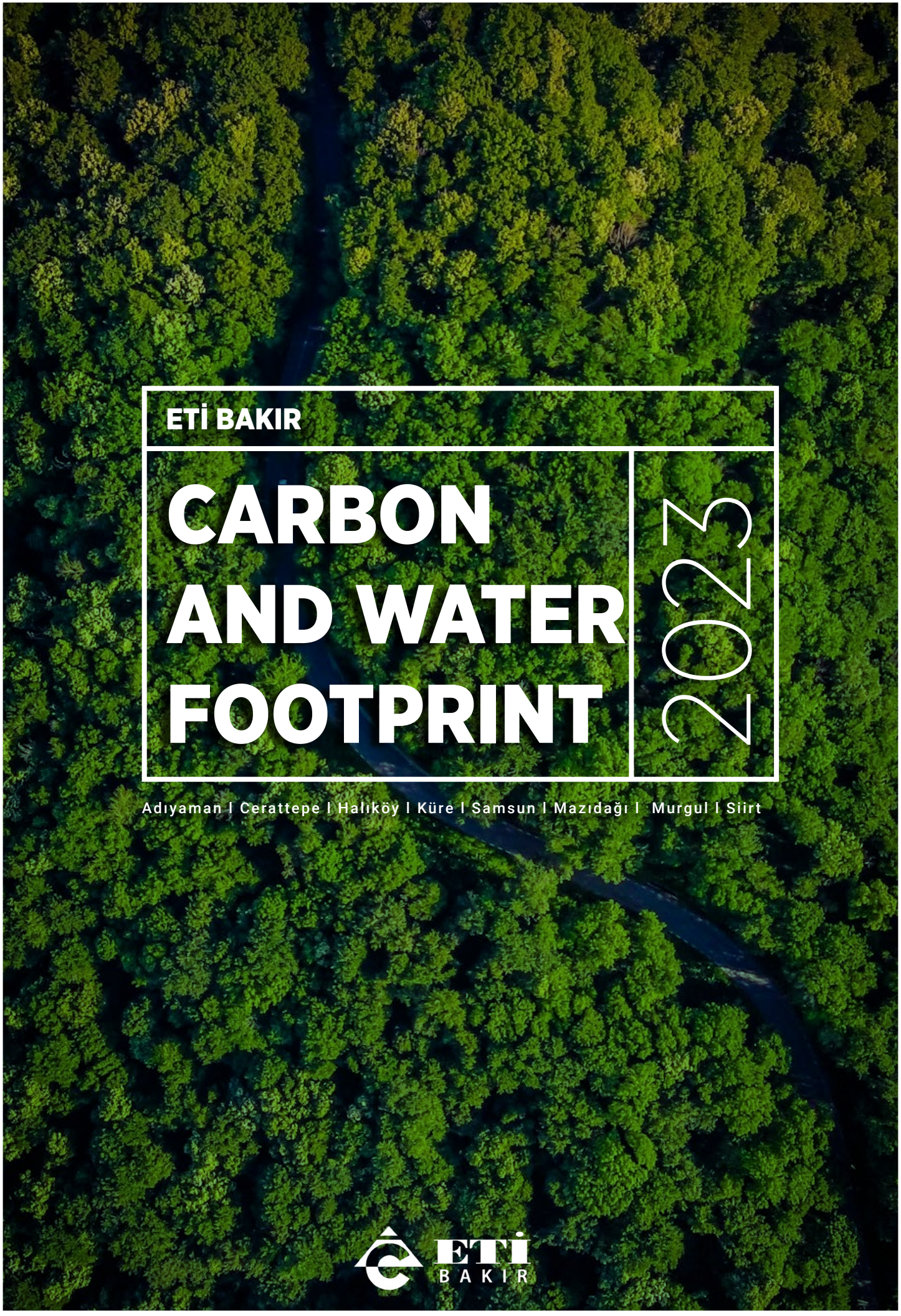

ETİ BAKIR

CARBON AND WATER FOOTPRINT 2023

Adıyaman I Cerattepe I Halıköy I Küre I Samsun I Mazıdağı I Murgul I Siirt

ETİ BAKIR

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GRAPHS

1. About the report

Electricity savings
587.2
MWh

Number of trees planted
217,739
pcs.

Greenhouse gas emissions
261,756
tons CO_2

The United Nations' Sustainable Development Goals to ensure the common welfare of humanity by 2030 represent a goal for Eti Bakır as well. In addition to making a major contribution to the Turkish economy with its productions, Eti Bakır adopts a holistic approach to analyze risks and opportunities as part of environmental, social and corporate governance. Focusing on developing responsible policies in line with the global and national impacts of the climate crisis and changing preferences, Eti Bakır prioritizes sustainable investments that generate continuous value.

In this second report, Eti Bakır's carbon and water footprints are measured and compared with the previous year to see the change. The aim of this report is to provide a comprehensive analysis of Eti Bakır's 2023 carbon and water footprints as a company producing cathode copper from ore.

According to calculations, Eti Bakır cut its greenhouse gas emissions down to 261,756 tons of CO2, marking a 55% drop compared to the previous year, and halved its water footprint, using 26.5 m3 of water per 1 ton of copper produced in 2023. Eti Bakır reduced its production capacity at Murgul plant for operational reasons and shifted the plant's production method from open pit mining to underground mining.

The company decommissioned the Lahanos Plant in 2023, again for operational reasons, and saved water by increasing the amount of recycled water used in production.

In 2023, Eti Bakır saved 1,051 liters of oil, 587,220 kWh of electricity, 388 m² of storage space and reduced its greenhouse gas emission by 14,603 kg. The company planted 217,739 new trees at 8 affiliated enterprises in 2023, reaching 2,177,379 trees, thus increasing its CO_2 sink capacity to 87,504 tons.

Prioritizing environmental safety in all mining operations, Eti Bakır manages its waste storage facilities with strict adherence to national and international criteria at all stages from construction to rehabilitation.

All data compiled in this report has been prepared with integrity, consistency, transparency and accuracy and in line with the World Resources Institute's Greenhouse Gas Protocol. Eti Bakır strives to set a role model in mining, surpassing the benchmarks both nationally and internationally.

2. About Eti Bakır

Samsun Smelter & Electrolysis Plant produced 85,392 tons of cathode copper in 2023 by processing copper concentrate obtained from copper mines. Türkiye's annual copper consumption averages 450,000 tons, 20% of which is produced by Eti Bakır.

Eti Bakır, the only integrated company in Türkiye that produces copper from ore to end product, produced 85,392 tons of cathode copper in 2023, meeting about 20% of the country's need. Eti Bakır contributes USD 750M to closing the country's current account deficit every year.

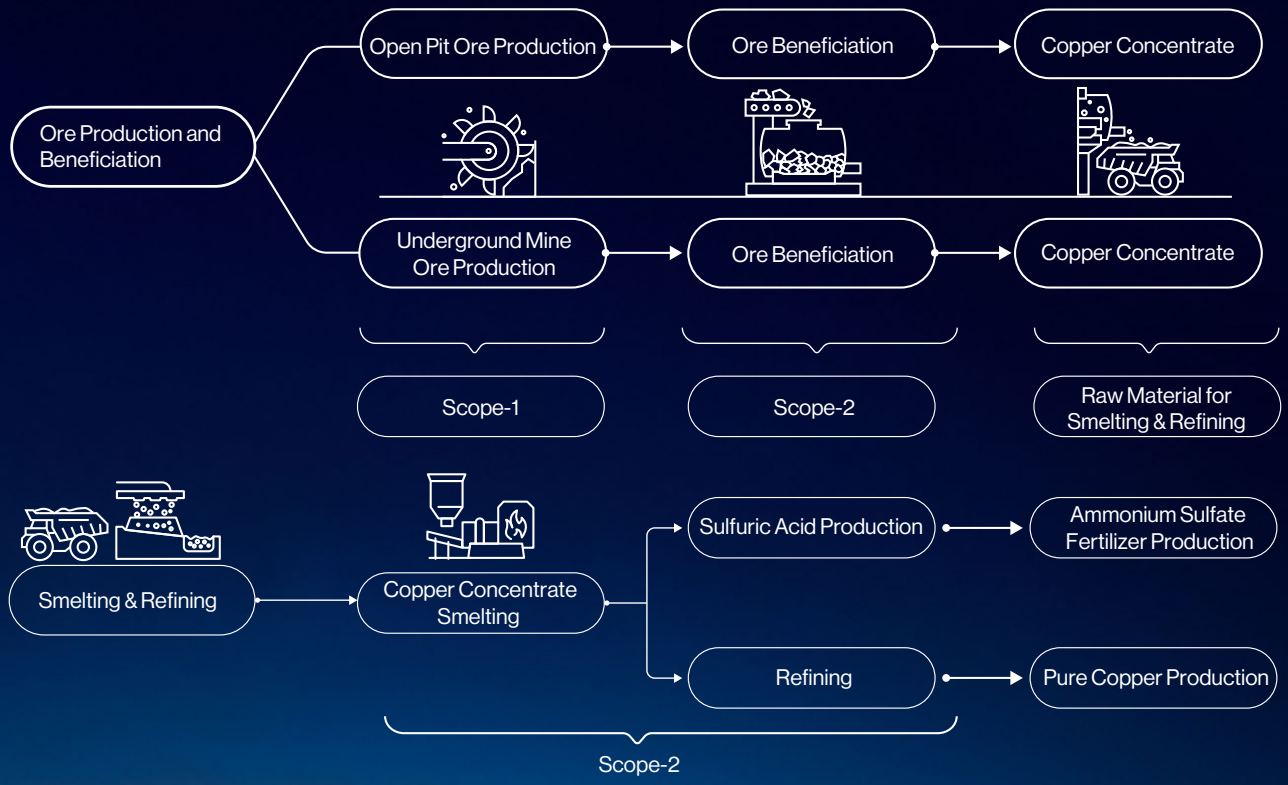
Five of Eti Bakır's eight mining plants within the provincial borders of Kastamonu, Artvin (two plants), Siirt and Adıyaman extract copper ore through underground or open pit mining. The ore obtained is first processed into copper concentrate and then beneficiated in the Samsun Smelter & Electrolysis Plant to produce 99.99% purity cathode copper.

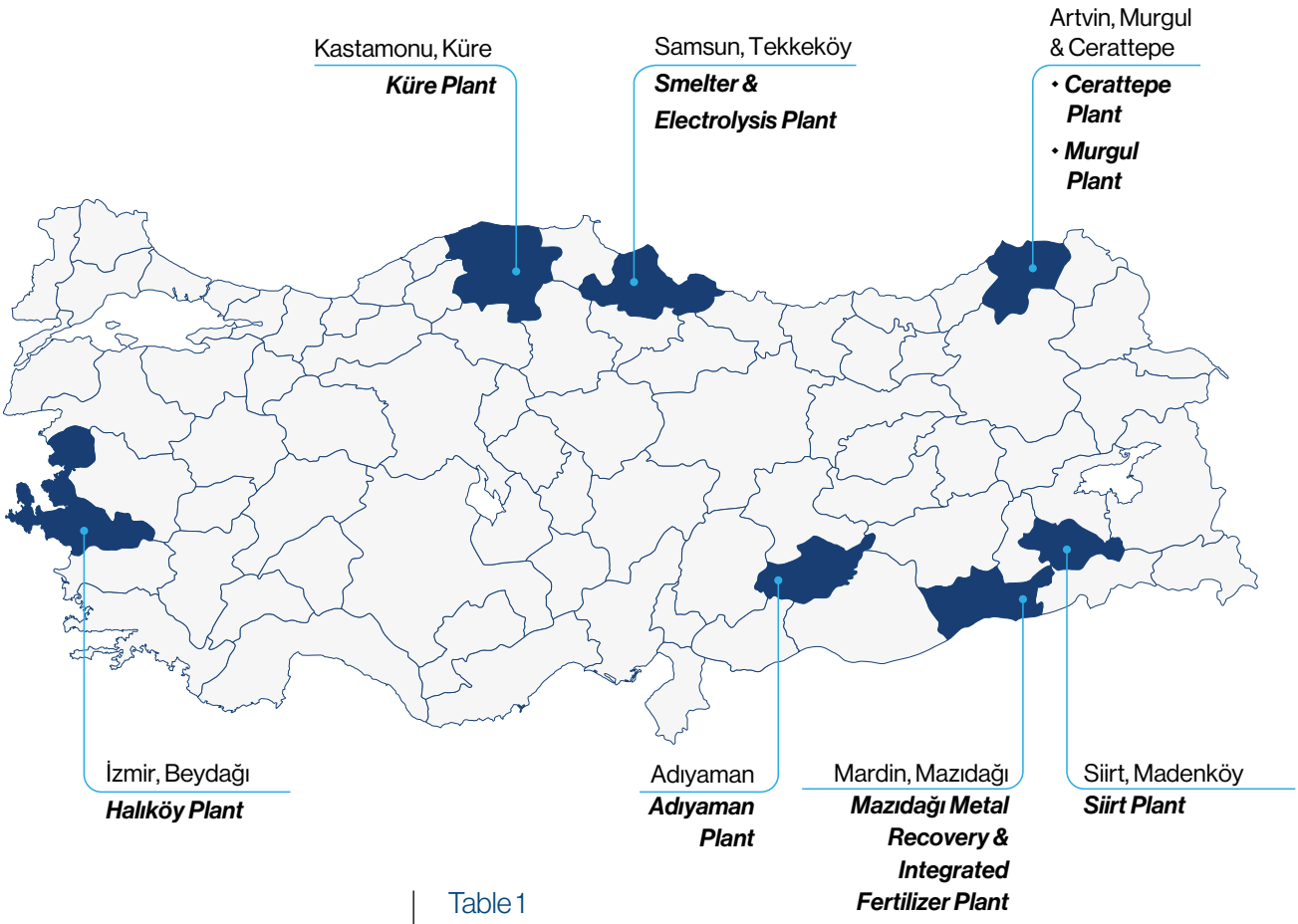
Ammonium sulfate fertilizer is also produced in this plant. In addition to these, the company has a plant in Izmir that produces antimony ore from an underground mine and another one in Mardin that recovers metals and produces DAP fertilizer from phosphate rock extracted through open pit mining.

All of the company's copper mines have basic processing equipment (crushing and screening, grinding, flotation and filtration) to produce run-of-mine ore. The copper concentrate obtained therefrom is transferred to Samsun Smelter & Electrolysis Plant.

Graph 1

Production Flow Chart





Number of Plants
8

Out-of-Mine Copper
5.9 million tons

Out-of-Mine Antimony
13,935 tons

Out-of-Mine Phosphate
1.3 million tons

Table 1

Our Plants

Location	Product Processed	Product Obtained
Kastamonu Küre	Out-of-mine copper	Copper concentrate Pyrite concentrate
Artvin Cerattepe	Out-of-mine copper	Out-of-mine copper
Artvin Murgul	Out-of-mine copper	Copper concentrate Pyrite concentrate
Siirt	Out-of-mine copper	Copper concentrate
Adıyaman	Out-of-mine copper	Copper concentrate
Samsun	Sulfuric acid (98%) Ammonia (anhydrous) Copper concentrate Silica sand	Cathode copper (99.99%) Precious metal precipitate (Anode sludge) Sulfuric acid (98%) Ammonium sulfate Oxygen (gas) Oxygen (liquid) Nitrogen (gas) Nitrogen (liquid) Argon (liquid)
İzmir Halıköy	Raw antimony ore	Antimony concentrate
Mardin Mazıdağı	Phosphate concentrate Pyrite - DAP Fertilizer	Cathode copper Cobalt carbonate Zinc carbonate Iron Cake

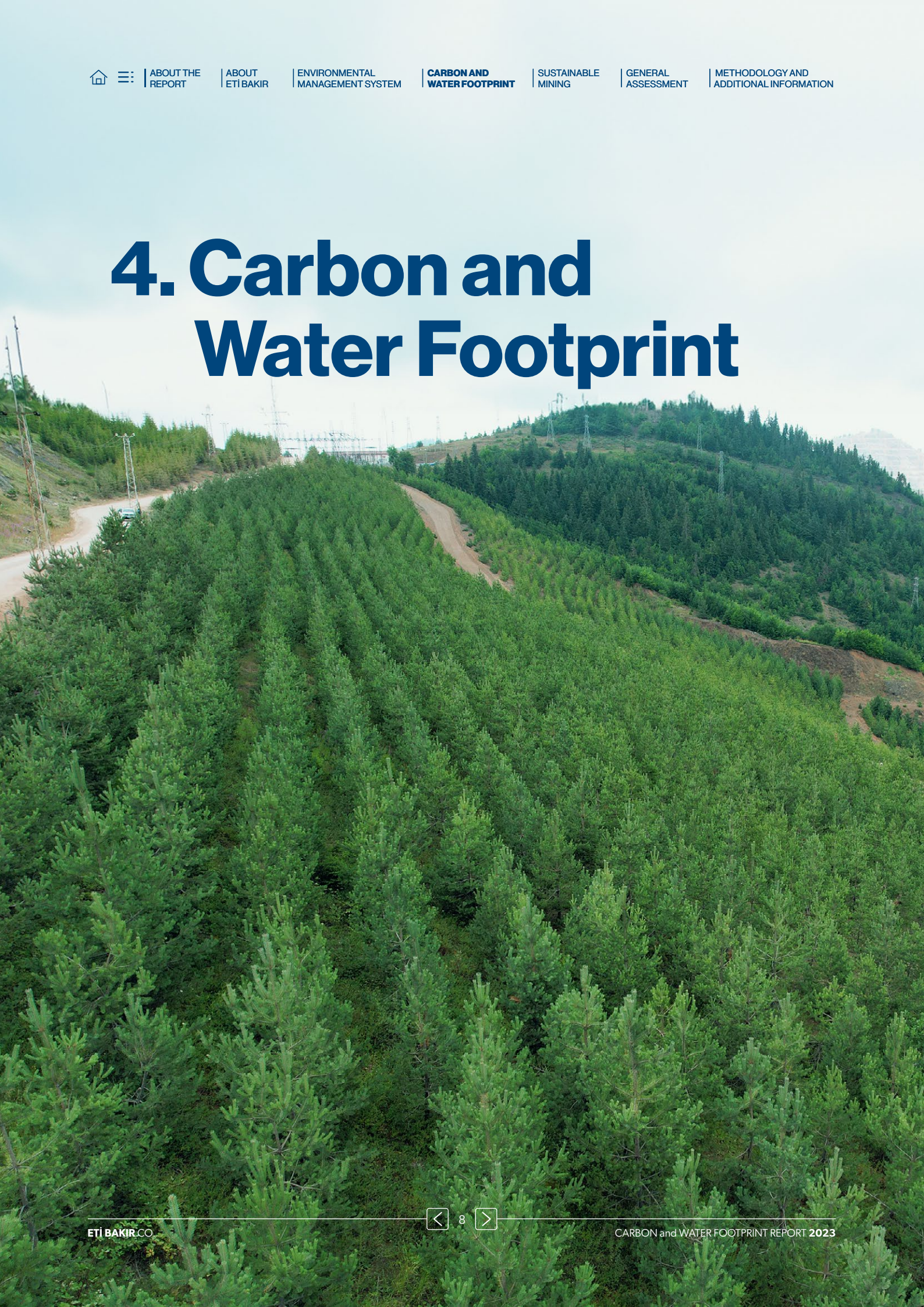
The United Nations Global Compact and Sustainable Development Goals constitute the framework of Eti Bakır's environmental management system.

The environmental management systems at Eti Bakır and its 8 plants are built on national and international environmental legislation, standards and initiatives. All Eti Bakır plants are dedicated to continuously improve their environmental policies.

Always focused on controlling and reducing energy and water consumption, Eti Bakır prioritizes waste prevention, waste reduction and recycling in all processes as defined in national regulations. This policy is best manifested in pyrite concentrate, a byproduct generated at Küre Plant that is processed as a raw material at Mazıdağı Metal Recovery and Integrated Fertilizer Plant to recover precious metals such as cobalt, copper and nickel. This recovery has made Eti Bakır the only cobalt producer in Türkiye.

The first of Eti Bakır's solar power plant investments, which started construction in 2023 to meet the electricity need for production from renewable sources, is slated to start power generation in 2024. Eti Bakır always shows utmost care to maintaining biodiversity in the areas where it operates, and strives to protect and develop ecosystems, endangered species and endemic plants. The environmental impacts of every new investment are assessed as early as the project design stage, keeping environmental protection and risk management on the agenda at all times. Implementing a Zero Waste Management System in all of its plants, Eti Bakır has secured the efficient use of resources by decision of the Board of Directors.

4. Carbon and Water Footprint



4.1. CARBON FOOTPRINT

Scope-1 Total Emission

58,734 tons

Scope-2 Total Emission

203,023 tons

Greenhouse gas emissions arising from the activities of the plants were calculated in accordance with TS ISO EN 14064 requirements, split into two groups, i.e., "Scope-1, Direct Greenhouse Gas Emissions" that are associated with fossil fuels consumed to meet the plants' needs for energy, heat and/or steam and "Scope-2, Indirect Greenhouse Gas Emissions" associated with the purchase/outsourcing of electricity, heat and/or steam.

"Scope-3, All Other Indirect Greenhouse Gas Emissions" were excluded from the assessment.

Greenhouse gas emissions arising from fossil fuels consumed to meet the energy needs at Eti Bakır plants such as diesel fuel, natural gas, LNG and coal were calculated in Scope-1, and the indirect emissions responsible for the consumption of outsourced electricity in Scope-2.

Scope-1 emissions of all Eti Bakır plants amounted to 58,734 tons in 2023. In the same year, Scope-2 emissions were 203,023 tons.

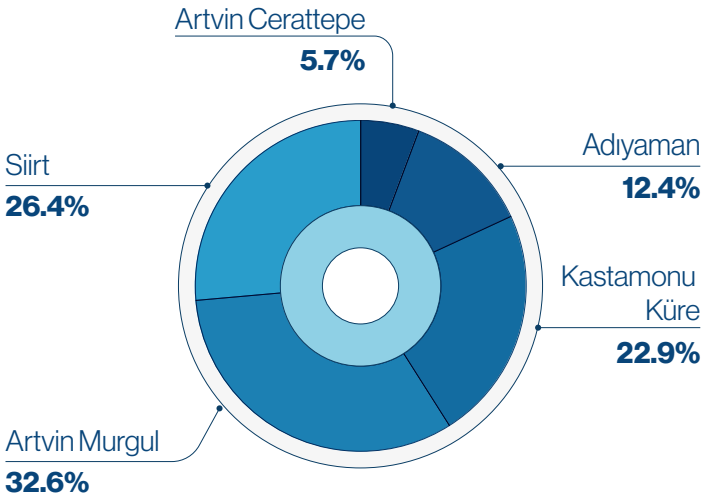
Table 2

Scope-1 and Scope-2 Emissions from Diesel, Natural Gas and Electricity Use in Eti Bakır Plants (ton/CO_2)

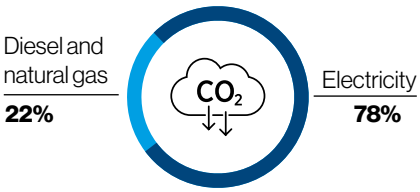
	SCOPE-1			SCOPE-2	SCOPE 1+2
Plant	**Diesel**	**Natural Gas**	**Total**	**Electricity**	**TOTAL**
İzmir Halıköy	189	-	189	1,065	1,443
Kastamonu Küre	7,631	451	8,082	41,719	57,883
Samsun Smelter & Electrolysis	1,908	19,125	21,033	81,356	123,422
Artvin Murgul	12,210	-	12,210	35,123	59,543
Artvin Cerattepe	2,144	-	2,144	978	5,266
Adıyaman	4,358	-	4,358	15,513	24,229
Siirt Madenköy	9,369	-	9,369	27,269	46,007
Mazıdağı Metal Recovery & Integrated Fertilizer Plant	4,188	104,209	108,397	123,847	340,640
Total	**41,997**	**123,785**	**165,782**	**326,870**	**658,433**

Graph 3

Scope-1 Emissions from Copper Ore Producing Plants



Distribution of Eti Bakır's CO_2 emissions



Eti Bakır's total emissions from copper production is 261,756 tons, of which 22% stems from diesel and natural gas (Scope-1) and 78% stems from electricity use (Scope-2). The amount of cathode copper (99.99% purity) produced in 2023 is 85,312 tons.

The carbon dioxide emission per kilogram of cathode copper before emission sinks is 3.62 kilograms, dropping to 3.16 kilograms after the carbon dioxide is absorbed at the emission sinks. This includes all production processes of mining beneficiation and refining.

This ratio is below the averages of international companies operating in a similar sector. The sources of energy used at Eti Bakır plants are mainly diesel fuel and electricity, along with coal and LNG used to heat the social facilities and offices at the plants. Total consumption in 2023 was 11,866 tons of diesel, 463,933,651 kWh of electricity, 9,138,710 cubic meters of natural gas, 162.5 tons of LNG and 425 tons of coal.

Table 3

Mining Plant Diesel and Electricity Consumptions

(ton/kWh)

Plant	Diesel Cons. (tons)	Electricity Cons. (kWh)
İzmir Halıköy	59	2,434,284
Kastamonu Küre	2,395	95,332,723
Samsun Smelter & Electrolysis Plant	599	185,909,388
Artvin Murgul	3,832	80,260,781
Artvin Cerattepe	673	2,235,328
Adıyaman	1,368	35,448,380
Siirt	2,940	62,312,767
Total	**11,866**	**463,933,651**

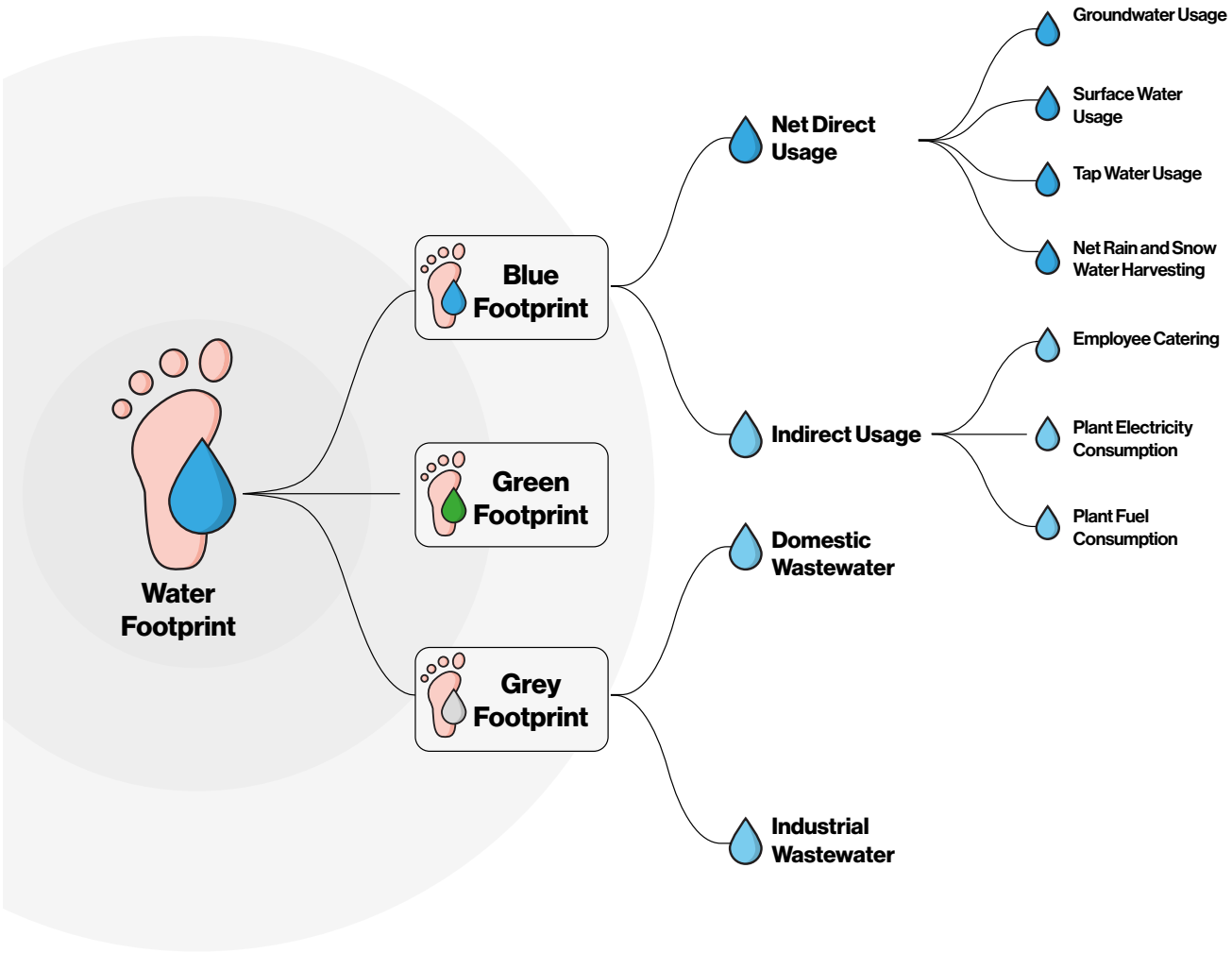
4.2.WATER FOOTPRINT

water footprint network

The Water Footprint Network Method (Hoekstra et al. 2011) was used to calculate Eti Bakır's water footprint. In the mining sector, blue and gray water footprints are included in the water footprint calculation, whereas the green water footprint is excluded.

Graph 4

Eti Bakır Plants' Water Footprint



Cathode copper production at Eti Bakır plants involves water consumption in all production processes from ore to final product, incl. ore production, flotation, beneficiation and reaching 99.99% purity at Samsun smelter and electrolysis plant. Therefore, the main goal is to reuse water.

Significant progress was made towards this goal in 2023. The reuse of process water collected in waste storage facilities was increased. Water usage at maximum efficiency results in a water footprint at different rates at each Eti Bakır plant. The factors underlying this difference include climate, ore structure, ore grade, and production method.

Artvin Cerattepe Plant only produces ore and therefore has a quite low water consumption. Artvin Murgul Plant uses the open pit method. The average water footprint value of the three plants in Adıyaman, Kastamonu and Siirt, which are the main ore sources of Eti Bakır, is 40.9.

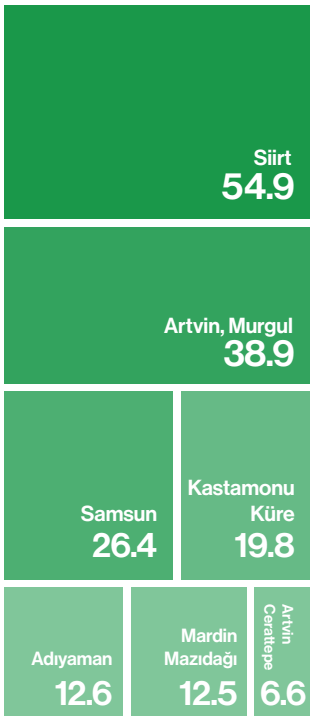
Table 4

Eti Bakır Plants' Water Footprints (m^3 water/ton)

Plant	Blue Footprint	Grey Footprint	Total Water Footprint
Adıyaman	3.75	8.96	12.71
Artvin Cerattepe	0.85	5.80	6.65
Artvin Murgul	38.79	-	38.79
Kastamonu Küre	16.69	3.07	19.76
Samsun Smelter & Electrolysis	16.62	9.82	26.44
Siirt Madenköy	25.20	29.68	54.88
İzmir Halıköy	223	189	412
Mazıdağı Metal Recovery and Integrated Fertilizer Plant	10.91	1.54	12.45
Total	**335.81**	**247.87**	**583.68**

Graph 5

Eti Bakır Plants' Total Water Footprints (m^3 water/ton)



5. The Highlights of Sustainable Mining

5.1. ZERO WASTE MANAGEMENT

Eti Bakır, which was awarded the Zero Waste Certificate by the Turkish Ministry of Environment, Urbanization and Climate Change in 2020, has achieved significant gains in waste management in all plants.

Committed to zero waste, waste management and separation at source, Eti Bakır contributes to the Turkish economy with effective zero waste management through recovery and recycling.

The table below shows the savings obtained from recyclable materials collected at Eti Bakır plants within the scope of zero waste.

Table 5
Savings

	Oil (Barrel)	Energy Savings (kWh)	Waste Storage Space (m^3)	GHG Reduction (kg/CO_2)	Trees Saved (pcs.)	Raw Material Usage (ton)
Adıyaman	-	2,554.6	2.2	118.7	10.4	0.1
Artvin Cerattepe	26.1	9,007.4	3.9	64	36	0.7
İzmir Halıköy	10.5	7,282	4.2	203.3	14.5	0.6
Samsun Smelter & Electrolysis	25	35,761.9	83.1	2.854.2	47.1	31.5
Mazıdağı Metal Recovery & Integrated Fertilizer Plant	436	301,694	193.3	8,423.7	602	22.4
Artvin Murgul	79.3	31,562	15.2	375.4	14.5	0.5
Siirt Madenköy	13	9,016.1	4.9	251.7	15.8	1
Kastamonu Küre	462.1	190,342.9	81.5	2,312.9	110.5	-
Total	**1,052**	**587,220.9**	**388.3**	**14,603.9**	**850.8**	**56.7**

5.2. REHABILITATION WORKS

Pioneering the path to zero carbon in mining, Eti Bakır conducts important research on the environmental impact of mining practices.

Eti Bakır, the first mining company in Türkiye to engage in projects on the environmentally friendly rehabilitation of mine sites, partnered up with Artvin Çoruh University for an R&D project funded by TÜBİTAK and the Technology & Innovation Funding Programs Directorate (TEYDEB) to research special plants for use in mine site soil rehabilitation.

As part of the project, which is a first in Turkish mining, 900 birch and poplar trees were planted in the tailings area and monitored for 1.5 years. Samples of plant leaves were taken and analyzed, with trunk inspections still ongoing.

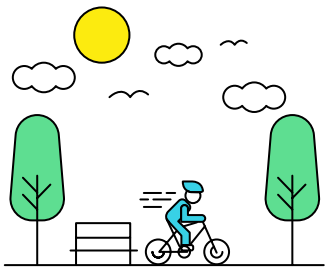
This pilot project, which is expected to make a significant contribution to the academic literature, is planned for Eti Bakır's other plants as well, with the results to be monitored and inspected in the medium and long term.

Other environmental and rehabilitation practices carried out at Eti Bakır plants in 2023:

- 27,100 saplings were planted.
- Birch saplings were grown in Murgul as part of the TEYDEB Project to support biodiversity.
- 8,240 kg of paper and cardboard were recycled, saving 136 trees.
- 28,350 kg of plastic was recycled, saving 462 barrels of oil.
- Recycling reduced CO_2 emissions by 2,312 kg, energy consumption by 190,342 kWh and storage space by 81.45 m3.
- In Siirt, wild animals were fed and saplings were planted to conserve wildlife and nature.
- Wild goats were fed in Adıyaman.
- Water resources were protected in Halıköy through treatment plant efficiency studies.
- Environmental awareness was raised in Mardin Mazıdağı through environmental trainings and a waste battery collection campaign.
- 225 students were trained as environmental inspectors, raising awareness of future generations.

These achievements demonstrate Eti Bakır's commitment to nature protection and sustainability. The company will continue to work for a cleaner future with goals such as increasing recycling rates, conducting energy efficiency studies, expanding environmental trainings and developing collaborations for wildlife conservation efforts.

5.3. KAI-ZEN



35.091 trees

Eti Bakır Mazıdağı Metal Recovery & Integrated Fertilizer Plant started Kai-Zen in 2020, which is a 'Lean Production' management system based on continuous improvement in all operational processes aimed at better response to the needs of organizations. Kai-Zen is adopted across all Eti Bakır plants.

Eti Bakır's Kai-Zen efforts focus on energy, material, machinery, equipment and labor savings, 5S studies, reducing environmental impacts, improving occupational safety measures, and enhancing employee satisfaction.

With 564 improvement works carried out in 2023:

- Greenhouse gas emissions that would take 35,091 broad-leaved trees with 20 centimeter trunk diameter to be absorbed were prevented.
- Electricity savings equivalent to the 1-year electricity consumption of 539 families of four living in Türkiye were achieved.
- Water savings equivalent to the 1-year water consumption of 57 families of four living in Türkiye were achieved.

Electricity **1,486,723** kWh

Water **15,654** m^3

Diesel **18,601** lt

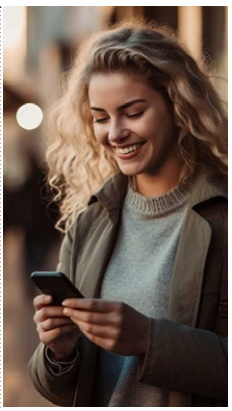
Steam **6,018** m^3

701,812 tons CO_2e

64 units wind turbine production*

Carbon emissions equivalent to **1** car traveling 2 million km*

88 units helicopter production*



76.700 units cell phone production*

International life cycle assessment databases were used for benchmarking.

5.4. EMISSION SINKS

FORESTATION

Forestation works are conducted in different periods at Eti Bakır operation sites.

Especially within the scope of the closure of mines that have come to the end of their lifespan and the rehabilitation of the area, new green areas are created by planting the most suitable trees for the relevant soil type based on research, as well as local tree species. These new stands are of great importance for sustainable environment and reforestation.

In order to sustain their biological activity, trees take carbon dioxide from the air and give oxygen through photosynthesis, while their carbon intake is accumulated in the trunk throughout their lives, which makes trees (and therefore forests) one of the most important carbon dioxide sinks for greenhouse gases.

Carbon dioxide emissions absorbed by trees vary according to the physical characteristics of the tree, such as its species, age, diameter and height.

In order to determine the amount of carbon stored in the trunk of a tree, the dry weight of the above-ground part of the tree (biomass) must first be calculated.

Calculations were made and the information on Eti Bakır plants' forestation efforts was determined accordingly. CO_2 emissions corresponding to the total carbon stored in afforested/reforested areas were calculated approximately. The tree species-specific coefficients used in emission amount calculations were obtained from a report prepared by the US Department of Agriculture (USDA) that provides measured coefficients for many tree species.

Forestation has been in the focus of Eti Bakır plants for the past 11 years. Artvin Murgul Plant, which has the largest carbon dioxide sink, has more than 70,000 trees planted about 12 years ago, and the amount of carbon these trees have sequestered in their trunks to date is approximately 37,000 tons of carbon dioxide equivalent.

The second largest sink area among Eti Bakır plants is the one in Kastamonu Küre. Approximately 27,000 tons of carbon dioxide has been captured by a stand of 450,000 mixed coniferous and broadleaf trees with an average age of 12 years. These plants are followed by Samsun, Siirt and İzmir Halıköy plants.

Newly planted trees to increase greenhouse gas sequestration

In 2023, approximately 201,000 new trees were planted at Siirt Madenköy Plant and 27,100 trees at Mardin Mazıdağı Plant. These trees are expected to boost greenhouse gas sequestration in the coming years.

In the last four years, approximately 551,000 new trees were planted at Siirt Plant and 80,600 new trees at Mardin Mazıdağı Metal Recovery & Integrated Fertilizer Plant. These trees captured 87,504 tons of CO2 in 2023.

Table 6

Number of Trees, Tree Species and Amount of Captured Carbon Dioxide Emissions by Plants

TYPE	SPECIES	QUANTITY	AGE	TRUNK Ø	CO2
İZMİR HALIKÖY					
Coniferous	Stone pine	230	49	20.5	43
	Red pine	1,766	39	20.5	331
SAMSUN					
Broadleaf	Broadleaf	30,000	28	23	14,121
ARTVİN / CERATTEPE					
Broadleaf	Acacia, Chestnut, Juniper	2,000	5	2.5	4
KASTAMONU / KÜRE					
Mixed	Black pine, Scotch pine, Acacia, Ash, Cotoneaster, Maple, Horse Chestnut	450,000	12	12	26,833
ARTVİN / MURGUL					
Broadleaf	Acacia	98,000	6	3	294
	Mixed	614,000	12	12	36,613
SİİRT					
Broadleaf	Acacia	500,000	6	5.5	6,969
	Acacia	200,000	4	4	1,273
	Miscellaneous Fruit Trees	400	3	3	1
Coniferous	Stone pine	1,250	2	2.5	3
	Thuja	300	4	3	1
	Cypress	300	4	4	2
	Pine	200,550	6	3.5	856

Total CO_2 emissions

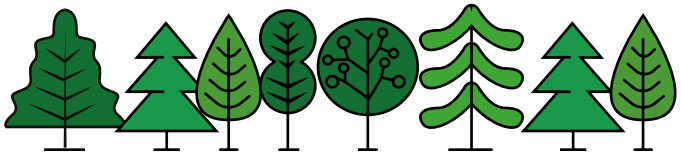
87,504

tons

Total trees

2,177,379

pcs.



TYPE	SPECIES	QUANTITY	AGE	TRUNK Ø	CO_2
MARDİN / MAZIDAĞI					
Coniferous	Pine	3,870	5	6.5	62
	Cedar	12,000	2	1.5	8
	Red pine	17,000	2	1.5	12
	Cedar species	57	6	13.5	4
	Red pine-Black pine	280	5	13.5	21
	Blue Cypress, Leyland	30	3	11	1
	Red pine, Cedar	14,800	1	1	4
Broadleaf	Pistacia terebinthus(Pistacia vera)	11,000	2	1.5	6
	Almond	3,000	3	1.5	2
	Tulip tree, Plane tree, Maple, Willow, Crepe Myrtle etc.	101	7	13.5	13
	Plane tree, Mulberry	70	4	7.5	2
	Catalpa, Cotoneaster, Chinaberry tree	50	4	9	2
	Plane tree	5	5	17	1
	Maple, Elaeagnus	5	4	15	1
	Almond saplings	2,000	2	3	6
	Almond and Pistacia terebinthus saplings	10,210	1	1	2
ADIYAMAN					
Coniferous	Pine	3,650	5	2.5	8
	Frurit trees, Lemon, Cypress	355	3	2	1

5.5. ENERGY GENERATION

Emission sink
28,709
tons

Murgul Hydroelectric Power Plant (HEPP)

Power plants generating power from renewables in industrial zones are another important sink. Murgul HEPP operated by Eti Bakır on Kabaca Stream has an installed capacity of 4.7 MW. In 2023, the plant generated 65,603,155 kWh of electricity and had an emission sink equivalent to 28,709 tons of carbon dioxide.

Emission sink
104,202
tons

Mazıdağı Thermal Power Plant

The power plant uses a natural gas-fueled gas engine to generate electricity, which is used in some processes within the plant. In 2023, the plant generated 238,113,500 kWh of electricity, sequestering 104,202 tons of carbon dioxide.

5.6. NEW INVESTMENTS

Total Installed Capacity
97
MW

New Fertilizer Plant Production Capacity
250
thousand tons

Aiming to increase the number of sinks through technology and R&D investments with a view to reducing greenhouse gas emissions, Eti Bakır continues its efforts to meet its electricity need for production from renewable sources.

Mazıdağı and Ağrı Solar Power Plant

As part of these efforts, Eti Bakır built a 52 MW solar power plant (SPP) in Mazıdağı to be commissioned in 2024. The company also started another 45 MW SPP project in Ağrı which will be completed in 2024. With this vision of renewable energy, the company will continue to invest in SPP in the coming years.

DAP Fertilizer Production Plant

Eti Bakır continues to invest in fertilizer productions on the land of Samsun Smelter & Electrolysis Plant. With this TL 1.5 billion investment, Eti Bakır aims to bring the plant's by-product, sulfuric acid, back into the economy.

The plant will have an annual DAP fertilizer production capacity of 250 thousand tons and enable the reuse of sulfuric acid, a byproduct obtained in cathode copper production, and of ammonium sulfate solution obtained from flue gas treatment. The plant is expected to reach completion in 2025.

5.7. R&D CENTER

Eti Bakır will continue its R&D activities to reduce, reuse and recover waste in all its plants with a 'Zero Waste' approach in mining

Placing advanced technology, R&D and sustainability at the center of all its activities, Eti Bakır renovated its R&D Center in Samsun to ensure most efficient use of mineral resources and produce high value-added products. The center, which started operations in its new place in 2023, adds value to the national economy by researching and developing new ways that will improve product quality, increase efficiency and incorporate zero waste production technologies.

The Center's work explores ways to improve product quality and efficiency while reducing costs and environmental impact.

Adopting a 'Zero Waste' approach in all mining activities, Eti Bakır is committed to engage in R&D activities for the reduction, reuse and recovery of waste in all its plants and has been making continued efforts to recover metals such as copper, cobalt and zinc from old and new slags.

The R&D team works with research companies in Europe, Canada and the USA, and collaborates with leading universities in Türkiye on various projects.

The R&D Center aims to make Samsun a global base for advanced technologies in mining and to improve production processes in all group companies and subsidiaries of the holding.

Recognizing the importance of private sector-university collaborations for the development of the Turkish industry, the R&D team works with research companies in Europe, the USA and Canada, and collaborates with Türkiye's leading universities on various projects. The R&D Center, which the company established with their own equity capital, offers researchers the opportunity to develop themselves and work with national and international experts.

5.8. TRAINING

At Eti Bakır A.Ş., occupational health and safety and environmental awareness training is mandatory for all employees working at the plants and is part of the recruitment process. In addition to basic training, employees are continuously trained on occupational health and safety and environmental awareness through mandatory trainings of at least six hours a year, on-the-job trainings, on-site demonstrations, refresher trainings, and mandatory / voluntary drills.

A total of 4,515 hours of training was provided to 4,716 blue-collar employees across all enterprises in 2023.

In addition to these trainings, toolbox trainings are organized periodically. The aim of the trainings provided to employees on occupational safety, use of PPE, safe working techniques, fire safety, first aid, environmental awareness, energy and water saving, waste management and recycling is to ensure that they work in a safe work environment and to continuously improve worker health, occupational safety and environmental awareness.

Total Training
4,515
hours

Table 7
Number of Employees and Training Hours

Plant	Number of employees	Training hours
Cerattepe	149	75
Halıköy	150	150
Adıyaman	448	448
Murgul	522	522
Küre	626	626
Samsun	705	705
Siirt	731	731
Mardin	1,385	1,258

5.9. ENVIRONMENTAL INSPECTORS

Number of schools
45

Number of students trained
1,500

Always focusing on people and the environment, Eti Bakır continues to raise awareness among students with the trainings it gives for a sustainable future. Within the scope of the Environmental Inspectors Project, Eti Bakır contributes to the education of children for a conscious future by providing periodic trainings to 1,500 students in 45 schools in Mazıdağı.

These trainings, which cover critical topics such as environmental sensitivity, energy efficiency, recycling and zero waste, also include a campaign on “Waste Battery Collection”.

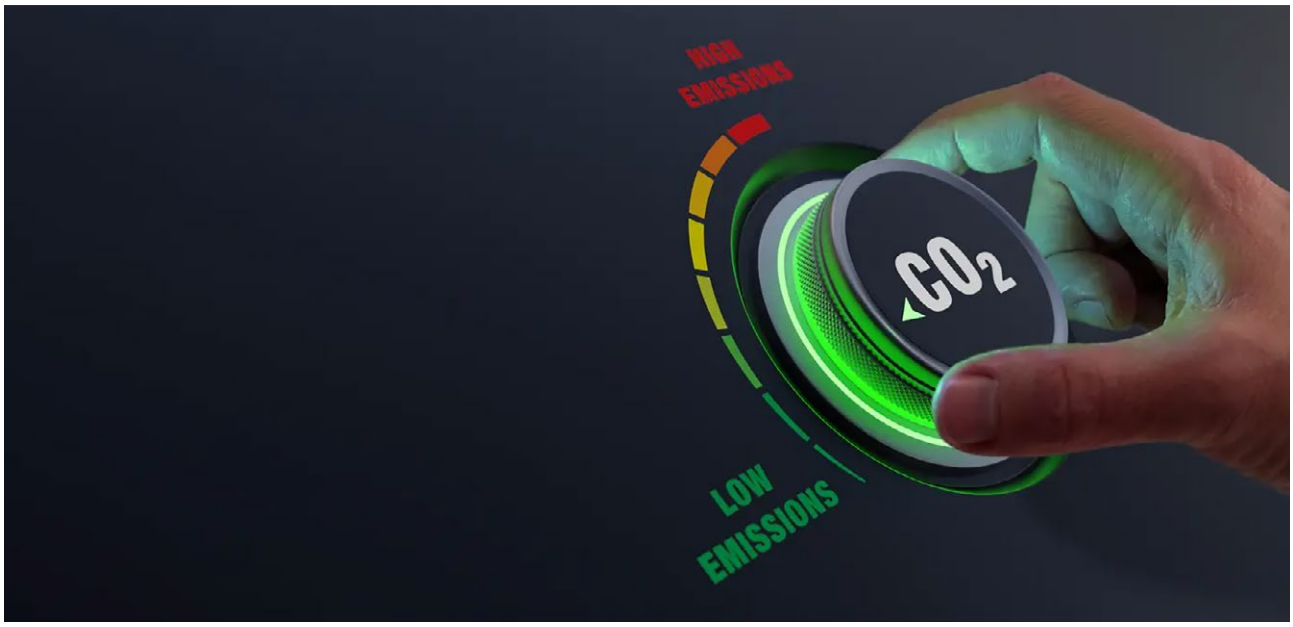
More than 25 kilograms of waste batteries were collected under the project, marking a huge success and an important step towards raising environmental awareness among the locals of the region.

The 225 “Environmental Inspectors” selected from among the students attending the trainings will participate in environmental activities, take a closer look at the functioning in practical life and continue to raise awareness among their peers.

Eti Bakır aims to reach new schools and more students every year as it continues to train environmental inspectors. With this project, both students' and society's sensitivity to the environment is increased, laying a solid foundation for a sustainable future.

Eti Bakır's commitment to sustainability and efforts to raise environmental awareness extends to all segments of society, with the goal of leaving a more livable world to future generations.

6. GENERAL ASSESSMENT AND OBJECTIVES



Year-on-year drop in greenhouse gas emissions

20% ↓

When compared with the carbon footprints reported in the literature for similar facilities in different countries, the carbon footprints calculated for Eti Bakır plants are within an acceptable range, at a level that is comparable to the world average.

Forestation and energy generation activities at some of Eti Bakır plants have enabled a further reduction of the plants' carbon footprints, making them reach values even below those of some individual enterprises in the world.

In 2023, the greenhouse gas emitted per 1 kg of copper production at Eti Bakır plants dropped to 2.60 kg, marking a 20% decrease compared to the previous year. This downward trend will continue in the near future with the contribution of solar power plants to be commissioned in Mardin and Ağrı.

7. METHODOLOGY AND ADDITIONAL INFORMATION

7.1. CARBON FOOTPRINT

Scope- 1: Greenhouse gases arising from the use of fossil fuels in production (Direct greenhouse gas emission).

Scope- 2: Greenhouse gas resulting from the use of fuels consumed for the indirect generation of power (Indirect greenhouse emission).

Carbon dioxide (CO_2) is the main greenhouse gas among the ones resulting from the combustion of fuels at the plants within the frame of Scope- 1. Although some amount of methane (CH_4) and nitrous acid (N_2O) emission occurs together with CO_2, these have a very little share in overall greenhouse gases. For example, CO_2 constitutes more than 99.99% of greenhouse gases resulting from the combustion of diesel (for diesel, emission factors are $EFCO_2$ = 74.1 t/TJ, $EFCH_4$ = 0.003 t/TJ and EFN_2O in order).

Therefore, the CH_4 and N_2O emissions have not been included in the calculations within the scope of this study since they will not change the level of total emission on basis of plants. The carbon dioxide emission has been calculated according to the following formula within the scope of the study:

CO_2 emission (t/year) = Fuel consumption (TJ/year) x Emission factor (kg CO_2/TJ)

The net calorific value (NCV) of fuel must be known so as to be able to find mass fuel consumption on thermal value basis (TJ). The NVC (TJ/Gg) and the emission factors (kg emission/TJ) used for the calculations are extracted from the methodology in Scope-2 included in the Communique on the Monitoring and Reporting of Greenhouse Gas Emissions and IPCC 2006 Manual and covering the grid electricity used by the plants.

The emission factor specific to Türkiye has been used for the calculation of these emissions and the following operational data and methodology have been applied to find this factor: The latest figures given in the website of the International Energy Agency (IEA) for greenhouse gas emissions in Türkiye are 2021 figures (https://www.iea.org/countries/turkiye). So, total CO_2 emission resulting from the generation of power in Türkiye is 141 million tonnes.

The Republic of Türkiye Energy Market Regulatory Authority (EMRA) reports the total national power generation as 334,723.1 GWh. CO_2 emission per unit power generation has been calculated as 0.421 kg CO_2/kWh by using the two figures. The latest emission factor specific to Türkiye has been used for the calculation of Scope-2 emissions.

7.2. WATER FOOTPRINT

Different approaches are adopted for the calculation of water footprint. The calculation employing ISO 14046 (ISO, 2014) Water Footprint Standard is the most common among these. ISO 14046 is an international standard defining the principles, requirements and guidelines for the assessment and reporting of water footprints. It is applied to products, methods and organisations based on the lifecyle assessments (LCA). Water Footprint Network Method (Hoekstra vd. 2011), another approach, will be used within the scope of this study since it is more commen and will be more appropriate for mining activities. The components presented on the Figure below will be taken into consideration for the calculation of water footprint. So, it is seen that controlled water rise can be achieved with:

Water footprint = Blue water footprint + Green water footprint + Grey water footprint

BLUE WATER FOOTPRINT: *The total volume of the surface water and groundwater resources, i.e. freshwater resources, required for the production of a commodity and are freshwater resources.*

GREEN WATER FOOTPRINT: *The total stormwater used for the production of a commodity. The stormwater taken into consideration for green water footprint is that stored in soil or for a certain period, above ground. This item has not been taken into consideration for the calculation of footprint at Eti Bakır plants.*

GREY WATER FOOTPRINT: *It is a pollution indicator and represents the amount of freshwater used for the avoidance or reduction of pollution load according to the current water quality standards.*

Table 8

Activity-related Virtual Water Amounts

Natural Gas (m^3/l)	9.251
Fuel oil (l/l)	30.75- 62.50
Diesel (l/l)	2.81 – 5.62
Petrol for Transportation (km/l)	0.16 – 0.33
Diesel for Transportation (km/l)	0.18 – 0.26
Electricity (MWh/l)	1,800
Food (meal/l)	4756.88
LNG (kg/l)	2.60
Coal (kg/l)	1.09

Blue water footprint calculation has two components. The first one is the actual water consumption, by which the water used for production is calculated directly. During the production, a plant may supply the water it needs from rivers or still water bodies (lake, dam, reservoir) in the vicinity of the plant as well as groundwater resources or mains, where it is close to residential areas. In addition, the plant may supply water through stormwater harvest in waste storage areas and storage areas intended for reuse within the plant. For the calculation of net stormwater harvest, the net harvest should be calculated by taking account of evaporation. The second component in blue water footprint calculation is the virtual water consumption.

Virtual water refers to the water used

for the production and processing of items and services consumed during production. That's to say, virtual water consumption is indirect use. For example, the water used for the preparation of food for staff employed in the production process is a sub-component of virtual water. The water used for the supply until the plant of the electricity consumed at the plant and the fuel consumed by machinery is another sub-component of virtual water.

For the calculation of virtual water consumption, the number of personnel employed at the plants and the annual fuel and electricity consumption have been taken into consideration and thus virtual water use has been calculated.

Rainfall:

To calculated the volume of rainfall over sedimentation tanks and waste facility:

$$V_{rainfall}\ (mL/year) = 0{,}01 \times R \times YA$$

R *: Rainfall amount measured in the reporting period (mm)*

YA *: Surface area in ha of storage facility*

Evaporation:

Evaporation is calculated using the formula on the side.

$$V_{evaporation} = 0{,}01 \times S_{evaporation} \times Pan_{evaporation} \times f$$

$S_{evaporation}$ *: is the average surface area (ha) of the surface where evaporation will be calculated.*

$Pan_{evaporation}$ *: is the value of the pan evaporation rates (2000 mm/year) measured during the reporting period. It will be extracted from the Meteorological Office data for the relevant region.*

f *: is the correction factor for pan evaporation measurements. A rate of 0.75 will be used.*

For the calculation of grey water footprint, the domestic wastewater generated by staff and the industrial wastewater resulting from the process have been evaluated separately and the necessary amount of dilution for minimising the prints of the wastewater generated by the plants in receiving bodies have been determined individually.

For the calculation of grey water footprint;

(Wastewater flow rate x Pollution concentration of discharged wastewater) – (Flow rate of raw clean water generating wastewater x Pollution concentration of raw water) gives the load of the pollution from the plant that results from production.

Water grey footprint amount has been found by dividing the calculated load by the Environmental Quality Standards (EQS) value, the permitted pollution concentration for class 1 water of Water Quality Classification as included in the Regulation on Surface Water Quality.

ETİ BAKIR

İSTANBUL
Altunizade Kısıklı Cad. No: 37
34662 Üsküdar, İstanbul / TÜRKİYE
Tel: +90 (216) 554 53 00 (Pbx)
Faks: +90 (216) 474 97 30 - 474 11 22

KASTAMONU
37900 Küre
Kastamonu / TÜRKİYE
Tel: +90 (366) 751 20 04 (Pbx)
Faks: +90 (366) 751 30 55

CONTACT
mining@etibakir.com.tr
kurumsaliletisim@cengiz.com.tr
*www.**etibakir**.com.tr*

This report has been prepared digitally only.