS and CBAM in the Steel Sector	
Weaknesses/Threats/Risks	**Strengths/Opportunities**
• Room for improvement for engineering-technology companies in terms of quantity and quality. • Lack of education and research on modern production technologies in universities, increasing need for industry-university collaborations. • The need for increasing the production of high value-added steel products. • Rising energy costs caused by foreign sources. • High dependence on foreign sources for raw materials (iron ore, scrap, ferroalloys, etc.). • Need for increasing main inputs for domestic scrap resources (ship dismantling (breaking) and press and shredding facilities) • Large number of producers, inability to grow through mergers and acquisitions. • High logistics costs for facilities that are not located by the sea. • Inadequacy of railway infrastructure. • The imperative for SMEs to grow. • Concentration of production in the automotive and construction sectors. • Unfavorable foreign demand conditions due to additional taxes and quotas. • High inflation, instability in exchange rates, need for more financing. • Risk of not attracting foreign investors. • Provision of multilateral state support to the producers of competitor countries.	• Logistical and strategic advantages of the country's geographical location, proximity to Europe. • Existence of a wide foreign market. • Strong presence of construction and manufacturing industries. • Increasing tendency of steel density in constructions through earthquake awareness, transformation projects. • The rapid expansion of steel structures and the use of structural steel in Türkiye. • New facilities with high competitiveness adopting modern technology and the predominance of EAF-based production in total production. • World-class, branded production capability. • High number of facilities holding quality system certification, willingness for- and knowledge about export. • Strength and experience to survive in times of economic crisis. • The steel sector to become a fully private sector. • Young population structure and manpower that can be trained. • Low-cost labor compared to developed countries. • Tendency to become a regional automotive production base. • Existing installed capacity that can be converted into production very quickly.

Risks and Opportunities Associated with Climate Change, ETS and CBAM in the Cement Sector	
Weaknesses/Threats/Risks	**Strengths/Opportunities**
• High investment cost in transition to low emission technologies • Risk of incurring high carbon costs due to carbon pricing triggered by high carbon emissions • Lack of access to adequate financing for green transformation • Limited resources in additives and alternative raw materials used for emission reduction and lack of access to resources characterized as green raw materials • Limited availability of low-carbon fuels and biomass resources used for emission reduction and lack of access to resources characterized as green fuel • Financial and human resources risks for R&D investments in developing new products • Loss of markets and financial challenges in case of the production of higher carbon emissions than competitors • Risk of adaptation to a market that will shift to emerging products and low carbon expectation • The management risk of carbon finance due to the frequent volatility of carbon prices • High cost of facilities and investments for the conversion of captured carbon into new products due to insufficient carbon storage • Inadequacy of carbon storage space as the areas where the captured carbon will be stored are limited in Türkiye and are generally located in the Southeastern Anatolia region	• Return on investment in low emission technology • Increasing the diversity of financial assets to combat climate change (green bonds, government incentives, loans with low interest rates) • Developing new products using green raw material sources and reaching new markets with low carbon products • Manufacturing low-carbon products using green fuel sources and achieving a cost advantage over competitors • Opportunity to access new markets by developing low carbon products • Revenue growth through demand for low-carbon products • Opportunity to generate revenue through carbon trading in addition to product sales • Rapid adaptation to carbon markets and achieving financial advantage through early green transformation

Risks and Opportunities Associated with Climate Change, ETS and CBAM in the Aluminum Sector	
Weaknesses/Threats/Risks	**Strengths/Opportunities**
• Dependence on foreign resources regarding scrap in secondary aluminum production • Low level of implementation for electricity-based production/melting technologies • Lack of a national emissions trading system • Excessive number of SMEs in the Turkish aluminum sector, lack of trained personnel and competence problem • Foreign dependence in primary aluminum • Difficulty in accessing finance for adaptation efforts • Trade wars - restrictions and barriers to foreign trade • Loss of competitiveness for SMEs due to potential additional high carbon price as a result of CBAM • Transformation of facilities with old technology being more challenging than of new facilities • The need for R&D studies on alternative raw material technologies	• Ability to change the supply plan to low carbon products due to the low level of primary aluminum production • Tendency to engage in trade and production with developed economies • Direct emissions in manufacturing semi-finished products being lower than the overall EU average • Flexible transportation, supply and access opportunities due to its geopolitical location • A strengthening recycling sector, increasing capacity and competence • Familiarity with the EU legislation and intensive training support on CBAM • High installed capacity and new investments

Risks and Opportunities Associated with Climate Change, ETS and CBAM in the Electricity Sector	
Weaknesses/Threats/Risks	**Strengths/Opportunities**
• Financing need for the green transformation of electricity generation • Dependence on foreign machinery and equipment used in renewable power plants and distributed systems • Fossil fuel power plants in the existing power plant portfolio remaining in operation for a relatively long period of time, which will have an upward impact on the Turkish grid emission factor • Obligation for the sectors covered by CBAM to report their emissions from electricity consumption • Increase in electricity demand as a result of population growth and developing industry	• Türkiye's low level of electricity exports to the EU • Türkiye’s high potential for renewable energy resources • Developments in legislation and regulations over the years and efforts for harmonization with the EU legislation • Increase in the share of renewable resources in the existing installed capacity • The direct impact of Türkiye's renewable energy and energy efficiency targets on combating climate change and reducing greenhouse gas emissions • Low operating expenses of renewable power plants • Knowledge and experience in the sector

Risks and Opportunities Associated with Climate Change, ETS and CBAM in the Fertilizer Sector	
Weaknesses/Threats/Risks	**Strengths/Opportunities**
• High dependence on foreign resources regarding critical inputs/raw materials such as ammonia and natural gas • Negative impacts of the rise in raw material prices on the capacity utilization of fertilizer production facilities in Türkiye • Existing facilities being mostly old and not very efficient • Competitive disadvantage in the international market against major natural gas exporters and fertilizer producing countries • Periodic restrictions on fertilizer exports • Slow progress of investments in emerging technologies • International competition • Decrease in agricultural land • Fluctuations regarding exchange rates and international commodity prices • Developments expected in national/international legislation on climate/environmental issues • Requests of clients for emission values	• Geographical proximity to raw materials and markets • Robust financial, technical and institutional infrastructure of fertilizer producers • Competent human resources capacity • Close monitoring of market trends and ability to adapt quickly • Increasing demand for fertilizer in Türkiye and other countries • Reduced costs for renewable energy investments • Access to organic raw material sources • Developments in low-carbon technologies • Increased finance/incentive opportunities for green transformation

Potential additional activities in the CBAM sectors to reduce emissions and comply with the EGD also include innovation-enhancing, digital transformation and supply chain management projects. Details of potential efforts for green transformation and compliance with the EGD in the CBAM sectors are outlined in Chapter 6.

Green transformation does not necessarily mean CBAM only. Yet, this transformation requires the implementation of concepts such as circular economy, effective waste management, energy efficiency, renewable energy, inclusive and sustainable value chain management and consumer-

oriented green practices. From this perspective, this report also discusses in detail various thematic reflections of the green transformation.

As transition to environmentally sustainable economic models becomes imperative to mitigate the negative impacts of the climate crisis and accelerate the green transformation, the financial sector has a key role to play as both a catalyst and supporter of green transformation. Indeed, looking at the likely investment needs for green transformation, especially in the CBAM sectors, it can be considered that these sectors will require a considerable amount of financing.

In brief, this report aims to offer guidance to companies by encompassing the conceptual framework of green transformation, the outline of the EGD and the relevant regulations, CBAM as a carbon and trading instrument, the importance of CBAM for Türkiye and its potential for sectoral expansion, the thematic reflections of green transformation, production-trade balances/trends in the sectors covered by CBAM, the general outlook of emissions and mitigation options. Mainly covering in-depth assessments of the CBAM sectors, the report also outlines various tips for the sectors that are not covered by CBAM, but are likely to be affected by other regulations within the EGD corpus, and general implementation steps with a focus on green transformation. The report also addresses investment needs for transition to low-carbon production, offering a general framework on green transformation steps for all relevant stakeholders.