

# Natural capital





As we confront global challenges such as climate change, resource scarcity, pollution and waste, our dedication to conducting business in an environmentally and socially responsible manner remains steadfast. Our natural capital's strategic focus areas highlight our efforts to use natural resources efficiently and reduce our environmental impact.

### Focus areas

- ▶ Energy management
- ▶ Emissions control
- ▶ Water management
- ▶ Waste management

### Stakeholders impacted

- ▶ Employees
- ▶ Communities
- ▶ Vendors and suppliers
- ▶ Government and regulatory authorities

### UN SDGs impacted



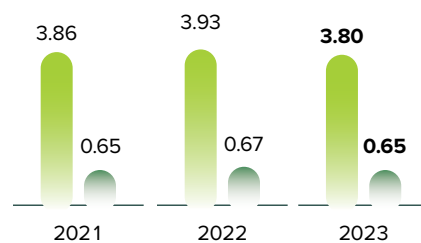
## Energy management

In 2023, we continued our efforts to systematically identify energy efficiency opportunities and implement improvement measures systematically. We emphasised optimising steam production and consumption, expanding solar power capacities and deploying LED lighting solutions, among other initiatives.

### Optimising steam generation and consumption

- ▶ **Castrop-Rauxel, Germany:** Conducted comprehensive steam pipeline overhaul, including reducing pressure, removing unnecessary pipes and installing Venturi steam traps, resulting in a 21.0 GWh reduction in natural gas consumption.
- ▶ **Hamilton, Canada:** Upgraded condensate return manifolds and steam tracing lines to improve condensate recycle rates, reducing steam and natural gas consumption and GHG emissions.
- ▶ **Zelzate, Belgium:** Implemented steam-related measures such as installing an economiser for a steam boiler and enhancing condensate recuperation systems.

## Energy input



- Absolute (Mn MWh)
- Specific (MWh/MT product)

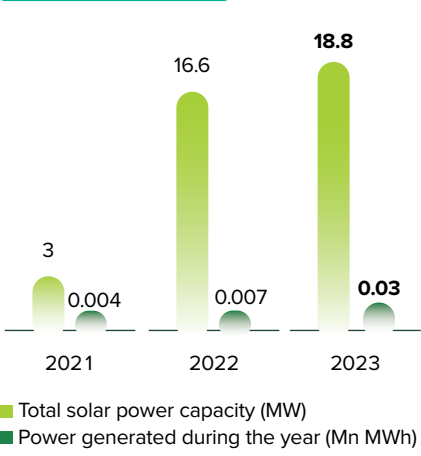
**4 Capital-wise value creation**

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## Expanding solar capacity

In 2023, we expanded our solar capacities at key sites in our commitment to sustainability. At our Belgium site, 40 kW of photovoltaic panels were added, while in India, solar farm capacities at cement plants increased by 2.2 MW, totalling 18.8 MW.

### Solar capacity



## Waste heat recovery systems

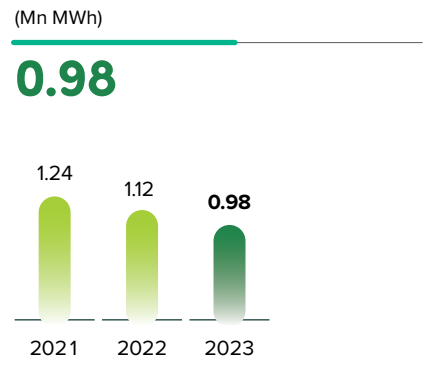
Over the years, we have prioritised emissions reduction through waste heat recovery systems, maximising energy efficiency and minimising reliance on external sources. Our Carbon and Advanced Materials segments generated 0.91 Mn MWh of energy from waste heat recovery, resulting in the avoidance of 0.31 Mn MT CO<sub>2</sub>e of CO<sub>2</sub> emissions across both business segments.

Our cement segment generated 0.07 Mn MWh energy from waste heat recovery (WHR) and avoided 0.082 Mn MT CO<sub>2</sub>e.

In 2023, our Canadian site implemented an advanced pitch cooler system, replacing natural gas-based heating with a new heat recovery method. This upgrade offers savings potential of 3,000 MWh per annum, equivalent to 510 tonnes of CO<sub>2</sub> emissions.

This investment showcases our commitment to reducing our carbon footprint and enhancing energy efficiency across operations.

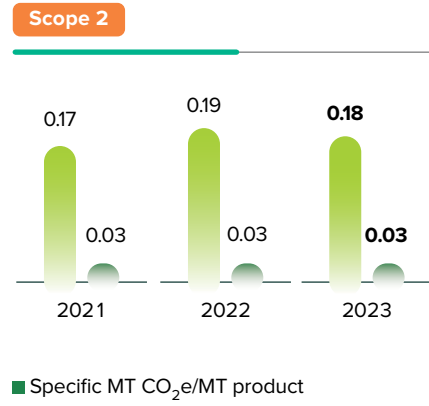
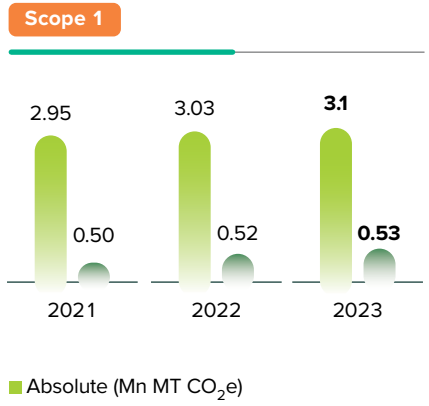
## Energy generated from waste heat recovery\*



\*Based on electricity and steam generation at waste heat recovery processes in 11 sites globally, we calculated the extent of emissions avoided from generated megawatts, emission factors of local electricity grids, combustion of natural gas and respective efficiency factors.



## GHG emissions



### Additional energy efficiency measures

We implemented various efficiency enhancements across sites, including replacing outdated equipment with modern, energy-efficient alternatives such as air compressors, pumps and energy monitoring systems.

- ▶ **Global:** Continued the transition to LED lighting across all sites, contributing to energy efficiency and reduced emissions.
- ▶ **India Carbon segment calcination facility:** Reduced plant air header pressure, resulting in a daily power reduction of

600 kWh. Additionally, adjustments to cooling fans of main power transformer and unit auxiliary transformer during low load periods led to a further reduction of 18,000 kWh in 2023.



### Emissions control

In line with our ongoing efforts to control emissions, several of our sites focused on further reducing our nitrogen oxides (NO<sub>x</sub>) footprint in 2023.

#### Castrop-Rauxel site

Our Castrop-Rauxel site further progressed with upgrading heating technology for the continuous coal tar distillation plant. We have substantially reduced NO<sub>x</sub> emissions by replacing the existing gas burner with a more efficient model.

This installation has led to a remarkable reduction of NO<sub>x</sub> emissions by over 90% at the BTX plant. Additionally, low NO<sub>x</sub> furnaces were installed in two other plants to enhance emission control measures.

#### Zelzate site

In 2023, our Zelzate site installed a cutting-edge de-NO<sub>x</sub> unit on the BTX incinerator, designed to remove NO<sub>x</sub> from the exhaust gas stream.

#### Hamilton site

In 2023, the Hamilton site finalised the planning for its installation of state-of-the-art natural gas burners. This initiative is poised to significantly lower NO<sub>x</sub> emissions, reinforcing our commitment to environmental sustainability.

## Carbon footprint studies of products and sites

In 2023, we continued our commitment to systematic Product Carbon Footprint (PCF) assessments, focusing on products within the Carbon and Advanced Materials segments.

### Key achievements in 2023

Significant milestones in 2023 included the PCF calculations for Phthalic Anhydride, reassessment of carbon calcination processes and a analysis of the NOVARES® portfolio.

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## Water management

In 2023, our Carbon and Advanced Materials segment sites in Europe and Canada increased their efforts to reduce net water consumption and wastewater volumes.

While water recycling has long been practiced at our Indian sites, our facilities in Europe and Canada implemented various water-related initiatives to enhance sustainability.

## Canada facility modernisation

At our Hamilton facility, we commenced the modernisation of the reverse osmosis unit following the stormwater treatment unit. By recycling rainwater, we aim to decrease wastewater discharged to the city sewers. Additionally, enhancing the recycling rates of boiler feed water will reduce blowdown and lower steam consumption.

## Testing reverse osmosis technology

Our site in Zelzate, Belgium initiated testing of reverse osmosis technology for wastewater treatment. This initiative aims to convert municipal wastewater from the Zelzate city wastewater treatment centre into reverse osmosis water.

**9,000 m<sup>3</sup>**

Potential freshwater savings following the implementation of reverse osmosis technology at Zelzate site





## Waste management

In 2023, we implemented several initiatives to enhance resource efficiency and reduce waste generation across our sites.

### Castrop-Rauxel, Germany

The Castrop-Rauxel site achieved significant wastewater reduction by implementing a pre-filtration process, among other measures. This proactive approach contributes to minimising environmental impact and optimising resource utilisation.

### Zelzate, Belgium

In 2023, the Zelzate site completed pre-tests with a tar centrifuge, a crucial step towards installing the centrifuge for removing tar sediments from storage tanks without emissions. This advancement underscores our commitment to responsible waste management practices.

### Hamilton, Canada

At the Hamilton site, we implemented stringent product waste management for truck unloading, focusing on reducing tar disposed of as hazardous waste. In 2023, waste from this source decreased by 27.75 tonnes compared to the 2022 amount of 111 tonnes, achieving a 25% reduction.

This approach emphasises waste avoidance and recycling back to tar whenever possible. Going forward, we aim to install a new recycling system in 2024 to enhance waste reduction efforts.

**27.75 tonnes**  
Reduction of hazardous waste from truck unloading processes

### Norco, USA

Our Norco site obtained approval for a new beneficial use plan for scrubbed spent lime material. The identified beneficial use sites will receive this material, aligning with our commitment to sustainable waste management practices.

Furthermore, plans are in place to apply for 'Best Management Practices' approval from the Louisiana Department of Agriculture and Forestry in 2024, facilitating the utilisation of spent lime on agricultural land.