13.4 AIR EMISSIONS

Due to both processes and raw materials, conventional production of pig iron and steel generates various emissions such as carbon dioxide (CO_2), but also sulfur dioxide (SO_2) and nitrogen oxides (NO_x).

voestalpine fully complies with the relevant statutory thresholds. These parameters are verified and the annual loads determined by means of continuous measurements, periodic tests, and material flow analyses. State-of-the-art scrubbing facilities (end-of-pipe measures) are utilized in addition to continual process optimization (process integrated (PI) measures) to minimize any remaining emissions.

Over the last few decades, the voestalpine Group substantially lowered its emissions thanks to extensive environmental measures and innovations in process technology. Given existent steel production technologies, the residual air emissions are the minimum achievable.

13.4.1 GREENHOUSE GAS EMISSIONS

13.4.1.1 Science Based Targets

voestalpine committed to setting targets for reducing greenhouse gas (GHG) emissions in 2022, as part of the Science Based Targets Initiative (SBTi). The proposed targets for voestalpine's "Near-Term Science Based Targets" have been reviewed and validated by the SBTi and are in line with the "well-below 2°C trajectory" initiative.

voestalpine has committed to reducing its absolute Scope 1 and Scope 2 emissions by 30% by 2029 compared to the reference year of 2019. The Group has committed to a 25% reduction in Scope 3 emissions for the same period. Achievement of the 2029 target is also subject to external factors and influencing variables, such as the availability of raw materials and renewable energy as well as the economic situation.

The ambitious savings targets are another important step for voestalpine. The challenge is that the decarbonization measures required to achieve the climate protection targets must also be economically viable.

The plan is for voestalpine's climate strategy to be gradually developed towards net zero emissions and a 1.5 degree reduction trajectory. An initial step towards narrowing this gap is the ambitious target to reduce Scope 3 greenhouse gas emissions.

13.4.1.2 Scope 1 and Scope 2 reduction potentials

Investments as part of the greentec steel climate protection program and other measures in all divisions and companies of the voestalpine Group are aimed at increasing the reduction potential. It is expected that this will reduce Scope 1 and Scope 2 emissions across the Group by 30%, thereby achieving the Near-Term Science Based Targets in 2029.

An important step on the path towards achieving the science-based targets for Scope 1 and Scope 2 emissions is the initial phase of the transformation of the metallurgical processes for crude steel production at the Linz and Donawitz sites. Two coal-based blast furnaces in Linz and Donawitz will each be replaced by an electric arc furnace powered by renewable electrical energy by 2027.

Measures are also planned in the following areas: Reduction of GHG emissions in the processing and refining processes, a further increase in the energy efficiency of existing processes, the use of renewable resources and renewable energy as well as measures involving the circular economy.

Significant changes to the GHG balance resulting from disposals or acquisitions of companies from the reference year 2019 onwards are not included in the savings targets and must be deducted when evaluating achievement of the targets. voestalpine has begun developing a rescaling process since publication of the targets by the SBTi and intends to establish this in the coming business year.

13.4.1.3 Scope 3 reduction potentials

In order to reduce indirect greenhouse gas emissions (Scope 3) by 25% by 2029, voestalpine has identified the raw materials used (iron carriers, energy sources, alloys, input materials, coatings), auxiliary and operating materials as well as existing and future approaches towards the circular economy as offering significant reduction potential. Upstream and downstream transportation can also play a part in reducing the voestalpine Group's indirect emissions.

Involving and cooperating constructively with companies along the supply chains in the area of raw materials and the circular economy is a prerequisite for determining Scope 3 emissions and for identifying and implementing reduction potential. voestalpine relies on the support and cooperation of its suppliers and business partners.

The availability and quality of data on GHG emissions from upstream and downstream activities along the value chain still includes some gaps. Determining Scope 3 emissions therefore remains a challenge. voestalpine only uses verified data sets and emission factors from recognized sources. Plans are in place for a gradual expansion and extension of the proportion of specific data from the supply chains.

The GHG balances of recent years have shown that the ongoing development of emission factors and the increasing availability of data sets for various material flows and input materials influence the quantification of Scope 3 emissions and can lead to an increase in the absolute amount of GHG emissions. It seems necessary for voestalpine to take these changes in data availability and quality into account in

connection with the reduction targets (science-based targets) in the future.

Significant changes to the GHG balance resulting from disposals or acquisitions of companies from the reference year 2019 onwards are not included in the savings targets and must be deducted when evaluating achievement of the targets. voestalpine has begun developing a rescaling process since publication of the targets by the SBTi and intends to establish this in the coming business year.

13.4.1.4 Greenhouse Gas Emissions 2023

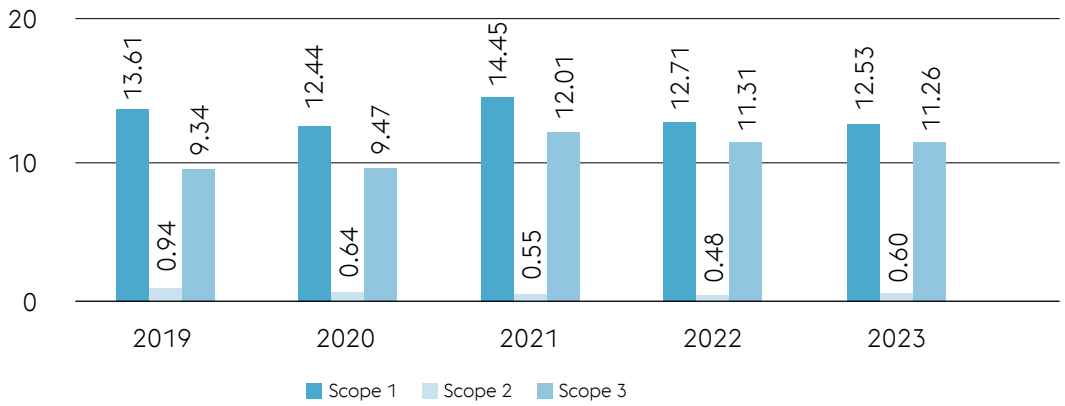
Direct greenhouse gas emissions (Scope 1) from the voestalpine Group's 115 production sites fell to 12.5 million tons of CO_2 equivalents in 2023 (previous year: 12.7 million tons).

The majority of direct greenhouse gas emissions are generated in Austria at the Linz (8.7 million tons) and Donawitz (2.9 million tons) sites, where crude steel is produced via the blast furnace route. In addition to the direct emissions (Scope 1), we also collected data on the indirect greenhouse gas emissions (Scope 2 and Scope 3) and analyzed the data using the "EF 3.0 Climate Change total" method. voestalpine only uses verified data sets and emission factors from known sources (sphera LCAFE®) and primary data from suppliers to determine indirect GHG emissions. Besides carbon dioxide, the direct and indirect emissions data also include the greenhouse gases methane and nitrous oxide.

In addition to the greenhouse gas accounting for the 115 production companies, an evaluation was also carried out of the direct and indirect greenhouse gas emissions of other sites in the voestalpine Group that perform customized processing and services. These additional emissions are not included in the overall result shown on the following page and amounted to the following in 2023: Scope 1 = 0.01 million t CO_2e; Scope 2 – market-based = 0.08 million t CO_2e; Scope 2 – site-based = 0.10 million t CO_2e and Scope 3 – raw material procurement = 0.26 million t CO_2e.

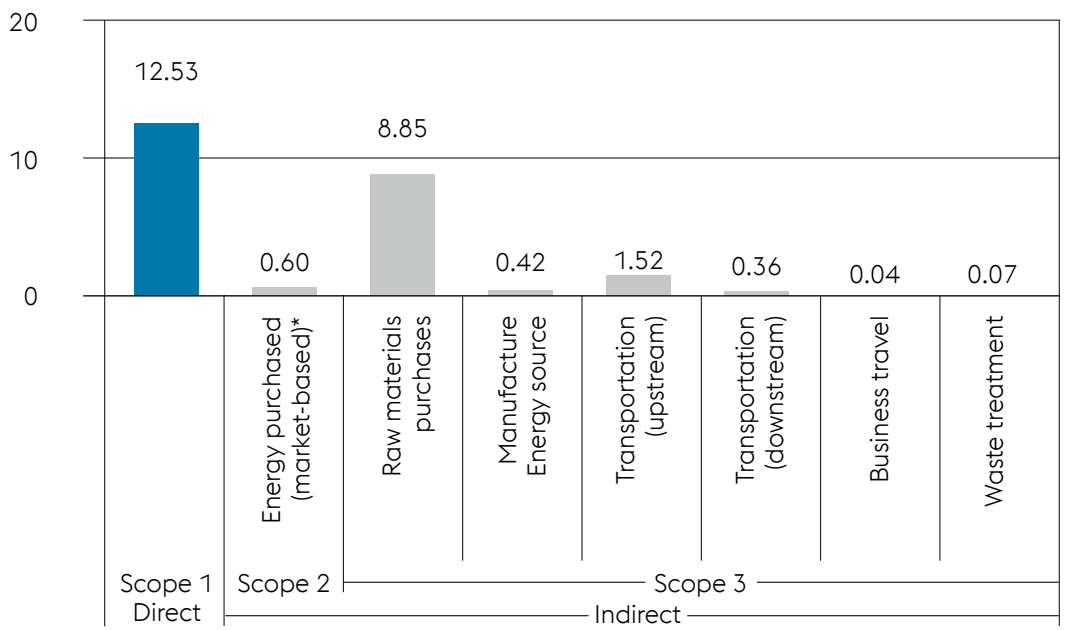
DEVELOPMENT OF SCOPE 1, 2, 3 EMISSIONS

In million tons of CO_2e



DIRECT AND INDIRECT GREENHOUSE GAS EMISSIONS 2023

In million tons of CO_2e



* Scope 2 market-based: 0.60 million tons of CO_2e
Scope 2 site-based: 0.53 million tons of CO_2e

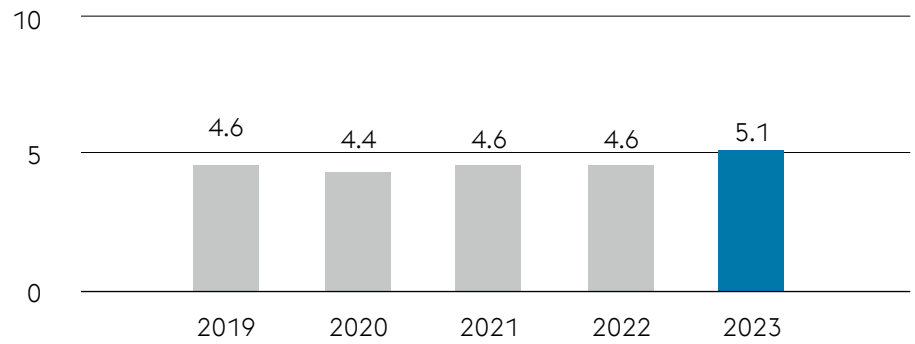
13.4.2 SO_2 EMISSIONS

The use of particular raw materials—especially coal and coke—introduces sulfur into the production process. Additional processing steps and the use of by-products such as coke oven gas (COG) and blast furnace gas (BFG) for thermal recycling turn sulfur into sulfur dioxide.

At 0.62 kg per ton of product, specific SO_2 emissions in the 2023 calendar year were higher than the previous year's figure of 0.54 kg. The reason for the increase is the slight rise in emissions at the main sites in Linz and Donawitz. Absolute SO_2 emissions rose to 5.1 kt.

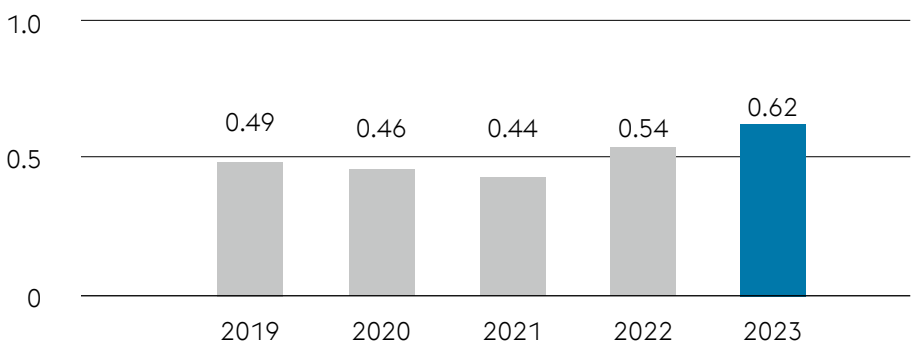
SO_2 EMISSIONS

kt



SPECIFIC SO_2 EMISSIONS

kg/t product



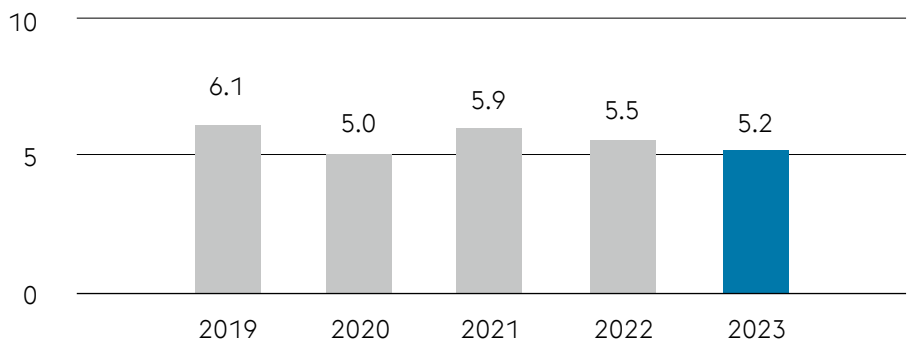
13.4.3 NO_X EMISSIONS

Nitrogen oxides are generated through the operation of industrial furnaces and the thermal recycling of by-product gases.

voestalpine's absolute NO_x emissions fell to 5.2 kt (previous year 5.5 kt). As in the previous year, specific NO_x emissions per ton of product were 0.64 kg.

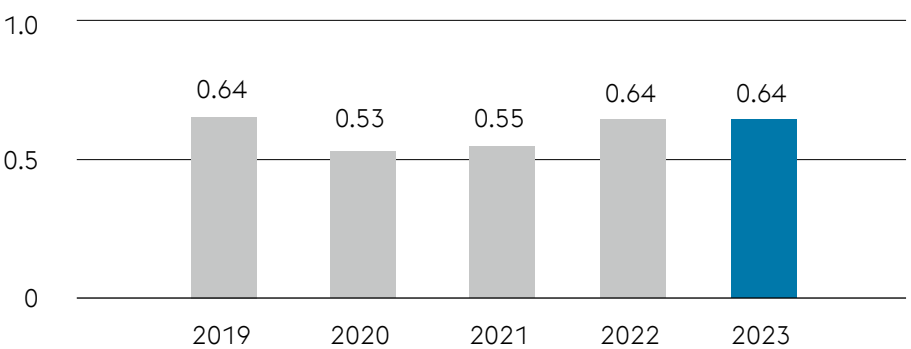
NO_X EMISSIONS

kt



SPECIFIC NO_X EMISSIONS

kg/t product



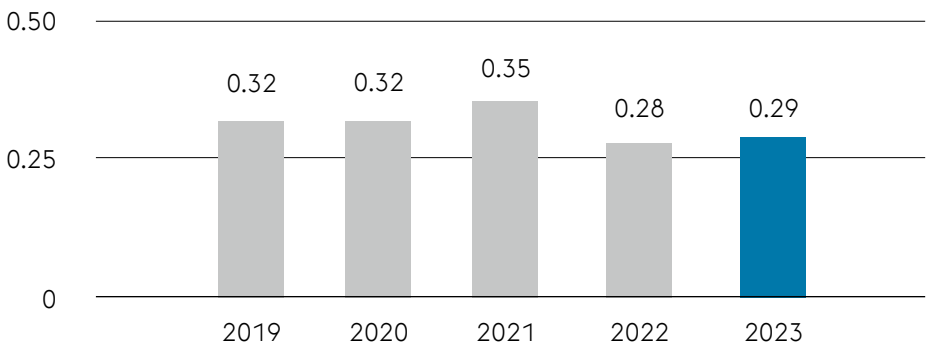
13.4.4 CAPTURED DUST EMISSIONS

Dust-laden exhaust air and exhaust gases that occur during production are captured and channeled to dedusting systems using state-of-the-art processes and equipment.

Captured dust emissions increased in absolute terms to 0.29 kt in 2023. In specific terms, the value increased slightly to 35 g per ton of product.

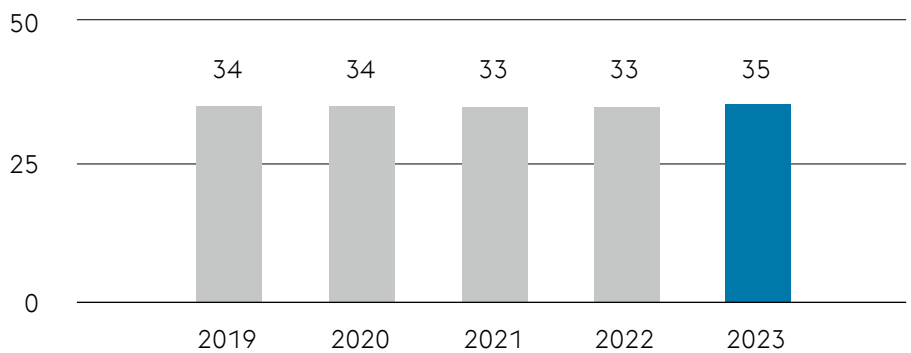
CAPTURED DUST EMISSIONS

kt



SPECIFIC CAPTURED DUST EMISSIONS

g/t of product



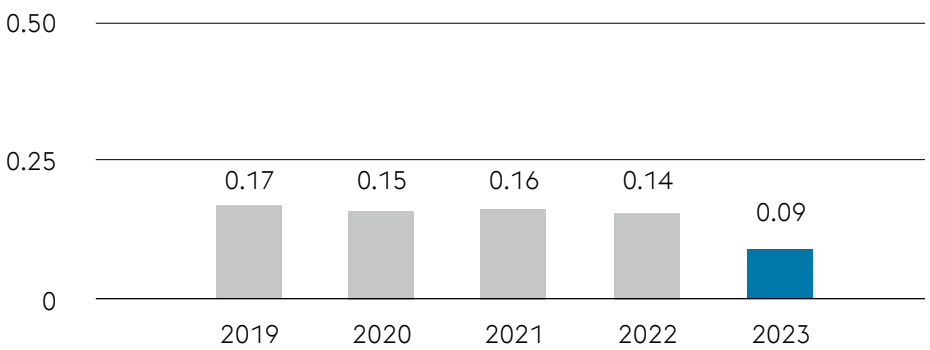
13.4.5 ORGANIC AIR POLLUTANTS

Organic air pollutants (i.e., volatile organic compounds, VOC) are generated primarily during the thermal process stages of crude steel production as well as during the associated combustion processes.

voestalpine commissioned several technically sophisticated pieces of equipment in recent years to cut VOC emissions. This enabled a substantial decline in the emission of organic air pollutants. VOC emissions amounted to 0.09 kt (2022: 0.14 kt) in absolute terms and 11 g (2022: 17 g) per ton of product in specific terms in 2023.

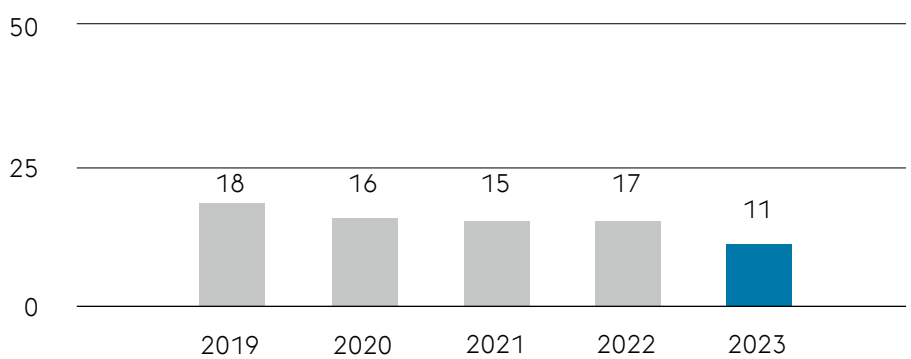
VOC EMISSIONS

kt



SPECIFIC VOC EMISSIONS

g/t of product



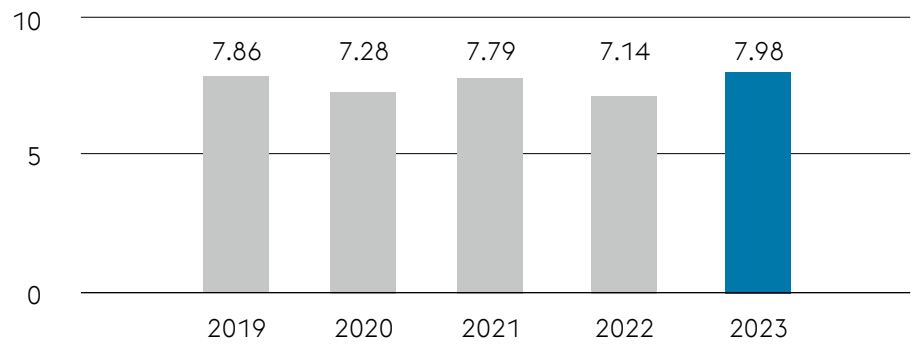
13.4.6 HAZARDOUS AIR POLLUTANTS (HAPs)

The overall parameter of hazardous air pollutants (HAP) covers a range of air pollutants. Benzene emissions account for the largest proportion of hazardous air pollutants at voestalpine.

Absolute HAP emissions amounted to 7.98 t and specific emissions to 0.97 g per ton of product in 2023.

HAP EMISSIONS

in tons



SPECIFIC HAP EMISSIONS

g/t