

# Sustainability 2022



## Sustainability at TROX

### The TROX GROUP 2022

The increasing energy efficiency of TROX technology and system solutions as well as the general saving of fossil energy raw materials at our locations have become even more significant in 2022 due to the crisis on the energy markets – and have reinforced the decision for our considerable investment in a sustainable, stable and strong TROX GROUP for the future. To further improve our sustainability, we are working together with EcoVadis, the world’s largest and most reliable provider of sustainability ratings for companies.

# SUSTAINABILITY

Worldwide

# 34

subsidiaries



# 4,710

staff members  
of various nationalities



# 46

€ mill.  
investment volume



Market leader in Europe  
since the 70's, today the

# global

market leader

Offering fresh air  
to approx.



# 320

mill.\* people



# 670

€ mill.  
annual sales

\* calculation see p. 11

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NET  
ZERO

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## Sustainability perspectives at TROX



### Udo Jung

Managing Director of TROX GmbH

'Our mission to create a climate-neutral TROX GROUP has inspired us to think outside the box. In this way, we have made our path to climate neutrality calculable thanks to the TROX climate formula and clearly defined short-, medium- and long-term sustainability targets. Our new TROX O<sub>x</sub> system platform has allowed us to dismantle interfaces in building services engineering and bundle them in a manner that ensures optimum energy efficiency. And by providing healthy air indoors, we are paving the way for a future in which economic viability and sustainability play a mutually reinforcing role for the benefit of all, including our customers.'

### Thomas Mosbacher

Managing Director of TROX GmbH

'We see sustainable business and corporate responsibility as a healthy foundation for progress and prosperity. As a pioneering and cutting-edge company, we like to be one step ahead here. The investment volume planned for 2023, amounting to roughly €80 million, is the largest to date in the history of our company and is testament to our determination to make TROX the most sustainable company in the industry and to ensure its success for the long term.'

### Christine Roßkothen

Head of Corporate Social Responsibility (CSR) TROX GmbH  
Board of directors of the Heinz Trox Foundation

'At TROX, there is an enormous company commitment to sustainability. We see it practically every day, in the form of proactive ideas and implementation on the part of the workforce and in the huge corporate investments in climate protection. By precisely recording and documenting all activities and contents that are subject to reporting, we also enable outsiders to have an all-round transparent and comparative sustainability view of the entire TROX GROUP.'

### Prof. Dr. Hans Fleisch

Chairman of the Foundation Council  
of the Heinz Trox Foundation

'Being affiliated with a foundation, the work of the TROX Group is firmly anchored in a set of values that considers social and sustainable commitment to be the vital counterbalance to speculative and risky business practices. This value-based commitment is the bedrock for a world in which sustainable behaviour that promotes public well-being is crucial to the survival of present and future generations.'

What motivates us



# ENERGY CRISIS

The 2022 energy crisis drew global attention to a key issue that is well within the bounds of feasibility: saving energy. We are taking the next step in change – towards a healthy future.

## EVERY SAVED KILOWATT HOUR COUNTS

Recent experience has highlighted how the global interdependence of our energy supply can quickly result in a scenario of uncertainty that triggers price hikes and inflation. This made energy conservation in 2022 a symbol of filled gas storage tanks and something innately tied to social, financial, and economic security. We have all seen how efficiently energy can be saved.

TROX welcomes any reduction in the consumption of fossil fuels for another reason: every kilowatt hour saved also means lower CO<sub>2</sub> emissions. This aspect must not be pushed into the background. Because global greenhouse gas emissions are still at record levels – with correspondingly dramatic effects on the natural Balance of our planet and on our health.

The building sector has a high share in this situation – in Germany it is responsible for around 30% of CO<sub>2</sub> emissions. With innovative developments and active association work, TROX therefore often leads the way towards CO<sub>2</sub> reducing processes and standards. At the same time, in line with our mission ‘for indoor life quality’, we ensure that people can breathe fresh, healthy air indoors. A point that is becoming increasingly important due to the climate crisis: In summer, rooms with good, healthy air serve as a refuge from air pollution and heat waves. In winter, as protection against disease-promoting cycles, where the already greater viral load inevitably increases further due to higher indoor temperatures with insufficient ventilation.

# HEALTH



Thomas Hermann Voshaar, MD, Chief Physician for Pulmonary and Bronchial Medicine at Bethanien Hospital Moers and Chairman of the Board of the Association of Lung Clinics in Germany.

#### Air is our most important sustenance.

For us, air is nourishment that needs to be consumed in its purest form to ensure a healthy life. We are already providing approx. 320 million\* people around the world with fresh, healthy air indoors.

Two facts make good indoor air quality in buildings particularly important: Firstly, according to the World Health Organisation (WHO), 7 million people worldwide die prematurely each year due to air pollution. Secondly, most people spend more than 90% of their time indoors.

We are proud to be able to bring fresh, healthy air to every home with our latest, highly efficient ventilation and air conditioning solutions. By reliably removing CO<sub>2</sub>, pollutants, viruses and other germs or filtering them out of the room air, and optimising humidity, temperature and acoustics. Our claim is to offer the best conditions for a healthy life with healthy air. Numerous investigations and studies have shown that people feel better when air quality is good; they work more attentively and with greater concentration, they are fitter and the frequency with which they fall ill is considerably lower.

The renowned pneumologist Dr. med. Thomas Hermann Voshaar has been involved in aerosol medicine for around 30 years and made a name for himself as an expert on the spread and containment scenarios of airborne infectious events, especially during the Corona pandemic. On the subject of healthy indoor air quality, he says: 'We will never be able to completely eliminate a respiratory virus. With viruses, it is quite sufficient to filter away most of it so that our immune system can learn and adapt.'

Having survived the Corona pandemic, we are now in the all-important recovery period. What have we learned? Clearly, the human immune system can learn to fight a virus – if it is not overrun by too high a viral load. In Germany, TROX is therefore campaigning with the industry associations for a volume flow of at least 25 m<sup>3</sup> of fresh air per hour and person to be specified in the building regulations for rooms in public buildings. To avoid high air pollution with pathogens of all kinds and thus improve people's health and performance.

#### THE TROX CO<sub>2</sub>-SAVINGS TARGETS FROM 2022:

##### SCOPE 1, 2:

2025 > CLIMATE-NEUTRAL PRODUCTION FACILITIES

##### SCOPE 3:

2030 > – 15% CO<sub>2</sub>

2035 > – 50% CO<sub>2</sub>

2040 > – 100% CO<sub>2</sub> = CLIMATE NEUTRALITY

#### We push for change – for healthy people and a healthy nature.

We are also committed to good air quality and quality of life outside of rooms. Effective measures against climate change, such as massive CO<sub>2</sub> savings, are therefore one of TROX's top priorities.

In 2022, we invested €46 million to expand our efforts to become a sustainable, climate-neutral and forward-thinking TROX GROUP and thus enable future generations to have a future worth living in.

To ensure that every cent is well invested, we have expanded our central sustainability goal – a climate-neutral TROX GROUP by 2040 – to include short and medium-term interim targets for CO<sub>2</sub> reduction.

Our intermediate targets lead us directly and verifiably to climate neutrality. In doing so, we attach great importance to demonstrating our commitment to sustainability in a transparent and comprehensible manner through ever better data collection and reporting.

As the world's leading brand manufacturer of high-quality ventilation and air-conditioning technology, we are aware of this great responsibility of our time and of the need to face it head on. The outstanding energy efficiency of the TROX technology and systems used in buildings, which provide people with fresh, clean breathing air, is therefore just as important to us as our mission to become climate-neutral as TROX GROUP. We are ready for the future. We are ready to actively drive forward sustainable change.

\*Calculation basis: Total volume flow of terminal air diffusers and air-water systems in relation to turnover, extrapolated for inflation.



## Foundation and sustainability – this unity adds strength to our sustainability commitment

The TROX GROUP is a foundation-affiliated group of companies and is therefore naturally focused on sustainability.

When Heinz Trox founded the Heinz Trox Foundation as the main shareholder of TROX GmbH in 1991, he fundamentally believed that 'the human being is the yardstick, and people's well-being is our goal'. This was subsequently anchored as the guiding principle of all entrepreneurial activity at TROX.

The non-profit Heinz Trox Foundation is a charity organisation that supports people in need, young people and the elderly. It is also committed to promoting art, culture and sports. From the very outset, however, Heinz Trox wanted the foundation's support efforts to focus on education and science as the basis for sustainable, responsible further development.

As a company affiliated with a foundation, we have a major advantage here: we can focus on what will benefit everyone. Not on short-term profits, but on long-term stability. And on the well-being of people, sustainable management, scientific research and sustainability measures that make a difference.

Economy and humanity form a unity at TROX. This was evident in 2022 in the many projects supported by both TROX GmbH and the Foundation. For example, TROX GmbH helped refugees from Ukraine with quick, unbureaucratic actions – from accommodation to donations to jobs (see p. 94). The Heinz Trox Foundation also supported suitable measures for the welfare of Ukrainian refugees with a total of € 45,000.

Specifically, the Heinz Trox Foundation supported Ukrainian refugees through:

- Financing of initial German lessons and the materials needed for them
- Transfers to authorities etc.
- Expense allowances of volunteer escorts
- Events for children and families

Together, TROX GmbH and the foundation are committed to the well-being of people. Each sponsorship project represents both the values of the TROX GROUP and its way of living sustainability.

**TROX SEEKS TO ENSURE STABILITY AND THE WELL-BEING OF PEOPLE**



You can use this QR code to find out more about the Heinz Trox Foundation and its supporting activities.  
[www.heinz-trox-foundation.com/en](http://www.heinz-trox-foundation.com/en)





## Step by step. In this way, we will achieve climate neutrality by 2040.

By setting clear interim goals, we are paving the way for a straightforward, manageable and highly transparent path to climate neutrality by 2040

The entire TROX GROUP will be climate-neutral by 2040! Each TROX company is working to achieve this central sustainability goal with great commitment and growing passion. We want to achieve our goal together – with measures that are effective because they are well coordinated and realistically implementable.

Clearly defined interim goals for 2025 will help us to do precisely this. They will enable us to maintain a full overview, drive forward progress in the right areas and pull together to secure a future and quality of life that is economically, ecologically and socially worth living in.

### INTERIM GOALS PROVIDE A DIRECT PATH TO CLIMATE NEUTRALITY

#### Our interim goals up to 2025

Basis	I.	II.	III.	IV.
Financial stability	Healthy air	Energy + emissions	Material + waste	Employees + Society
<p><b>X-FIT+ programme:</b> €800 million in sales and 8% EBIT</p>	<p>We offer healthy air to <b>350 million</b> people</p>	<ol style="list-style-type: none"> <li>Our production facilities will be <b>climate-neutral*</b></li> <li>We will reduce the CO<sub>2</sub> emissions for our products and <b>perform life cycle assessments</b></li> <li>Thanks to our TROX system technology, our customers will save more than <b>1,900 GWh</b> of energy</li> </ol>	<p>We will increase the recycling quota of the GmbH to <b>90%</b> and introduce a globally <b>standardised waste management system</b> at all locations</p>	<p>We will review at least <b>90%</b> of our suppliers for sustainability and train at least <b>90%</b> of TROX employees in core areas</p>
		  	 	   

\* Scope 1 and 2.

**Our aspiration: Addressing sustainability globally.**

With the European Climate Change Act of July 2021, the EU has committed itself to becoming climate neutral by 2050 to counteract climate change. An ambitious legislative package of 13 interlinked, revised laws and six legislative proposals on climate and energy was launched. An absolutely sensible and necessary programme for a sustainable future.

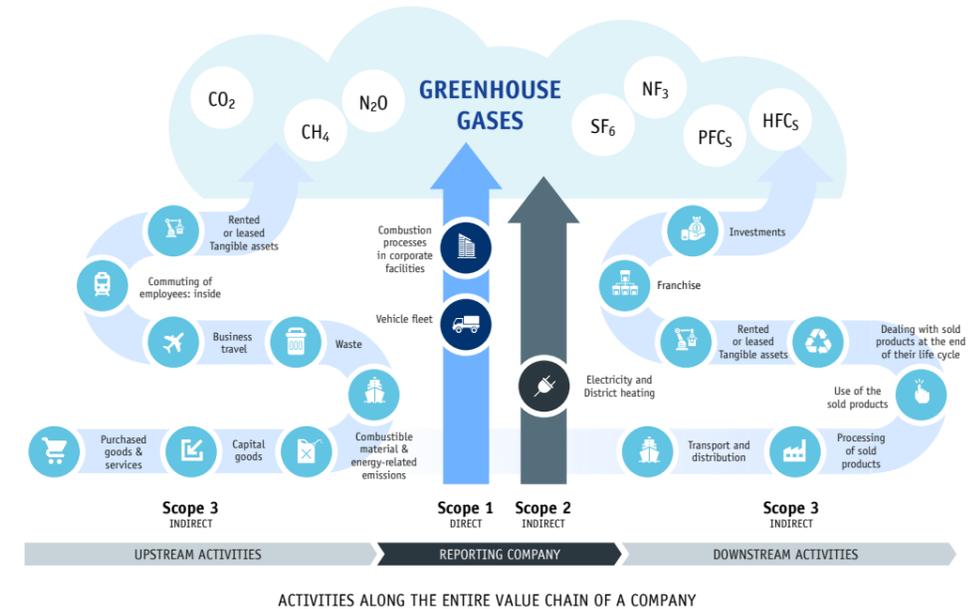
With our medium- and long-term sustainability goals, we not only support these efforts for a sustainable Europe, we go a little further: climate neutrality by 2040 – worldwide for the entire TROX GROUP. Because climate change does not stop at borders.

**WE WILL BECOME CLIMATE NEUTRAL 10 YEARS EARLIER THAN REQUIRED BY THE EU**

**TROX climate neutrality by 2040**



**Scope classification according to GREENHOUSE GAS PROTOCOL**



Scope 1:	Company-related, direct
Scope 2:	Company-related, indirect
Scope 3:	Product-related
	<ul style="list-style-type: none"> <li>Upstream: material, energy production</li> <li>Downstream: energy use</li> </ul>

Source: GREENHOUSE GAS PROTOCOL

**Scope 1, 2 and 3 – this clarity gives us confidence to act.**

A central question on our path to climate neutrality is: 'Where in the entire value chain of our products and systems does how much CO<sub>2</sub> arise?' In determining our CO<sub>2</sub> emissions, we are guided by the classification of Scope 1, 2 and 3 according to the GREENHOUSE GAS PROTOCOL (GHG Protocol).

When calculating emissions according to the GHG Protocol, the emissions along the entire product life cycle are considered – both direct and indirect. For TROX, this results in clear measurement parameters: Around 90% of our CO<sub>2</sub> emissions are generated indirectly within Scope 3 in the course of upstream product procurement. The remaining 10% arise within the company itself, both indirectly in Scope 2 and directly in Scope 1.

Knowing at which point in the value-added process of our products and systems how much CO<sub>2</sub> is produced provides us with the starting points for targeted, particularly efficient measures to reduce CO<sub>2</sub> on our way to climate neutrality. Measures that we will implement in TROX's six fields of action within our medium and long-term timeframes.

## The TROX Sustainability strategy

**THE TROX CLIMATE  
FORMULA IS THE HEART  
OF OUR SUSTAINABILITY  
STRATEGY**

Sustainability is an essential element when it comes to securing the future. TROX has therefore developed a far-sighted sustainability strategy. The core of this strategy is to achieve our primary goal of climate neutrality by 2040 as well as our defined interim goals.

The heart of our sustainability strategy is the TROX climate formula. It allows us to calculate the CO<sub>2</sub> emissions that result from our business activities and their compensation.

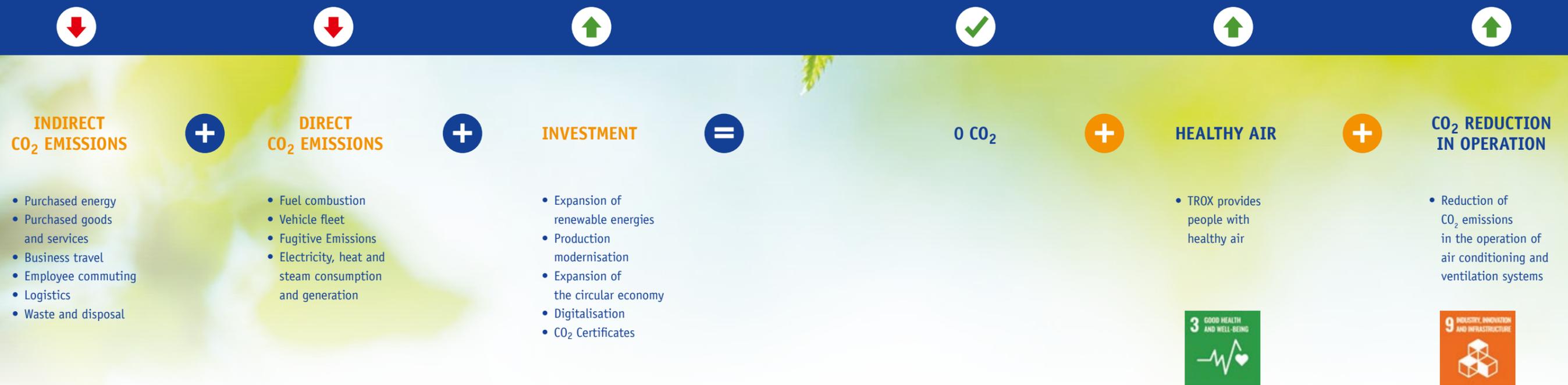
To this end, we record all indirect and direct CO<sub>2</sub> emissions within the value chain of our products and counterbalance them with reduction measures. The resulting well-founded data creates a high degree of transparency and makes our sustainability successes visible.

This strategy will help us to achieve climate neutrality in a manner that can be simply calculated and illustrates our additional efforts to create a sustainable future – by providing people with fresh, healthy air and with products and systems that are becoming more and more energy efficient, thus continuing to reduce operational CO<sub>2</sub> emissions.

SUSTAINABILITY  
STRATEGY



# The TROX climate formula



## OUR PRIMARY GOAL IS TO BE CLIMATE-NEUTRAL BY 2040!

With the TROX climate formula, we can now calculate precisely how this goal can be achieved. And in doing so, we can rely on strong support from our employees around the world, who are all working to achieve the TROX sustainability goal with tremendous commitment and dedication.

## THE TROX CLIMATE FORMULA

**= CO<sub>2</sub> NEUTRAL TROX GROUP**

**+ HEALTHY AIR AND CO<sub>2</sub> REDUCTION IN PRODUCT OPERATION**

# We want to achieve more – through dialogue and exchange with our stakeholders!

As our stakeholder, you have ideas, wishes and ideals regarding sustainability – just like we do.

Knowing and understanding your point of view helps us to incorporate it into our sustainability strategy and to move forward with you in a way that strengthens the individual and increases the impact.

To this end, we use forums of dialogue such as trade fairs, discussions, social media channels or this sustainability report to address topics that are of interest to you. In 2022 we implemented multiple specific communication measures to facilitate dialogue with you.

**FOR ENVIRONMENTAL AND CLIMATE PROTECTION TO SUCCEED, WE MUST ACT! TOGETHER. BECAUSE A GOAL THAT HAS THE SUPPORT OF MANY WILL ACHIEVE MORE.**



# Know what is relevant: the TROX materiality analysis

A core component of our sustainability strategy is the materiality analysis. The results of our comprehensive environment, company and stakeholder analysis on the relevant economic, environmental and social issues are summarised here in a matrix. It reflects the expectations of our stakeholders as well as the importance of key sustainability issues from the perspective of TROX.

The TROX Board of Management along with the various TROX divisional heads play a key role in the development of our materiality analysis. They create a long list of all focus topics, which are initially prioritised in various small groups and then analysed to determine their influence on the decisions of the stakeholders. This analysis is carried out on the strong basis of continuous dialogue with our stakeholders. The result is the consensus of an intensive exchange between responsible representatives from all divisions.

The focus areas identified here underpin TROX's strategic orientation along the SDGs and correspond with the TROX sustainability strategy as well as the goals and measures within our fields of action.

The TROX GROUP's materiality analysis is a dynamic process that takes new developments and changes into account, with annual reviews ensuring it is always up-to-date.

### Topics:

#### Wirtschaft

- 1 Indirect economic effects
- 2 Sustainable and responsible procurement
- 3 Digital transformation
- 4 Research and development
- 5 Industry, innovation and infrastructure
- 6 Governance, risk management and internal controls
- 7 Cyber security and data security

#### Environment

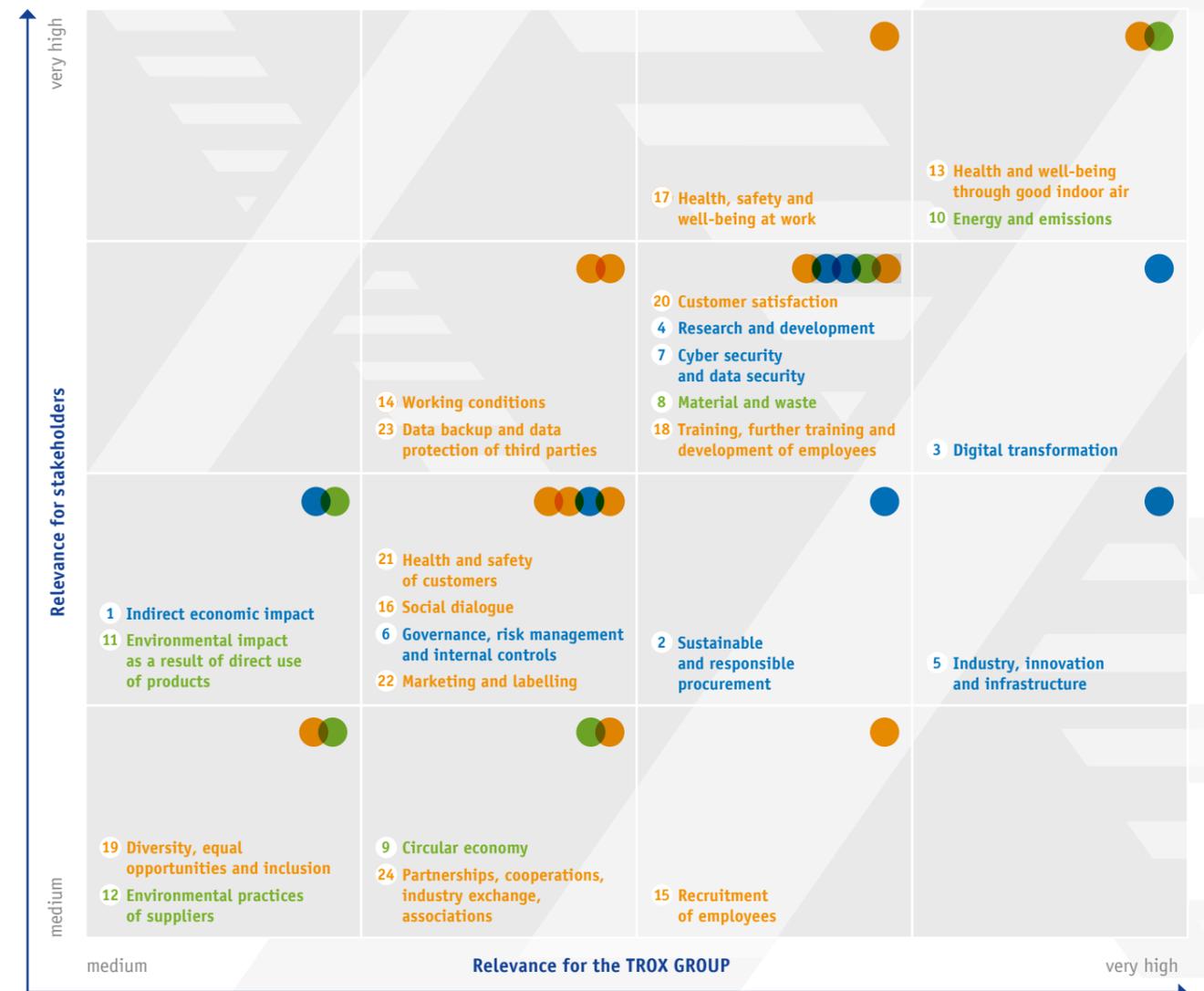
- 8 Material and waste
- 9 Circular economy
- 10 Energy and emissions
- 11 Environmental impact through direct use of products
- 12 Environmental practices of suppliers

#### Social matters

- 13 Health and well-being through good indoor air
- 14 Working conditions
- 15 Recruitment of employees
- 16 Social dialogue
- 17 Health, safety and well-being at work
- 18 Training and development of employees
- 19 Diversity, equal opportunities and inclusion
- 20 Customer satisfaction
- 21 Customer health and safety
- 22 Marketing and labelling
- 23 Data protection and data security of third parties
- 24 Partnerships, cooperation, industry exchange, associations

**WE HAVE THE STAKEHOLDERS  
AND TROX'S PERSPECTIVES  
ON SUSTAINABILITY IN MIND**

Areas: ● Environment ● Social matters ● Economy



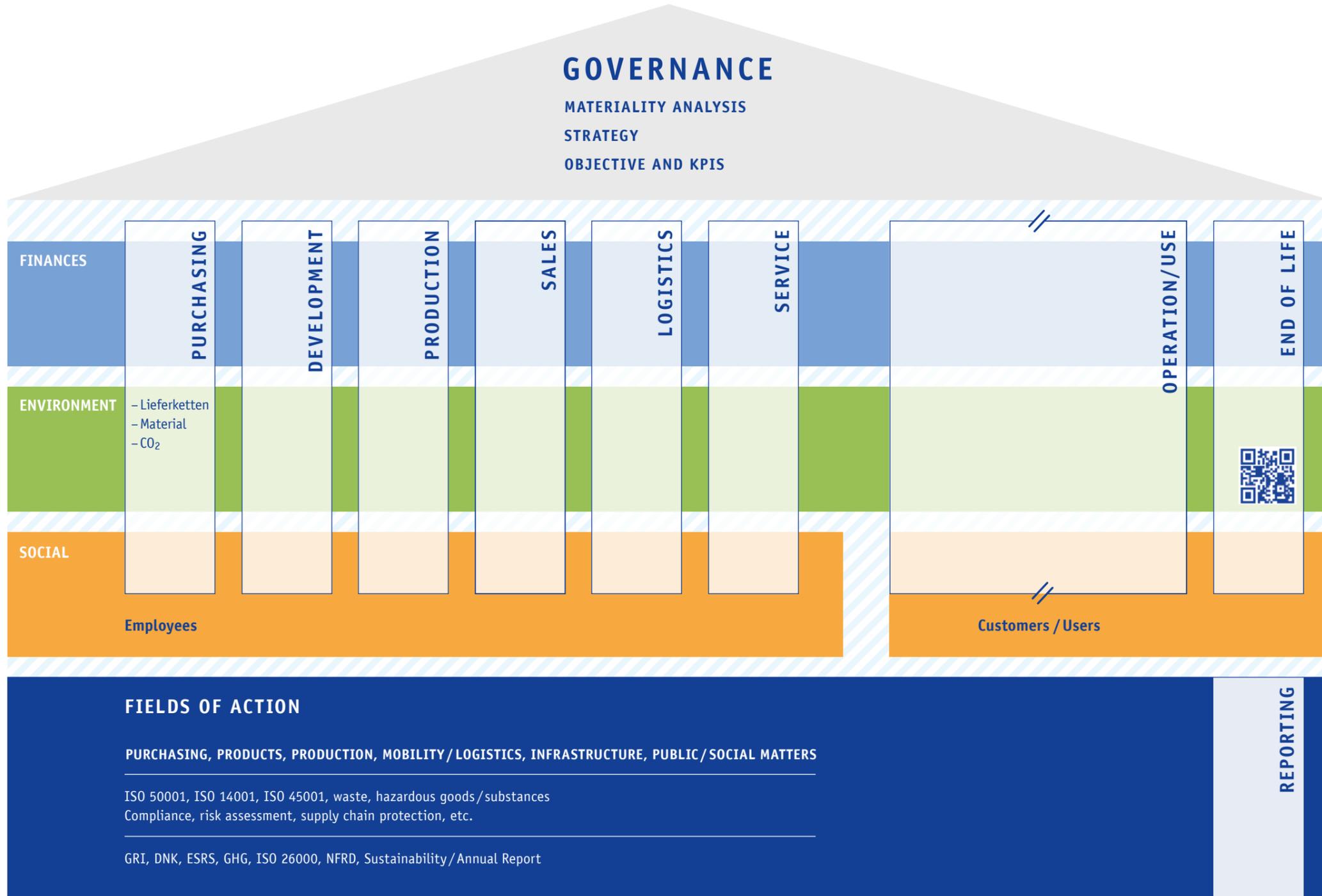
# The big picture in view

Our governance provides effective management and monitoring of the achievement of our sustainability goals. It brings clarity to the individual areas of responsibility, creates a framework that improves the target-oriented implementation of our Sustainability commitment and ensures the highest level of transparency.

Our starting points for responsible sustainability management are therefore of a fundamental nature: Identification of the relevant topics in our materiality analysis, the definition of

sustainability strategy and targets, and the development of robust key performance indicators. Within the value chain of our products and systems, we ensure that each phase is considered from an environmental, social and economic perspective.

In order to inform our stakeholders transparently and comprehensively, we report on all of TROX's key fields of action, include common and special regulations and codes of practice, meet recognised sustainability standards and publish in media such as the sustainability report and the annual report.



## STAKEHOLDERS

- Customer
  - relevant sustainability metrics
    - CCF (Company Carbon Footprint)
    - PCF (Product Carbon Footprint)
    - EPD (Environmental Product Declaration)
    - Rating agencies such as EcoVadis
- Capital providers (Heinz Trox Foundation, banks etc.)
- Suppliers and business partners
- Science and university
- Press / media
- Politics, committees and associations
- Public relations
- Employees



## Firmly embedded at TROX: the 17 SDGs

A sustainable world worth living in for everyone – this was the intention when the UN member states defined the 17 Sustainable Development Goals (SDGs) in 2015.

With full conviction, we have taken the necessary measures to ensure that our commitment to sustainability is innately linked to these 17 goals. Thanks to its high awareness of responsibility, which is part and parcel of the company's DNA, TROX is active in almost all SDGs.

2022 also saw TROX commit to supporting the ten principles of the United Nations Global Compact (UNGC) and to complying with certain social and ecological minimum standards, the aim being to create an inclusive and sustainable global economy for the benefit of all.

**TROX SUPPORTS  
THE 17 SDGS AND  
THE TEN PRINCIPLES  
OF THE UNGC**



## The TROX fields of action

We are active – in six fields of action relevant to TROX.

TROX's development in terms of sustainability is a process that we have very carefully and directly aligned with our goal of climate neutrality. It is a process that is being constantly further developed.

Part of this development involves adjusting our fields of action. Based on current calculations, approx. 90% of CO<sub>2</sub> emissions at TROX are attributable to the procurement of goods and services. For this reason, we have integrated 'Purchasing' as an independent field of action and combined the 'Public relations' and 'Social matters' fields of action.

This means that the six strategic fields of action that are essential for TROX are now Purchasing, Products, Production, Mobility and Logistics, Infrastructure, and Public and Social Matters. They provide a framework for an initiation of measures that will help achieve climate neutrality for the entire TROX GROUP and ensure a healthy future worth living in for us and future generations.

**EACH TROX FIELD OF ACTION STANDS FOR ACTION IN MATTERS OF SUSTAINABILITY**



## Clear guidelines pave our sustainability path

Not with just any measures, but with exactly the right ones, we want to expand the sustainability of the TROX GROUP and work out an industry-wide inspiring, pioneering approach.

To this end, we define strategic and operational sustainability goals in each field of action, which provide us with a clear path. At the same time, these goals are explicitly aligned with the relevant topics identified in our materiality analysis. And even if all topics have not yet been addressed, we are constantly developing on this point.



### PURCHASING

Our medium-term goals by 2025: to screen at least 90% of all suppliers for sustainability and to evaluate 100% of our core suppliers in terms of sustainability, to obtain complete CO<sub>2</sub> transparency and train them.

#### To achieve this, we are implementing the following operational goals:

- We continuously support our suppliers in implementing and complying with TROX's sustainability ideas. (2)
- We are expanding the sustainability measurement and assessment of our suppliers through recognised platforms such as IntegrityNext (2)
- We subject our suppliers to a broad risk screening (2)
- We oblige suppliers to comply with our Supplier Code of Conduct and our General Terms and Conditions. (2)
- Together with suppliers, we develop a plan to identify the need for action. (24)
- We create and secure basic framework conditions with internal regulations such as TROX's 'Global Guideline for Sustainable Procurement'. (2)
- We focus on purchasing production materials with recyclable packaging (12)
- We expand the sustainability training courses for purchasing and expand them for our suppliers. (2)
- We follow the principle 'think global – act local' when selecting our suppliers in order to save logistics and transport emissions (2)
- We buy more green energy and promote the introduction of a certified energy management system on the supplier side. (12)

(1) to (24): cf. materiality analysis, p. 25.

In this way, TROX contributes to the implementation of these SDGs:



### PRODUCTS

Our strategic goals by 2025 are to provide healthy fresh air indoors for 350 million people through innovative, energy- and resource-efficient ventilation and air-conditioning solutions, as well as life cycle assessments for our products, and to reduce energy consumption for our customers by 1,900 GWh.

#### To achieve this, we are implementing the following operational goals:

- We offer
  - safe fresh air to 213 million\* people through fire dampers
  - comfortable fresh air to 350 million\* people through air diffusers
  - demand-based fresh air to 254 million\* people through volume flow controllers
  - clean fresh air to 85 million\* people through filter solutions,
  - treated fresh air to 33 million\* people through air handling units. (13)
- We reduce the energy demand of air handling systems in operation with optimally matched air handling components and units with the corresponding demand-oriented control systems from a single source. (10)
- We develop new strategies to realise a transparent, market-driven life cycle assessment of all products. (22)
- We focus on energy efficiency and resource efficiency throughout the product life cycle. (8), (10)
- We optimise our products and systems throughout the entire life cycle, taking into account the frequently occurring partial load cases (9)
- We increase construction efficiency through on-time, on-budget project realisation with TROX total system solutions including building automation (5)

(1) to (24): cf. materiality analysis, p. 25.

In this way, TROX contributes to the implementation of these SDGs:



\*Calculated over a lifetime of 25 years for our products and systems. Calculation for 2025.

## PRODUCTION

Our strategic goal is to increase the sustainability of our production processes worldwide in terms of waste avoidance for a more efficient use of materials within the TROX Production System (TPS) and in terms of designing safe, pleasant workplaces.

To achieve this, we are implementing the following operational goals:

- We use the TROX production system TPS to improve production and administration processes across the entire TROX GROUP.(5)
- We continue to develop TROX's management system that covers the areas of quality, energy and environmental management, as well as work and health management. (6)
- We streamline production processes and optimise the material flow. (8)
- We reduce cuttings and waste. (8)
- We invest in hardware and software components to ensure precise recording of energy data. (10)
- We use our energy audit system to improve the energy efficiency of investments. (10)
- We optimise our staff members' working conditions continuously, and record and remedy potential risks. (14)

(1) to (24): cf. materiality analysis, p. 25.

In this way, TROX contributes to the implementation of these SDGs:



## MOBILITY AND LOGISTICS

Our strategic goal is to reduce CO<sub>2</sub> emissions in the areas of logistics and transport as well as reducing the consumption of packaging materials.

To achieve this, we are implementing the following operational goals:

- We optimise warehousing to reduce specific power consumption. (10)
- We continue to expand our network of production facilities to be closer to our customers. (20)
- We minimise transport by establishing new production and storage facilities. (5)
- Pool transport for specific regions to allow for shorter delivery routes. (5)
- Gradually reduce the use of resources for packaging materials through reusable packaging. (8)
- We gradually replace our vehicle fleet with electric vehicles. (10)

(1) to (24): cf. materiality analysis, p. 25.

In this way, TROX contributes to the implementation of these SDGs:



## INFRASTRUCTURE

Our strategic goals up to 2025 include CO<sub>2</sub> neutrality for our plants, a recycling rate of 90% for TROX GmbH and the introduction of a globally standardised waste management system.

To achieve this, we are implementing the following operational goals:

- We convert our energy supply to green energy. (10)
- We invest in solar energy and other alternative, CO<sub>2</sub> reducing energy sources. (10)
- We compensate for remaining CO<sub>2</sub> emissions with appropriate certificates. (10)
- We set up carbon-reduced or ideally carbon-neutral production in all new facilities, as in the case of TROX Auranor in Norway. (10)
- We reduce primary energy and water consumption by investing in comprehensive building modernisation measures. (10)
- We are continuously expanding our hardware and software components for energy data collection in order to be able to localise further efficiency measures and better evaluate environmental performance in the processes. (10)
- We develop a group-wide uniform waste management system. (8)
- We improve our digitisation concepts so that we can continue to operate in a future-oriented digital manner. (3)

(1) to (24): cf. materiality analysis, p. 25.

In this way, TROX contributes to the implementation of these SDGs:



## PUBLIC RELATIONS AND SOCIAL MATTERS

Our strategic goal is to consistently live our corporate philosophy 'The human being is the yardstick, and people's well-being is our goal' and to further establish TROX in politics and the public as the most sustainable company in the industry.

To achieve this, we are implementing the following operational goals:

- We invest in our staff members' safety, health and well-being at the workplace. (17)
- We promote a conscious, appreciative attitude when it comes to the diverse achievements and experiences of our employees. (19)
- We refine education and further training opportunities for our employees, offer high-quality webinars, and training at least 90% in the core areas by 2025. (18)
- We promote gender equality and strive to increase the number of women in leadership positions. (19)
- We strengthen the economy and the social status of our employees worldwide through fair remuneration. (14)
- We promote our ethical guidelines to ensure fairness, integrity and equal opportunities and fight corruption and discrimination. (6)
- We act on the basis of our jointly developed corporate values, which we constantly reinforce through campaigns and workshops. (17)
- We are intensifying our active leadership and involvement in national and international associations, organisations and committees in order to enforce sustainable standards and quality requirements as well as set environmental and energy targets in the building sector. (24)
- We communicate transparently and comprehensibly with our stakeholders – digitally, via print media and in the press. (16)
- We are expanding the exchange of information and knowledge with our stakeholders on well-being through a minimum outdoor air volume flow of 25 m<sup>3</sup>/h for good indoor air quality scientifically substantiated. (22)

(1) to (24): cf. materiality analysis, p. 25.

In this way, TROX contributes to the implementation of these SDGs:



# Purchasing



**Oliver Casper**  
Head of Purchasing  
Member of the Extended Management Board TROX GmbH

'Purchasing has a substantial influence on TROX's sustainability – via the materials and services selected, via the energy sources used, and very significantly via how sustainably our suppliers are positioned or how good we are at checking, monitoring and improving the sustainability status of our suppliers. Points in which we have been extremely active and successful.'

# PURCHASING



## Purchasing

Our responsibility when it comes to creating a sustainable TROX GROUP begins with the purchasing of materials and services – and thus with the establishment of sustainable processes that include the entire supply chain beyond direct procurement.

Sustainable procurement is a central component of TROX sustainability. In accordance with our primary sustainability goal – a climate-neutral TROX GROUP by 2040 – we are incorporating sustainable processes into all areas of purchasing, where we intend to anchor them and drive them forward. To ensure that we will only be working with suppliers who meet the TROX sustainability requirements in the future, we are continuously implementing these requirements at our locations and with our suppliers in the supply chain.

Our goal is to generate 100% sustainable procurement by 2040:

- Through climate-neutral purchased parts
- Through climate-neutral suppliers
- Through recyclable purchased parts

To achieve this purchasing objective, we have set a medium-term goal to be achieved by 2025 that involves checking at least 90% of all suppliers to ensure that they fulfil our sustainability requirements, evaluating 100% of our core suppliers with respect to sustainability, creating full CO<sub>2</sub> transparency for suppliers and providing them with training.

Currently, the purchasing process for materials and services is responsible for approx. 90% of our CO<sub>2</sub> emissions. We have taken up this challenge and in 2022, through sustainable purchasing processes, have done much to reduce CO<sub>2</sub> footprint of TROX through sustainable purchasing processes.



**We specify our CO<sub>2</sub> emissions in Scope 3.**

Towards our goal – CO<sub>2</sub> neutrality by 2040 – we can now work even more precisely. In 2022, we began for the first time to calculate the indirect CO<sub>2</sub> emissions in Scope 3 for each of our material groups, which as upstream emissions very directly affect purchasing (see p. 17). We obtained initial results with the help of an online CO<sub>2</sub> calculator, via e-mail queries to our suppliers and on the basis of consumption calculations that are independent of material groups. For the CO<sub>2</sub>-Data of the TROX GROUP, we also include sales and consumption-related data of all subsidiaries. We expect exact data for 2023.

**SINCE 2022, WE HAVE ALSO BEEN RECORDING OUR CO<sub>2</sub> EMISSIONS IN SCOPE 3**

**Indirect CO<sub>2</sub> emissions per material group in Scope 3 in 2022**

Material group	CO <sub>2</sub> (t)	
	TROX GmbH	TROX GROUP
01 Metals	62,423	122,782
05 Plastics	685	1,492
06 Paints, chemicals	1,414	3,790
07 Adhesives	2,144	3,695
08 Insulating materials	2,329	4,464
09 Sealants	2,231	3,831
10 Fire protection materials	1,200	1,232
11 Filter materials, filters	444	1,715
12 Standard components, standard and small parts	1,996	3,629
13 Machined metal parts according to drawing	2,895	5,929
15 Components and systems for pneumatic and hydraulic applications	419	628
16 Electrical and electronic components and systems – without fans	8,116	15,139
16a Electrical and electronic components and systems – fans only	1,047	2,174
17 Actuators, controllers (electric)	2,298	4,070
18 Motors, converters	43	616
19 Components and systems for thermal applications	7,657	9,783
20 Packaging materials	1,380	2,410
21 Contract work	1,369	2,639
22 Components	179	878
25 Fittings	264	419
	<b>100,533</b>	<b>191,315</b>

With this data, we have created an initial basis that will enable us to better assess future developments in order to act in an even more targeted manner in our sustainability orientation.

**We systematically accompany our suppliers towards sustainability.**

As part of the TROX materiality analysis, we defined core suppliers and set the following priorities:

- Human and labour rights
- Responsibility in the supply chain
- Energy management
- CO<sub>2</sub> footprint
- Occupational safety
- Environmental protection
- Conflict minerals

In addition to 18 other assessment topics, these are the main topics according to which we analyse and evaluate the sustainability status of suppliers. We use sustainability key indicators to record the progress and degree of implementation of the priorities at all core suppliers. In addition, the key figures, which are documented and measured in annual supplier meetings, serve as a target agreement.

**TROX key figure evaluation for supplier assessment**

Key figure	Calculation of the key figure	Measurement frequency	Results 2022
Number of invited core suppliers in the sustainability platform	Number of suppliers IntegrityNext / Number of core suppliers	Monthly	100%
Number of assessed core suppliers in the sustainability platform	Number of core suppliers assessed / Number of core suppliers	Monthly	93%
Degree of environmental protection implementation at core suppliers	Green rated core suppliers / number of core suppliers	Monthly	65%
Degree of implementation of human and labour rights at core suppliers	Green rated core suppliers / number of core suppliers	Monthly	74%
Degree of implementation of occupational safety at core suppliers	Green rated core suppliers / number of core suppliers	Monthly	76%
Degree of implementation responsibility in the supply chain at core suppliers	Green rated core suppliers / number of core suppliers	Monthly	46%
Degree of implementation CO <sub>2</sub> -Footprint for core suppliers	Green rated core suppliers / number of core suppliers	Monthly	26%
Degree of implementation of conflict minerals at core suppliers	Green rated core suppliers / number of core suppliers	Monthly	46%
Degree of implementation of energy management at core suppliers	Green rated core suppliers / number of core suppliers	Monthly	37%
Evaluation of the overall results of the core suppliers' questionnaires	Number Status green / Number of core suppliers	Monthly	35%

Through continuous cooperation with our core suppliers in the implementation of and compliance with the TROX sustainability concepts, we are paving the way for a common path towards climate neutrality.

**Supplier and risk screenings provide security.**

From the very beginning, we methodically and consistently ensure that a supplier meets our sustainability requirements. For example, when we send an enquiry, we ask for an offer to be based on the TROX Supplier Code of Conduct. Only then will it be valid and taken into account. We also subject new suppliers to a risk and sustainability assessment via checklists before entering into a business relationship, so that issues such as quality and sustainability are directly disclosed.

In order to monitor and document the compliance and sustainability situation as well as to select suppliers, TROX works with various portals in which the sustainability of suppliers is measured and evaluated. We regularly perform supplier audits and carry out detailed reviews.

Critical or unclear results trigger procedures for improvement at TROX, and a lack of willingness to provide information can lead to the supplier being removed. We always prefer working with suppliers who are highly committed.

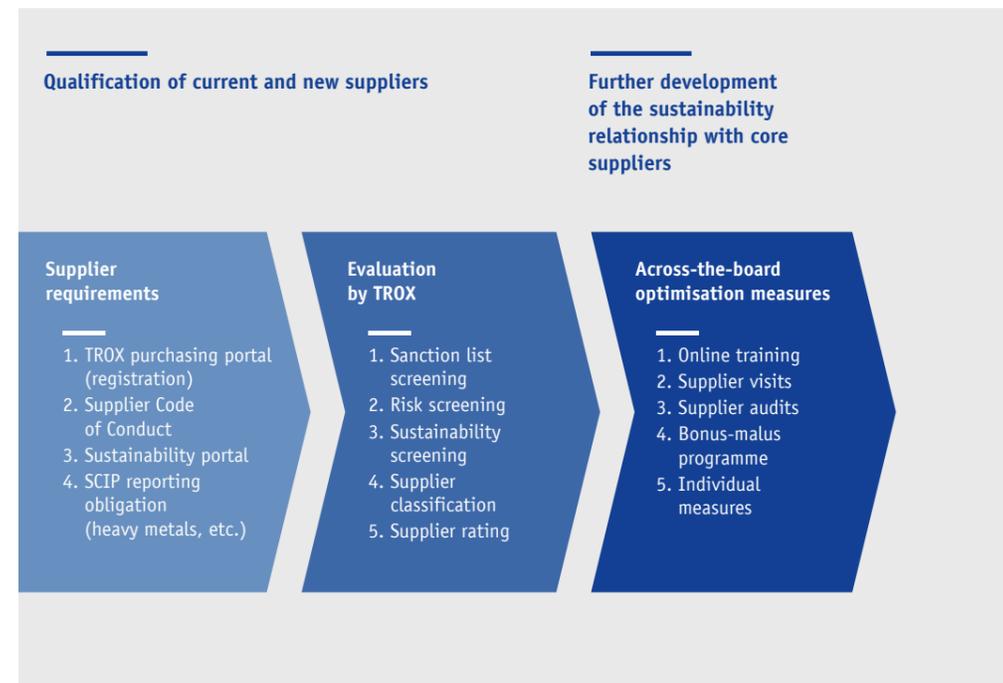
93% of our core suppliers have already been assessed in terms of sustainability; 35% of them have met our sustainability criteria. We are actively working with the remaining core suppliers to improve their sustainability.

All of these efforts help us to create an awareness of sustainability in cooperation with our suppliers, encourage their sustainability development and ensure that our requirements are established and fulfilled across the supply chain.

**WORKING WITH OUR SUPPLIERS TO ACHIEVE A PROCUREMENT PROCESS THAT IS 100% SUSTAINABLE**



**Indirect CO<sub>2</sub> emissions – responsibility in the supply chain**



**Binding rules create clarity**

We support our suppliers with great care in recording and fulfilling TROX's sustainability requirements. These rules and regulations ensure transparency:

- TROX Supplier Code of Conduct and our General Terms and Conditions**

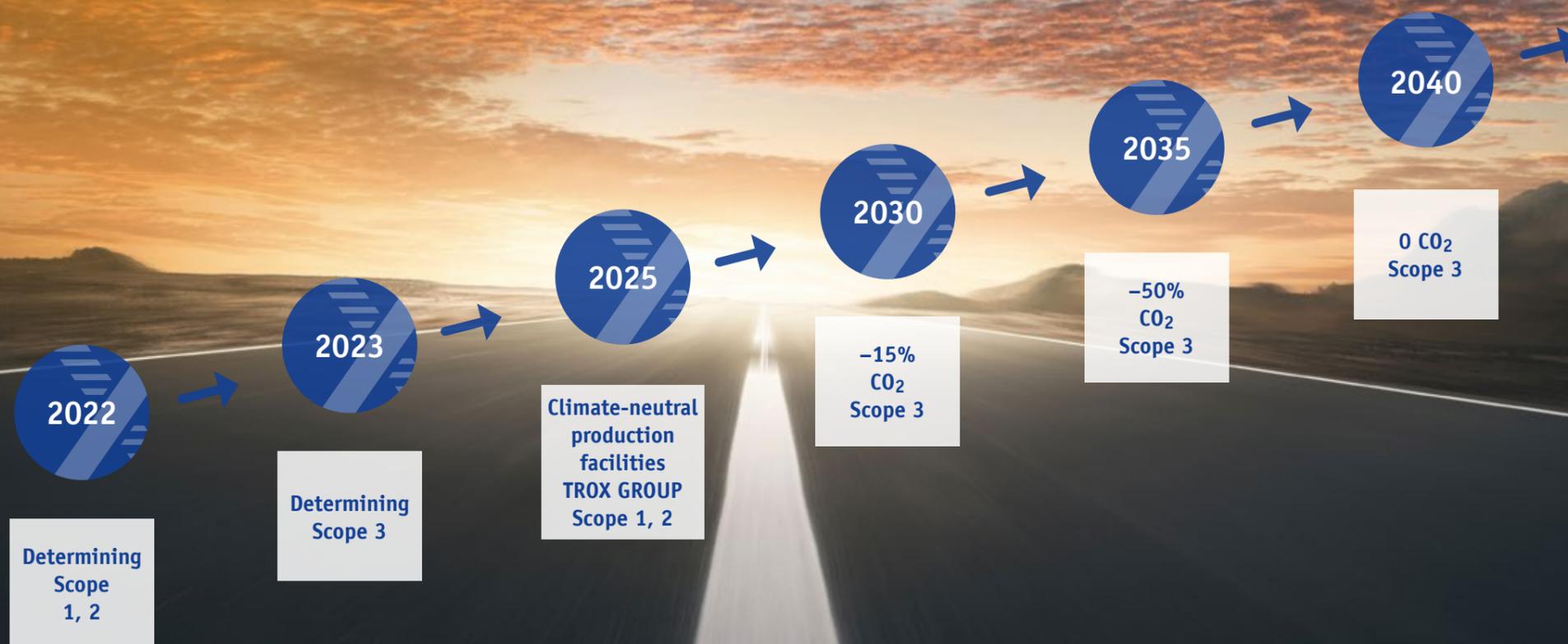
Compliance with the TROX sustainability values anchored here has been mandatory since 2021, so we only commission suppliers who have agreed to this. Violations can be reported via a whistleblower system, which leads to consequences determined jointly with the supplier.
- Environmental and Conflict Minerals Policy**

Detailed and easy to understand, this policy ensures that our suppliers comply with legal requirements. Conflict minerals data is already available from over 50% of our suppliers, including 46% of our core suppliers with results that meet TROX specifications.
- TROX Logistics Specification**

This guideline regulates our requirements for sustainable packaging such as the recyclability of packaging and filling material. For example, the filling material for deliveries to TROX GmbH must be sorted by type, and polystyrene chips or wood wool must be avoided.
- Guideline for sustainable procurement**

Basic framework conditions and instructions for global cooperation are clearly defined here, e.g. basic regulations on conflict minerals or behavioural guidelines on the focal points of the TROX materiality analysis.

2040 – CO<sub>2</sub> neutrality for the TROX GROUP



**Learning and teaching sustainability**

By the end of 2022, 100% of the employees in the purchasing department of TROX GmbH have been trained on the topic of sustainability. To expand this approach to include our suppliers and our subsidiaries, we decided to set up an e-learning platform in 2022, which will be implemented in 2023. In addition to globally accessible training materials, this platform is designed to ensure that what is learned is internalised through multiple-choice tests. The training courses are offered once a year for all buyers in the TROX GROUP and their suppliers.

**We avoid long delivery routes.**

To reduce CO<sub>2</sub>, we select our suppliers according to the principle of 'think global – act local'. This means choosing local suppliers at our locations where possible, which allows us to reduce logistics and transport emissions.

**Our green energy management**

TROX is doing a great deal more than purchasing more green energy and investing in solar panels and other alternative energy sources. Since 2015, we have been working with an energy management system certified according to ISO 50001, and since 2018 with an environmental management system certified according to ISO 14001. We are also striving to boost the commitment of suppliers by offering incentives to introduce a comparable system to reduce their power consumption.

TROX intends for sustainability to become an integral component of its purchasing strategy and is working closely with suppliers to achieve a procurement process that is 100% sustainable.

We are thus supporting the CO<sub>2</sub> savings targets of the TROX GROUP from the very outset during the purchasing process and making a significant contribution to achieving the milestones planned for 2030 and 2035 on the path to complete climate neutrality by 2040.

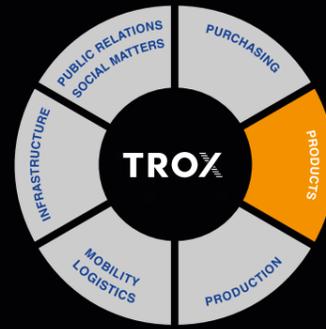
## Products



**Ralf Joneleit**  
Head of TROX Technology  
Member of the Extended Management Board TROX GmbH

'TROX products and systems have evolved into much more than highly energy- and resource-efficient technology. They are becoming ever smarter, ever better connected and provide fresh, clean air indoors, which in turn ensures people's health and performance. This is sustainability at all levels.'

# PRODUCTS



## Products

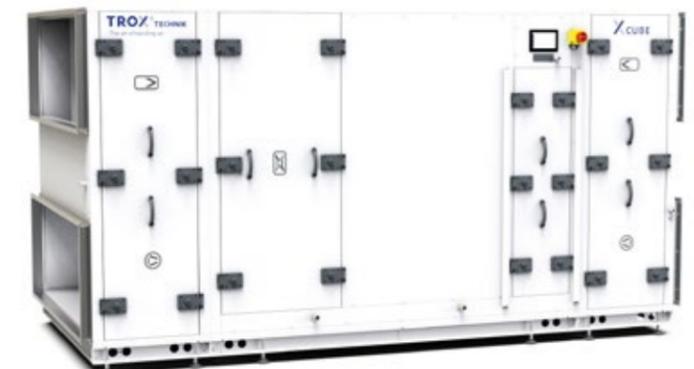
The sustainability of our products and systems is something we view in terms of a cycle, where each stage of creation, use and disposal plays a key part in conserving resources and minimising our CO<sub>2</sub> emissions.

TROX's global market leadership in ventilation and air-conditioning technology is based on our high standards of quality, energy efficiency, customer-friendly processes and durability. Our products have an average lifecycle of 25 years. They work efficiently, they save energy and CO<sub>2</sub>, they conserve resources and they fulfil our mission to provide 'indoor life quality'.

Meanwhile, we are now providing approx. 320 million people with fresh, clean air indoors. Our goal is to expand this to approx. 350 million people by 2025. After all, human health is just as fundamentally influenced by the quality of the air breathed as it is by the quality of water and nutrition (see pp. 8 – 11). Air is an important aliment. Good indoor air quality is a claim that we implement very successfully worldwide, with products and systems that remain sustainable throughout their entire life cycle.

Accordingly, sustainability begins for us with the first thought of a new product and only ends with its recyclability or reusability.

### TROX PRODUCTS BECOMING MORE AND MORE SUSTAINABLE



X-CUBE X2 compact with highly efficient heat recovery





TFC  
Ceiling-mounted particulate  
filter air terminal device



TFEA  
Ceiling diffuser for  
extract air applications

**We integrate sustainability into the entire product life cycle – right from the start.**

How sustainable a product ultimately is can and should already be planned in its creation process. Because from a sustainability perspective, it makes a big difference whether finite or renewable raw materials are used, whether the focus is on long-lasting quality or cost reduction, and whether a product can be easily disassembled and recycled at the end of its life cycle or has to be disposed of at great expense.

We place particular value on taking the ecological footprint into consideration right from our products' design stage. Our planning is appropriately careful and comprehensive:

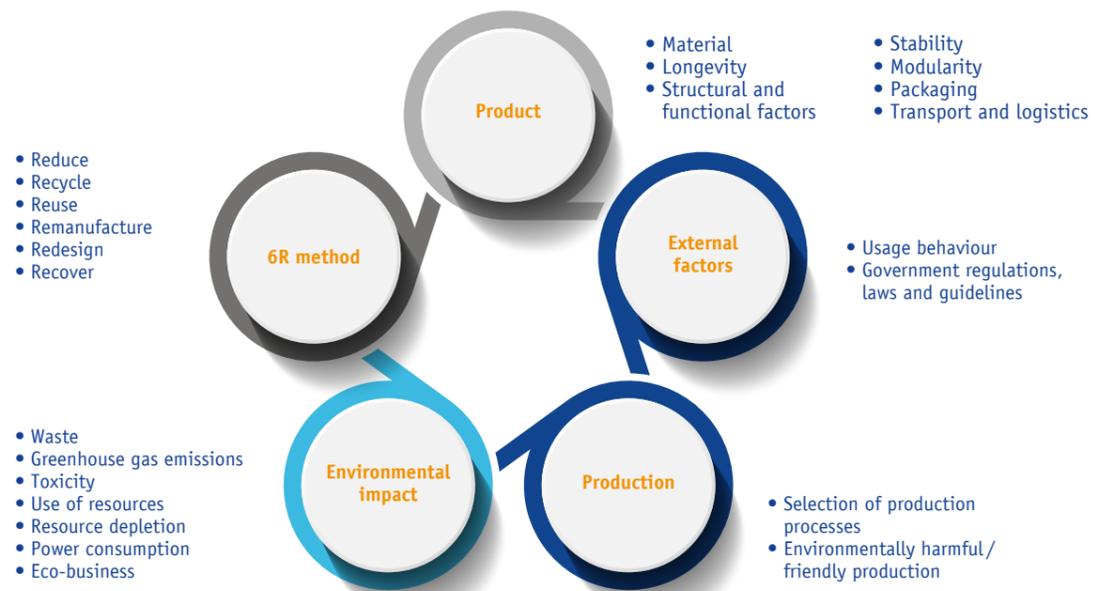
- Selection of material, material thickness, waste, etc. having regard to the supply chain
- Detachable connection methods for subsequent sorting on the basis of type
- Ensuring materials are free of harmful substances by expanding material compliance management
- Technical improvements to increase energy efficiency
- Stable, durable products that are repairable
- Easy disposal
- Sustainable packaging

The result of this extensive design work are products characterised by quality, durability, energy efficiency and well thought-out sustainability on the market.

**FOR US, THE ENTIRE PRODUCT LIFE CYCLE COUNTS**



**Ecological sustainability in product design**



**Entering a new phase of product development**

Thanks to an intensive expansion of our software development department, including upstaffing and a switch to agile development methods, we have significantly strengthened TROX's digital capabilities. In a market environment that requires innovative and fast development processes, we were thus able to push ahead with our further development, especially that of TROX systems, in close proximity to the market and customers.

One example is the new TROX O<sub>x</sub> System. Software and tools of this holistic, digital system innovation are developed in-house. TROX O<sub>x</sub> is thus bringing the future forward and into the here and now:

- Can be used for sub-systems or the complete control of ventilation and air conditioning systems – in future also as a basis for a comprehensive building automation solution
- Simple plug & play connections
- Significantly fewer interfaces
- Clear, intuitive operation
- Significant simplification of processes

**Innovative success a reflection of the courage to try something new**

Through creative out-of-the-box thinking, TROX has often been a pioneer of innovative solutions. 2022, we have opted for agile development in the area of software, which demonstrably outperforms classic project management methods in terms of project success.

In addition, we have launched the BMWK-funded research project 'LuftKonVerTeR' together with our partners, RWTH Aachen, the TU Berlin and Lavair, the market-leading manufacturer of air scrubbers. TROX is focusing its research on cloud-based air handling system monitoring and has applied modern machine learning methods, among other things.

We love curiosity and use progress to create innovations that make our future easier and more sustainable.



After two months

**Research renewable raw materials on site? Why not.**

On the Paulownia plantation, our research project with the agricultural company Stefan Bonsels and the bio innovation park Rheinland e.V., in Neukirchen-Vluyn, 4,000 Paulownia trees are growing. Here, TROX is investigating whether the wood of this rapidly growing tree can be used as a climate-neutral material for TROX and thus contribute to waste avoidance and CO<sub>2</sub> reduction.

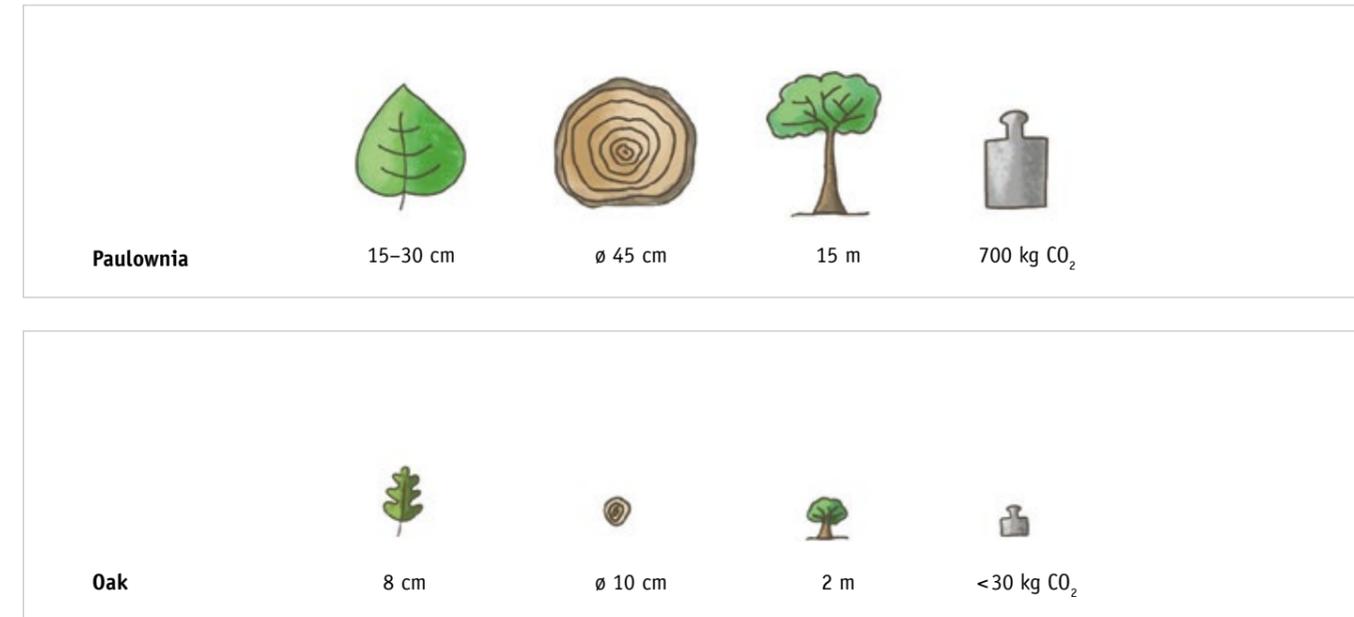
Paulownia trees, also known as bluebell trees, are characterised by extremely short growth phases and bind CO<sub>2</sub> much faster than conventional forest stands. In ten years, they reach many times the diameter and height of an oak tree and store 23 times more CO<sub>2</sub>. And after felling they sprout again up to five times.



After six months

**TROX CONDUCTS RESEARCH  
LOCALLY – ON CLIMATE-NEUTRAL  
MATERIALS AND A SENSIBLE,  
HONEST CO<sub>2</sub> CERTIFICATION**

**Paulownia – rapidly-growing hybrid tree compared to oak after 10–12 years**



The wood of the Paulownia trees is very light, stable and versatile. TROX is currently working on a use for ventilation components.

In addition, the plantation offers the opportunity to develop a certification model in order to create regional CO<sub>2</sub> certificates. For us, a certification option that would be locally based and traceable and that we could endorse with a clear conscience.

**Primary goals of this research project:**

1. Use of the extremely fast-growing, very light and stable wood as a climate-neutral product raw material.
2. Development of a certification model for the creation of regional CO<sub>2</sub> certificates that are comprehensible, make sense for us and strengthen the region.

With this project, we are embarking on an exciting research journey towards climate neutrality – with the potential to explore and advance the use of sustainable raw materials to reduce and avoid CO<sub>2</sub> emissions right on our doorstep.



Use this QR code to learn more about the Paulownia project.  
<https://paulownia.trox.de/en>

**Our tightness standards protect the environment.**

The energy efficiency of air handling units is dependent on the tightness of the installed components. The second highest leakage class C required by VDI 6022 is met by almost all TROX product types. Optionally, some series are also available with leakage class D if required. The latest TROX product types generally offer leakage class D, the highest leakage standard to date, even for basic products.

In this way, we are constantly creating better conditions for air handling units that are permanently in operation with maximum energy efficiency and thus save energy and CO<sub>2</sub> savings.



X-CUBE SCHOOLAIR-S-HV, compact stand-alone solution

**WE FOCUS ON SUSTAINABILITY THAT IS CLEAR, MEASURABLE AND MEANINGFUL**

**Less energy consumption with every product improvement.**

The new SCHOOLAIR HV floor-standing unit has been equipped with a further improved heat recovery system. In general, we have designed HV units of the latest SCHOOLAIR type in such a way that the use of rotary heat recovery units ensures year-round and permanent use of the heat recovery – heat recovery coefficient > 75%.

In addition, all SCHOOLAIR units achieve best SFP classes. The SFP value characterises the electrical energy consumption and thus the performance level of a fan system. The smaller the value in the spectrum between SFP-0 and SFP-7, the less electrical energy is required. All SCHOOLAIR units achieve SFP-0 and are thus characterised by extremely low energy consumption.

For example, the SCHOOLAIR-S-V in nominal operation consumes only 160 W at a volume flow of 800 m<sup>3</sup>/h (supply/extract air).

**We want to know the ecological footprint of every TROX product.**

In industries such as plant engineering, the product carbon footprint (PCF) is used as a common indicator of sustainability. It includes transport, material, purchased parts and the production process. We determined a PCF of 70 kg for the TROX multileaf damper JZ-LL and found that the area of materials and purchased parts holds the greatest potential for change with a share of around 66 kg.

Environmental product declarations (EPDs) are much more far-reaching and increasingly relevant in building technology because they describe the environmental impact of a product over its entire life cycle. This includes statements on the use of energy and resources, waste generation and the contribution to the greenhouse effect, acidification, eutrophication, destruction of the ozone layer, smog formation and more.

TROX has set the course in 2022 to be able to produce EPDs for all main product series in 2023. This will enable us to better define the sustainability factor of our products and subsequently influence it positively.

**We support environmentally sound waste disposal in cold print.**

In the future, every new assembly instruction will contain detailed disposal instructions that make it easy to dispose of all components correctly. It contains the breakdown of all components used and a material description, provides information on the waste code according to the European Waste Catalogue and, if required, also provides information on the type of disposal.



TROX multileaf damper JZ-LL

**20 years old and ready for a second product life. This is TROX durability.**

After Ferring, a large Swedish pharmaceutical company, sold its old headquarters in Copenhagen, the building was to be refurbished. The new owner approached us with the question of whether the 20-year-old TROX active chilled beams installed there could still be used with the same performance.

In-depth tests according to ISO, Eurovent and other current regulations showed undiminished performance of the units – after 20 years! Even with minor cleaning and refreshing work, 400 units could be made further usable. An extremely resource-saving success, which is based not least on the high product quality of TROX.



## Production



**Dieter Becker**  
Division Manager Production  
Member of the Extended Management Board TROX GmbH

'Year after year, we activate sustainability potential at the 20 TROX production sites that protects people and resources. Because our investments in sustainable technologies and processes ensure more safety and comfort at the workplaces and reduce the consumption of raw materials through the often much better use of materials. Everyone benefits here.'

# PRODUCTION



## Production

By implementing permanent sustainability improvements within production processes, we are utilising the opportunity to protect the earth's resources and to guarantee our employees a pleasant, safe working environment.

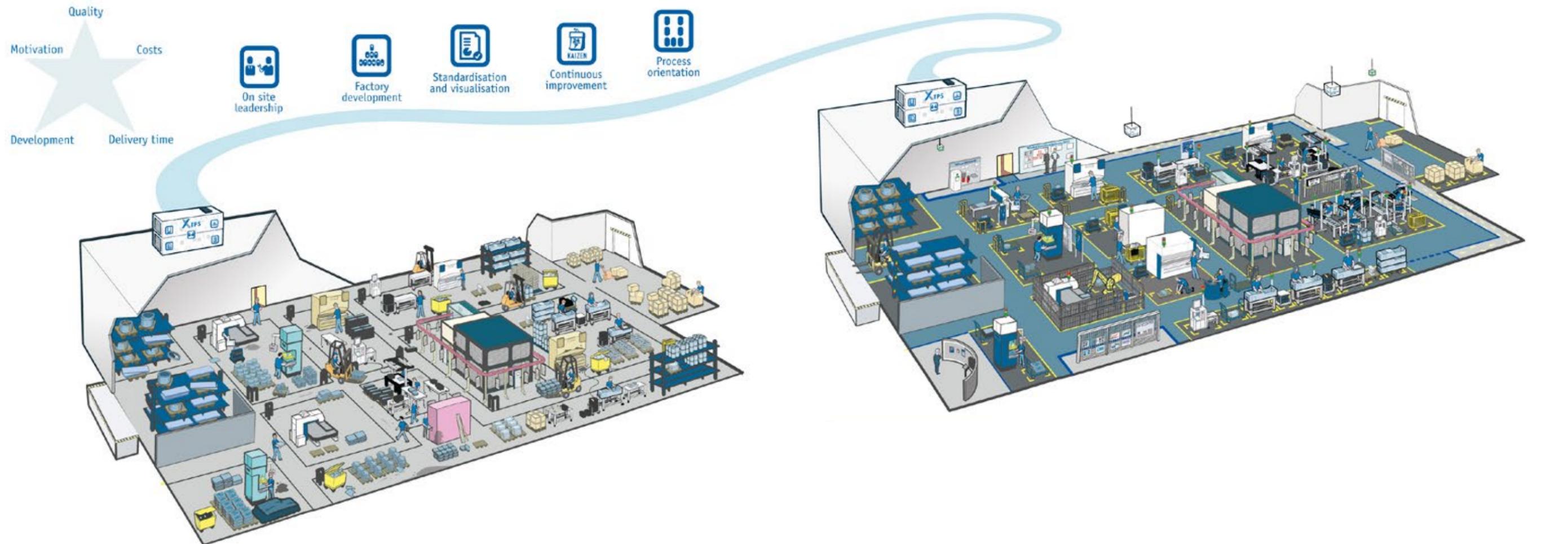
The TROX GROUP now produces at 20 locations worldwide. Each production facility is subject to a constant screening process to identify opportunities for continuous improvement, with respect to sustainability and with the aim of being completely climate-neutral by 2040. In Scope 1 and 2, we are even working towards climate neutrality in 2025 at our plants.

In the production process, our focus is on plant and process optimisations that help to continuously reduce our energy and resource consumption. Here, the improvement of data collection has proven to be particularly helpful. Because the more precisely we can determine our consumption, the easier it is to identify and implement optimisation options.

Equally important to us is a workplace design that offers every production employee an ergonomically healthy and highly safe working environment. Accordingly, we promote redesigns that enhance the well-being of our employees.

### PROTECTING RESOURCES, CLIMATE, PEOPLE





**The TROX Production System (TPS) systematically promotes sustainability in the production facilities of the TROX GROUP.**

The purpose of the TROX production system (TPS) is to help us to align the structures and organisations of each production facility in the TROX GROUP, to facilitate the continuous improvement of production processes and administrative procedures.

TPS provides a variety of improvement tools that can be used in a very targeted and needs-based manner. Annual trainings and audits combine the competent handling of the responsible persons with clearly defined fields of action and well-founded measures. We document outstanding ideas and implementations in the TPS Best Practice Manual.

At the same time, the plants ensure through permanent, comprehensive exchange – e.g. in regular video conferences – that successful improvements multiply quickly and that the sustainability development of the entire TROX GROUP progresses in a targeted manner.

TPS Workshop





**Additional sustainability engine at TROX GmbH: the integrated management system.**

The TROX integrated management system controls the areas of quality, energy and environmental management, as well as work and health management. All departments define concrete plans of action and measures and these are accompanied by internal system and process audits.

Together with the TPS improvement tools, the integrated management system within TROX GmbH led to very effective sustainability measures in 2022:

**Energy and CO<sub>2</sub> reduction:**

- Saving energy by regularly checking and stopping leaks in the compressed air lines
- Reduced power consumption due to new projection welding machine
- Energy saving through new air compressor with heat recovery, which has been connected to the heating boiler of the administration building

**Reduction of material consumption:**

- Complete elimination of packaging materials for filter deliveries from Goch is being planned
- Reduction of over 50% PU adhesive across all series through design changes plus modified assembly and adhesive application procedures
- Savings of approx. 30% hot melt adhesive by switching to air-loaded gluing process, which additionally reduces the total weight of the filter



**More pleasant, safer workplaces:**

- Design of ergonomic workplaces in small parts production
- Ergonomic working height adjustment in the U-production area
- Ergonomically optimised, more pleasant working environment through line optimisation of final assembly for filter housings
- Improved ergonomics due to additional support by means of a newly installed lifting device during the modified assembly and adhesive application process

**Sustainability impacts on several levels:**

- Reduction of waste when changing parts, fewer missing parts and lower energy consumption due to a new splitter frame profiling system
- Ergonomic assembly device for motor plates in small parts production with workflow monitoring to avoid bad parts
- Wood pellet production from waste wood for heating the CHP is being planned
- Reduction of packaging waste and CO<sub>2</sub> through approx. 741 m<sup>3</sup> reduced transport volume and savings of approx. 100 storage locations plus improved ergonomics in the packaging process thanks to the new automatic carton cutting machine
- Changeover from spot welding to a significantly more energy-saving clinching process that does not require cooling, with improved occupational safety and no fire hazard due to flying sparks

The production processes in the TROX GROUP will continue to be systematically screened and improved in a well-structured manner – for climate-neutral production by 2025 and for workplaces that are pleasant, healthy and safe.

**TROX's sustainability structures effective worldwide**

Our efforts to create an easy-to-use framework for sustainability development throughout the TROX GROUP are bearing fruit. In the production facilities of our subsidiaries all over the world, measures are developed and implemented that reduce our ecological footprint and benefit people. Examples of this are:

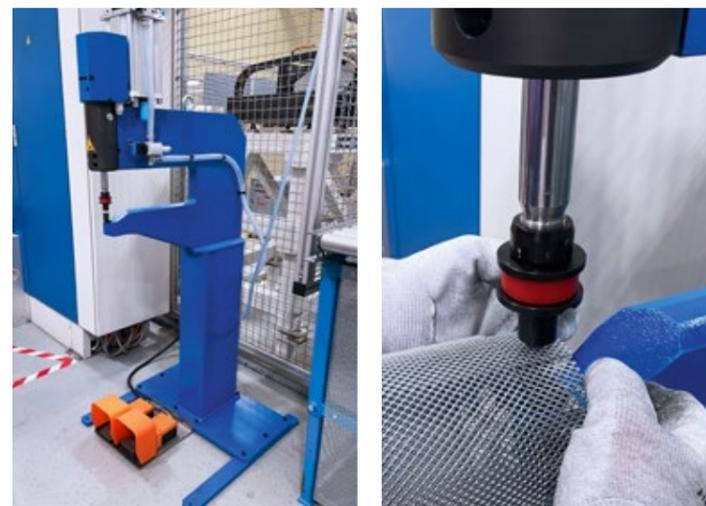
**Mexico:**

An in-house powder coating booth replaces external contract coating, thus reduces transports including CO<sub>2</sub> emissions.

**Brazil:**

Here, special platforms were purchased that can be individually adjusted to the most comfortable height for the employee. Used as assembly benches, they enable ergonomically improved, comfortable work. This ergonomic optimisation is currently in the test phase.

In addition, a new, more efficient powder coating system is being planned, which will contribute to energy and material savings.



## Mobility and logistics



**Natalie Licht**  
Functional Area Manager Logistics & Production Processes  
Customs Manager

'We are working towards a future that is more sustainable and at the same time more economical for us and our customers. So it seems obvious to use modern logistics concepts to increase the availability of goods and save on travel, to change packaging with a view to conserving resources, or to gear the vehicle fleet and travel behaviour to CO<sub>2</sub> saving mode. All of this takes place at TROX and offers exciting opportunities to help shape the future.'

MOBILITY  
LOGISTICS



## Mobility and logistics

Thanks to our changes and measures in the 'Mobility and logistics' field of action, we are saving more and more CO<sub>2</sub> and packaging waste.

The increasing awareness of the importance of sustainability is also coupled with a growing motivation across TROX to save CO<sub>2</sub> by implementing changes in travel behaviour, intensifying pioneering logistics concepts and rethinking packaging.

In this field of action, we have set the goal of systematically building on our previous successes in a way that inspires motivation.

### Our fleet growth: from now on, only electric!

There will always be business trips that are made by car at TROX, even after careful consideration. In 2022, the passenger cars of TROX GmbH travelled a total of 52,231 km – and this with growing electromobility. Because we only consider hybrid or electric models for new purchases.

In 2022, we increased our electric fleet at the Neukirchen-Vluyn and Anholt locations to ten vehicles.

Parallel to this, the expansion of charging stations is underway – and not just for our e-cars. Charging cabinets for future TROX job e-bikes as well as for private e-bikes are also being planned.



### WE ARE EXPANDING OUR ELECTROMOBILITY

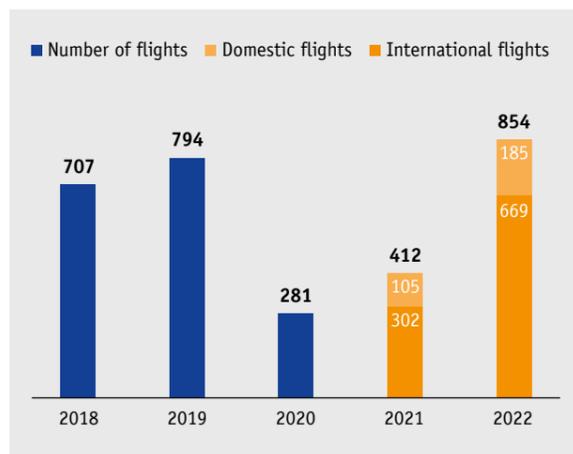




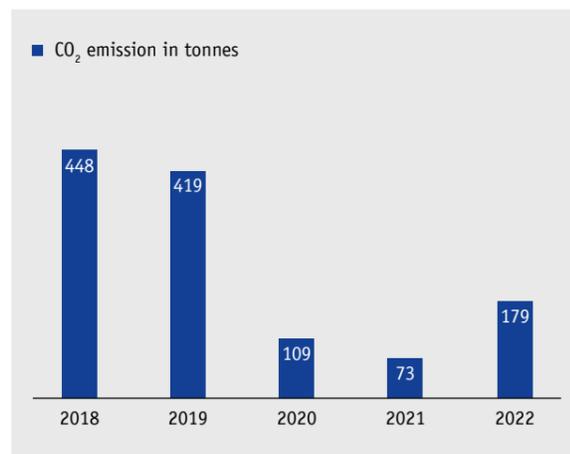
**This is how we fly today.**

In the wake of the post-Corona times, with the removal of contact restrictions, the number of TROX GmbH flights has increased again. So we can still work on that. However, there were significantly more long international flights than short domestic flights. On the basis of the current calculation parameters, only 179 tonnes of CO<sub>2</sub> were generated.

Number of TROX GmbH flights in year-on-year comparison



Annual comparison of CO<sub>2</sub> emissions at TROX GmbH



**We are increasingly travelling CO<sub>2</sub>-free by train.**

Where possible, we try to conduct business trips by rail to protect the climate. This way of travelling is becoming increasingly popular at TROX and replaces many a car journey and even some flights.

The passenger kilometres (PKM) travelled by rail at TROX GmbH more than doubled in comparison to the previous year – from 43,003 to 95,717. Through this expansion of our travel by rail, we were able to save 20 t of CO<sub>2</sub> in direct comparison to the car.

**FOR BUSINESS TRIPS,  
WE INCREASINGLY RELY  
ON THE TRAIN**

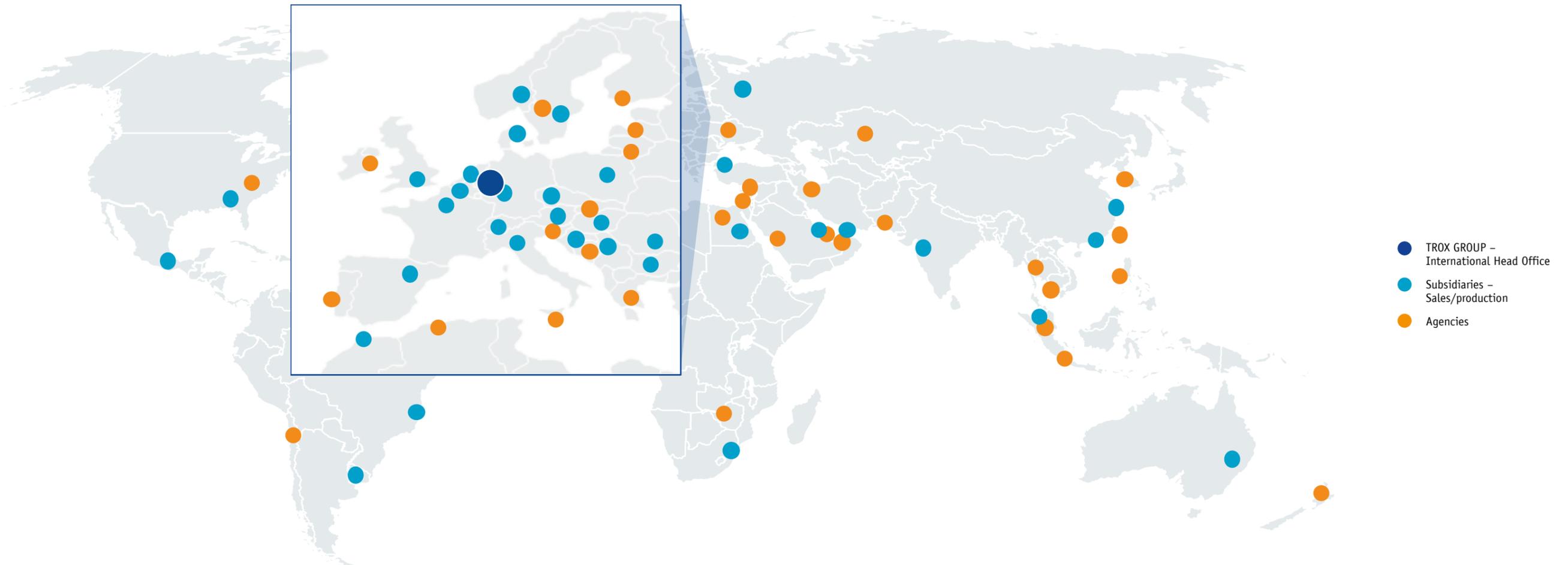
CO<sub>2</sub> savings of TROX GmbH through train usage



	PKM*	CO <sub>2</sub> emissions	CO <sub>2</sub> savings
2021	43,003	0	6,876 kg
2022	95,717	0	20,684 kg

\* Passenger kilometres travelled.





**OUR LOGISTICS STRATEGY:  
GLOBAL, HOLISTIC, INTERLINKED**

**Production in proximity to our customers worldwide.**

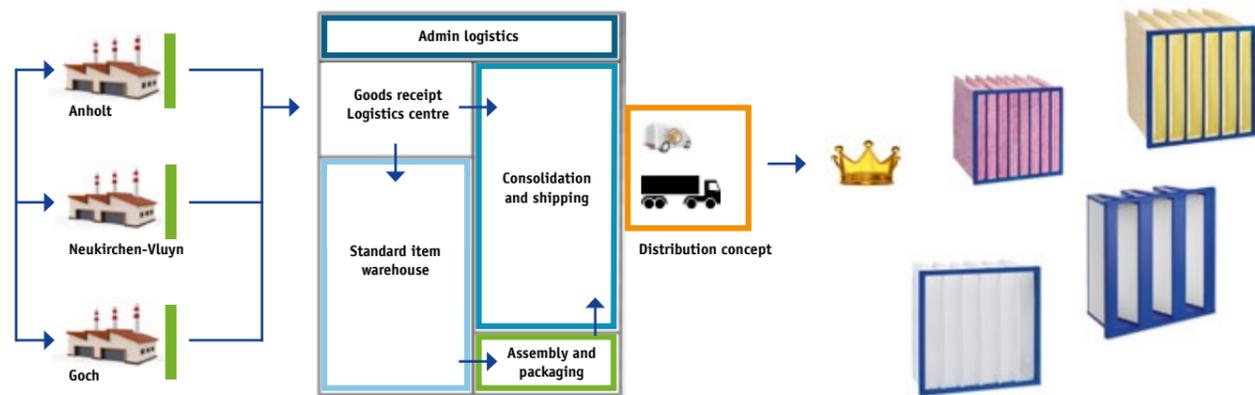
Thanks to our 20 production sites around the world, we produce precisely where our products are in demand and needed. Since we systematically bundle our deliveries, we cannot only produce and deliver close to our customers, we also shorten delivery times and travel distances and thus reduce CO<sub>2</sub> emissions of the entire TROX GROUP.

To ensure perfect networking and optimum processes, we work in close cooperation with our subsidiaries on the design and implementation of our logistics concepts to ensure that individual concerns are also taken into account.

**We pursue this holistic approach in all logistics-relevant areas:**

	Explanation
<b>Inbound logistics</b>	› Imports to TROX
<b>Outbound logistics</b>	› Ex works to the customer
<b>Customs matters</b>	› Supplier declaration, sanctions list check, export control, powers of attorney, authorisations and many more
<b>Ways of transport</b>	› Road, water, rail, air
<b>Company-internal</b>	› Logistics strategy
<b>Storage logistics</b>	› Finished goods warehouse, etc.

Logistics concept for the new finished goods warehouse



**THE DIRECT AVAILABILITY OF STOCK ITEMS REDUCES TRANSPORT ROUTES AND GIVES OUR CUSTOMERS PLANNING SECURITY**

**Great progress in our filter logistics pilot project**

We have expanded our stock items from 80 to currently 97 – and that on 1,000 storage spaces. Together with consolidation areas for further packages at a sustainably active service provider, we are thus increasing the number of products that are quickly available from stock and simultaneously facilitating production streamlining.

We are also collecting and evaluating data for this project. This led, among other things, to an optimisation of the packaging for our filters. The revised packaging is now reduced in volume, standardised according to packaging regulations – and thus significantly more resource-efficient. Only four carton sizes are required, foil packaging is only used when absolutely necessary and we do not use any filling material at all. A further volume reduction is also planned. A good example of how important robust data is to successfully integrate sustainable change.

In addition, the direct availability of stock items has enabled us to better consolidate our shipments rather than split them. This saves travel and gives our customers planning security, as many different delivery dates are now generally a thing of the past. The increase in the proportion of warehouse shipments from 13% to almost 20% confirms the effectiveness of this sustainable logistics concept.

**Replacing styrofoam with wood**

In the past, polystyrene was used for the packaging of many components, such as the TROX splitter sound attenuator. Since these silencers are often larger than a standard Euro pallet, specially shaped Styrofoam skids were developed for a simple, flexible and adapted solution – with correspondingly disadvantageous effects such as broken Styrofoam parts flying around, which quickly ended up in the normal waste. We were looking for an ecologically much more suitable alternative.

Since the end of 2022, we have been transporting our silencers to the customer on short wooden skids instead of on loose polystyrene skids as before. This enabled us to significantly reduce the packaging waste generated by the broken polystyrene parts.

Thanks to the more stable wooden runners, transport is also safer, which also reduces the risk of transport damage. With this packaging change, we have implemented another resource-saving optimisation measure.

**TROX registered in the LUCID Packaging Register**

As part of the Packaging Act that has been in force since 2019, a registration obligation in the LUCID packaging register applies from 1 July 2022, which we as TROX GmbH comply with. Further voluntary steps are currently being examined.

**We also plan logistics reliably and sustainably in the event of production relocation.**

The relocation of the production of our circular silencers from the Anholt production facility to the Czech Republic presented us with the logistical challenge of how to ensure the continuation of prompt delivery for customers in Germany. We therefore decided on direct deliveries with a forwarding agent that could meet our sustainability requirements and provide a modern vehicle fleet with a large partner network.

This arrangement illustrates our flexibility in aligning our logistics to meet demand – with a constant eye on the sustainability of our decisions.



## Infrastructure



**Paul Schwarz**  
Functional Area Manager Civil Engineering/Safety

'I can only say: it's working. From LED lighting to solar panels, we are making our buildings sustainable, gradually switching to green energy and reducing our waste with effective waste management – worldwide. The CO<sub>2</sub> emissions of the TROX GROUP are falling as targeted. Our control of measures is very precise and effective.'

# INFRASTRUCTURE



# Infrastructure



Year after year, we are improving the sustainability values of the TROX GROUP in the 'Infrastructure' field of action. Measures that we have implemented are continuing to take effect in lowering our CO<sub>2</sub> emissions, reducing our waste generation and paving the way for a sustainable digital future for the company.

The 2022 energy crisis has encouraged us to think even harder about alternatives to fossil fuels. It is the reason our path to achieving a climate-neutral TROX GROUP must go beyond implementing effective CO<sub>2</sub>-saving upgrade measures and take in the purchase of green energy.

The basis of our action planning is reliable data collection. We keep installing electricity, gas and water meters to measure our consumption accurately and to be able to take effective measures. In this way, we are moving steadily further away from having to estimate and derive individual CO<sub>2</sub> conversion factors, and obtain more and more accurate data.

TROX's internal environmental balance sheet confirms the success of our sustainability measures. In this way, TROX GmbH was able to reduce its CO<sub>2</sub> emissions in Scope 1 and 2 to 4,256 t and thus by a total of 53.8% in relation to outgoing invoices since 2015. On this basis, the entire TROX GROUP achieved a total CO<sub>2</sub> reduction of 40.3%. We are working towards a further drastic reduction by 2025.

**OUR ENERGY SAVING POTENTIAL IS BASED ON EXACT DATA**

### CO<sub>2</sub> emissions of TROX GmbH

TROX GmbH	2015	2016	2017	2018	2019	2020	2021	2022	> 2025	
CO <sub>2</sub> emissions (t)	6,514	6,625	6,769	6,719	6,645	6,958	4,952	4,256	1,073	
CO <sub>2</sub> emissions (t) per € million euros invoiced	29.0	28.6	29.1	26.4	24.0	25.7	16.2	13.4	2.9	
Change (%)							-11.2	-44.2	-53.8	-90

### CO<sub>2</sub> emissions of the TROX GROUP

TROX GROUP	2015	2016	2017	2018	2019	2020	2021	2022	> 2025	
CO <sub>2</sub> emissions (t)	16,099	16,180	15,815	16,257	15,879	16,394	16,454	13,204	5,647	
CO <sub>2</sub> emissions (t) per € million of outgoing invoices	33.1	34.3	32.4	32.1	29.3	31.2	27.1	19.7	6.9	
Change (%)							-5.7	-18	-40.3	-79.1

Outgoing invoices include only production and trade goods revenues.

**Reading example:** TROX GmbH has reduced its CO<sub>2</sub> emissions in Scope 1 and 2 by 53.8% between 2015 and 2022: from 29 t to 13.4 t per €1 million euros invoiced.

**Our interim goal: climate-neutral production facilities by 2025**

While we are striving to achieve climate neutrality for the entire TROX GROUP by 2040, we have already set this goal for our plants for 2025.

From climate-neutral new buildings to targeted optimisations of existing buildings, we have continued to identify, plan and implement many sustainable infrastructure projects in 2022, thereby reducing our CO<sub>2</sub> emissions in Scope 1 and 2. By 2025, we will therefore achieve climate neutrality in all Scope 1 and 2 plants with the help of our increasingly meaningful data collection.

**The CO<sub>2</sub>-saving measures in our German plants.**

Our energy monitoring system is being continuously expanded, and more and more meters for electricity, gas, water, compressed air and heat are being added. 2022, the focus of this expansion was on the Anholt site. The detailed data collection – visualised by dashboards and summarised in report form – enables us to easily analyse and evaluate our energy consumption and makes it easier for us to find potential savings and implement energy-efficient measures. 2022, we have implemented the following energy-saving measures in the TROX GmbH plants:

**Solar/ photovoltaic systems**

We have been investing in this form of green energy use for years. In 2022, we have invested a total of 2.2 million euro in numerous started, commissioned and planned projects. Over the next few years, we will expand CO<sub>2</sub>-savings potential by solar/photovoltaic systems worldwide, with a correspondingly increasing need for investment.



**WE ARE CONSISTENTLY MODERNISING IN ORDER TO BE CLIMATE-NEUTRAL AS EARLY AS 2025 IN OUR PRODUCTION**



With the start of construction in August 2022, for example, a photovoltaic plant with an output of 1,500 kWp and an expected electricity generation of 1,248 MWh per year will be built at our Anholt plant. TROX X-FANS in Bad Hersfeld is also installing this energy-saving technology for commissioning in 2023, with an output of 550 kWp and an annual electricity generation of 485,460 kWh. At the Hörstel plant, we already cover 100% of the energy demand with a corresponding system.

**Geothermal plants**

We have also been using geothermal heat pump and cooling systems for a long time to reduce energy consumption. Since June 2022, the connection of hall 2 to geothermal energy has supplemented the CO<sub>2</sub>-saving heating and cooling at the Anholt plant with an energy saving capacity of 976,285 kWh per year. A new facility for Hall 1 including heat recovery was planned in 2022 and is expected to be commissioned in mid-2024.

**Conversion to LED lighting**

Even the small things often make a big impact in the masses. The conversion of lighting equipment to LED at the Anholt, Goch and Bad Hersfeld plants, for example, will lead to annual savings of 98 MWh per year. In addition, motion detectors were installed in the Goch plant so that the lights are automatically switched off when workplaces are not occupied.

**E-Mobility**

For easy charging of our electric and hybrid vehicles, we have planned the construction of 16 wallboxes in 2022 and have already partially implemented them. In addition, the installation of charging stations with approx. 54 charging compartments for e-bikes in Neukirchen-Vluyn and Anholt has been initiated, with completion in summer 2023.

**Green energy**

Basically, we are trying to successively reduce our consumption of gas and oil and ultimately replace it entirely with purchases from renewable energy sources. We already cover 100% of our electricity needs at the GmbH with green electricity.



NATIONAL

**The CO<sub>2</sub>-saving measures in our international plants.**

In order to achieve our interim goal of climate-neutral plants by 2025, our subsidiaries also implemented many energy-saving measures in 2022:

**TROX Spain**

With the aim of reducing energy demand by 45%, photovoltaic systems are being installed at our Spanish subsidiary. In phase 1, implemented in 2022, the roof of the warehouse and office building was fitted with 781 photovoltaic modules, which save 420 kWh and 186.2 t CO<sub>2</sub> per year under continuous process monitoring. Phase 2 is currently building a car park canopy with solar panels and chargers for e-cars, as well as four charging stations for e-cars, which will generate an additional saving of 70 kWh and 31.6 t CO<sub>2</sub> per year. Phase 3 with annual savings of 331 kWh and 141 t CO<sub>2</sub> is being planned. Overall, this modernisation will reduce the annual CO<sub>2</sub> emissions by 358.8 t.

**TROX China**

The conversion to LED lighting was pursued in 2022, as was the development of an office automation system to reduce paper consumption. In addition, sustainable solutions for the housing sector are being researched in cooperation with international ESG organisations such as WELL.

**TROX Malaysia**

The photovoltaic system on the roof of the plant, completed in 2022, is expected to cover 40% of the electricity demand. In addition, rainwater harvesting was implemented for the plant's sanitary facilities.



**TROX Norway**

Even after the construction of the almost climate-neutral TROX Auranor plant, the energy consumption is precisely documented for possible further optimisation. In addition, planning for the installation of solar panels started in 2022 – with an expected completion in summer 2023.

**TROX Brazil**

Since January 2022, our subsidiary in Brazil has been operating with an ISO 14001-certified environmental management system.

The switch from the tied to the free electricity market at the end of 2021 made it possible to use renewable energy sources and thus reduce the plant's CO<sub>2</sub> emissions – confirmed by a certificate for the purchase of sustainable, clean energy.

In order to reduce natural gas consumption, the use of a powder paint with a lower curing temperature is in the test phase. And the use of solar panels is being planned.

**TROX Switzerland**

Following a thorough planning phase, TROX HESCO was able to start building its new plant in 2022. With the goal, like TROX Auranor, of producing almost climate-neutral. The focus is already on sustainability during construction. The supporting structure, for example, is made of regional timber and can be dismantled again thanks to detachable connections. A photovoltaic system with 600 kWp is firmly planned. This

plant in CO<sub>2</sub>-binding timber construction could hardly be realised in a more sustainable way.

TROX HESCO already uses energy-saving heat recovery for the powder line and the shrink wrapping oven. In addition, modern digital systems support sustainable processes such as the conversion to paperless production in two departments.

**TROX South Africa**

Here, the heat recovery project is taking shape – with a projected reduction of 8,640 kWh annually and 8.38 t CO<sub>2</sub>.

**TROX Czech Republic**

For both the existing building and the new building, the installation of photovoltaic systems was initiated in 2022, which are expected to generate 30% to 50% of the required energy.

INFORMATION



**WE FOLLOW OUR SUSTAINABILITY PATH TOGETHER WITH THE ENTIRE TROX GROUP**

**Our consumption of electricity, gas, oil and water is steadily decreasing.**

After an increase in the previous year, the TROX GROUP's water consumption fell again by 7.4%. Our investments, from the switch to LED lighting to photovoltaic systems to the choice of renewable energy sources, are paying off. The CO<sub>2</sub> emissions of the TROX GROUP from electricity, gas and oil consumption could again be slightly reduced by 4.2% in 2022.

Like TROX GmbH, more and more TROX companies are now sourcing exclusively green electricity. We are also working towards being able to do completely without gas and oil in the future. Our successes so far have shown us what is possible. On this basis, we plan to achieve another 57% CO<sub>2</sub> savings by 2025.

In relation to our total turnover, CO<sub>2</sub> emissions in tonnes per million euros invoiced fell to 13,204 tonnes compared to the previous year and is expected to fall by a further 7,557 tonnes by 2025. This proves our path to climate neutrality to be highly efficient and purposeful.

**CO<sub>2</sub> reduction per million euros invoiced**

TROX GROUP	2020	2021	2022	> 2025
CO <sub>2</sub> emissions (t) from electricity, gas, oil consumption	16,394	16,454	13,204	5,647
CO <sub>2</sub> emissions (t) per million euros invoiced	31.2	27.1	19.7	6.9

Outgoing invoices include only production and trade goods revenues.

**Thinking in all directions**

As we are always open all possibilities when it comes to saving CO<sub>2</sub> – therefore, we are also currently examining the use of wind power to generate energy.



**Our waste management: avoid, reduce, recycle, reuse**

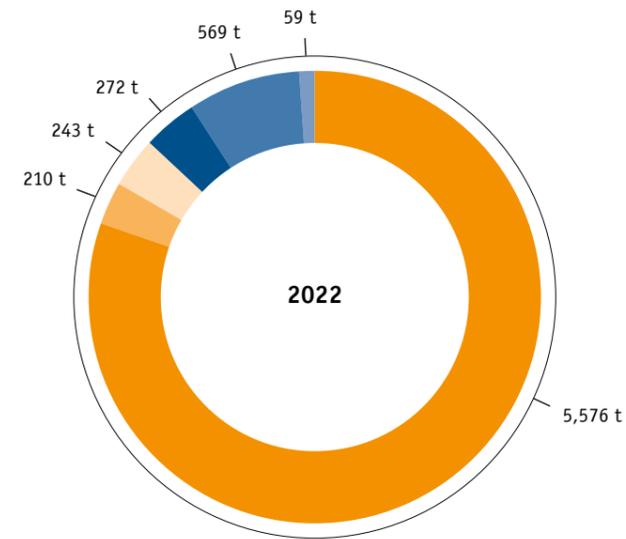
With the development of a Group-wide, uniform waste management system by 2025, we will be tackling the waste of raw materials throughout the TROX GROUP. We are already making great progress.



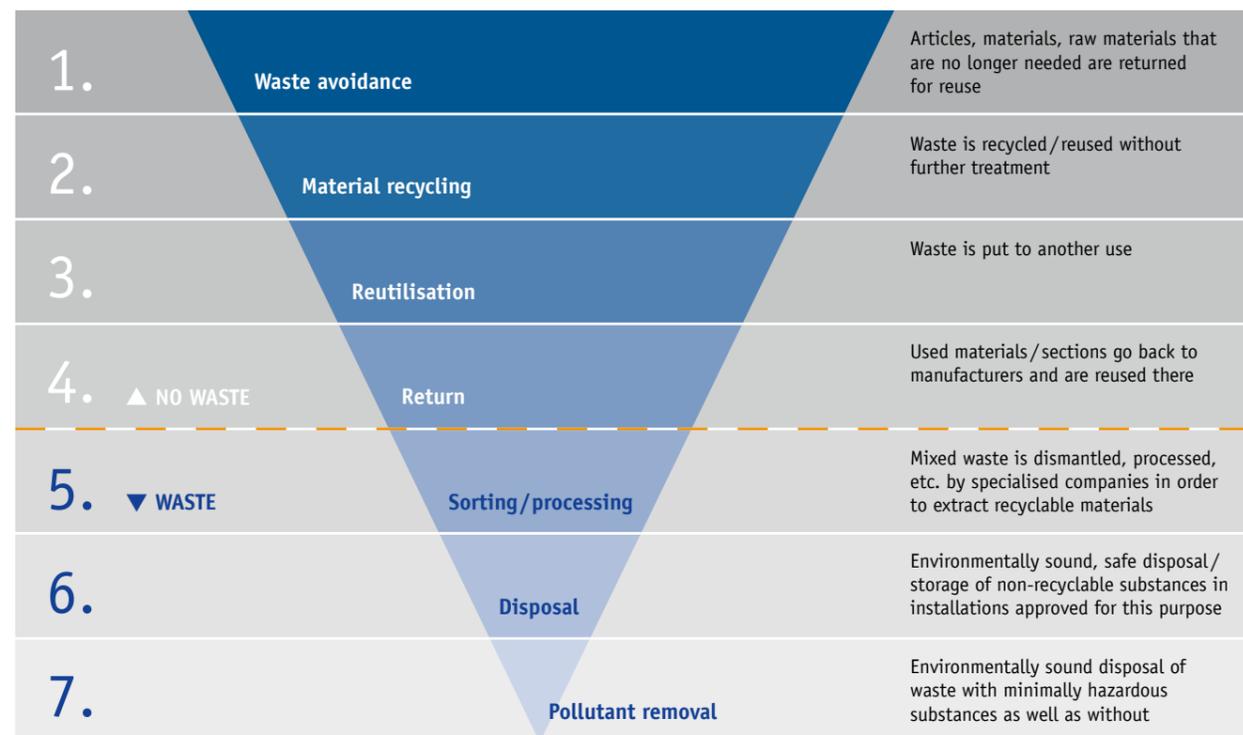
- TROX China reduces scrap by purchasing metal sheets in special sizes.
- TROX South Africa recycles previously disposed of waste material from air handling units internally and uses it to manufacture casings and front panels of the DCV dampers. Attractive side effect: Price reduction for our customers.
- TROX Brazil has replaced aggressive products such as paint thinner with biodegradable products. In addition, a first measurement over one week showed that the consumption of production paper can be reduced by 60% by using tablets.
- The Goch plant reduces the need for filling material thanks to tower packing. The paper-saving pilot project is expected to reduce paper demand by 5–15%.
- 2022 TROX GmbH has returned discarded hardware to HP. 36 servers were dismantled, 339 RAM modules processed and 181 HDDs erased. Almost 76% of all components were given a second life and are now being reused.

These examples show how many small and large ideas and measures are used to exploit the savings potential in the amount of waste generated by the TROX GROUP – such as the simple and yet so effective waste separation in the buildings of TROX Spain (photo left).

**Waste produced by TROX GmbH**



**The TROX waste hierarchy**



TROX GmbH	2020 in t	2021 in t	2022 in t	Target 2025
1 Waste avoidance	not recorded	not recorded	not recorded	
2 Material recycling	3,385	5,190	5,576	
3 Reutilisation	1,292	367	210	
4 Return	223	237	243	
Recycling rate 2–4	83%	86%	87%	90%
5 Sorting / processing	327	357	272	
6 Disposal	660	552	569	
7 Pollutant removal	37	43	59	
Disposal rate 5 – 7	17%	14%	13%	< 10%

The waste figures for the entire TROX GROUP were surveyed for the first time in 2022 in order to create a data basis and more transparency for future analyses and targets.

TROX GmbH is rapidly approaching the recycling rate of 90% targeted by 2025 and thus a disposal rate of less than 10%.

**WE ALSO SEE WASTE AS A RECYCLING POTENTIAL**



**The digital leader in the industry thanks to our innovative approaches**

We have viewed the digitisation mega trend as an opportunity right from the start and have been able to shape it. TROX products are becoming increasingly digital and intelligent.

The Internet of Things (IoT) creates the basis for perfect networking and comprehensive data exchange and enables seamless communication between employees, processes and objects. At TROX, the IoT is becoming increasingly important.



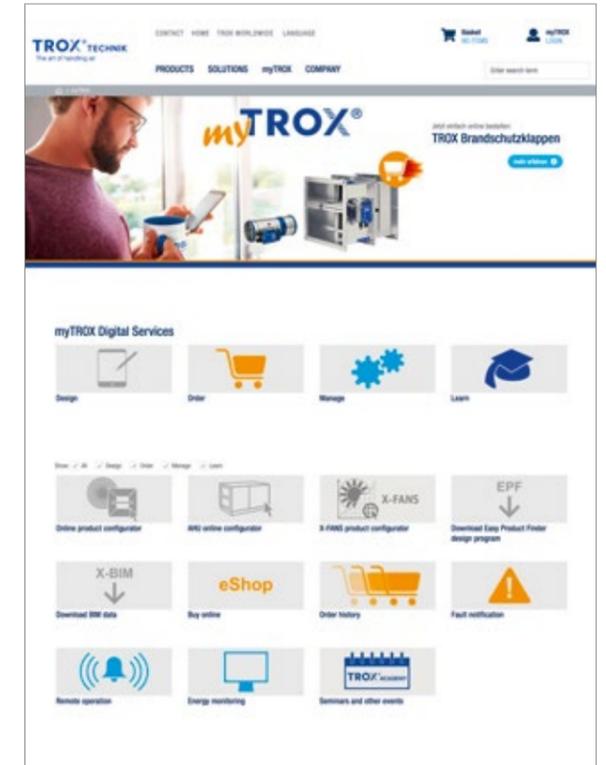
This is reflected in the software we have developed ourselves, which has long been used for the precise and reliable control and monitoring of our products and systems. And so successfully that we have greatly expanded our software development team in TROX Research and Development with various specialists. This team is characterised by particularly high versatility using the latest development methods. In this way, the IT experts ensure that development is close to the market and that changes in the market environment are immediately incorporated into the further development process. This enables us to work directly on the needs of our customers.

With our software development, innovative approaches are transformed into pioneering achievements with which TROX sets new standards in the ventilation and air conditioning industry. The TROX O<sub>x</sub> system platform is a direct result of this pioneering work and provides great added value for customers – it networks all components and subsystems to form a user-friendly overall system that is easy to maintain and offers unprecedented efficiency.

Even digital tools and applications that have already been successfully introduced are subject to a continuous optimisation process. Like the myTROX customer portal, which guides our customers easily, quickly and safely through all planning, ordering and operating processes. Or the functional TROX CLOUD for the X-CUBE and the wirelessly communicating, energy-efficient RadioDuct system.

In addition, we continue to work consistently on making our software architecture even more future-proof. For example, we are already researching innovative approaches in the fields of artificial intelligence and machine learning together with partners from RWTH Aachen University and TU Berlin (Technical University).

With digitalisation measures such as these, we are securing a stable future for ourselves and our customers, bringing noticeable simplification and transparency to processes, controls, monitoring and maintenance, as well as to communication and coordination, and confirming our pioneering position in the market.



**WITH OUR SOFTWARE DEVELOPMENT, INNOVATIVE APPROACHES ARE TRANSFORMED INTO PIONEERING ACHIEVEMENTS**



## Public relations and social matters



**Thomas Mosbacher**  
Managing Director of TROX GmbH  
(Finance, Human Resources/Legal, Audit/Compliance,  
Procurement and Information Technology)



**Udo Jung**  
Managing Director of TROX GmbH  
(Technology, Production, Sales,  
Research and Development and CSR)

'We experience it every day: Respect and helpfulness characterise the cooperation at TROX. And we are doing everything we can to further expand this value of appreciation. Because we are best as a team.'

'With our involvement in committees, associations and organisations, at trade fairs, in politics and in the media, we direct our strength and expertise towards anchoring sustainable standards in the building sector in order to save CO<sub>2</sub> and promote people's health.'

PUBLIC RELATIONS  
SOCIAL MATTERS



## Public relations and social matters

Committed people are the backbone of every successful company. In line with our motto 'The human being is the yardstick, and people's well-being is our goal', we are always striving to support this commitment among our employees and we are continually working to promote the sustainable improvement of indoor air quality in committees and associations.

It is not just our high-quality products, increases in efficiency and innovative strength that have shaped the internal and external perception of the TROX GROUP. It is the people who live the values of company and carry these values to the outside world. And it is our responsibility to ensure that TROX employees can and want to do this.

Heinz Trox's guiding principle 'The human being is the yardstick, and people's well-being is our goal' is thus both a basic requirement and the motivation for us to ensure a healthy future for us all and for the company. For us, this claim goes hand in hand with the active establishment of TROX as the most sustainable company in the industry in politics and in public.

### **We provide good working conditions.**

Employees at TROX should be able to rely on being treated respectfully, equally and without discrimination. They have a right to fair pay and maximum security at work. And this all over the world, in every single TROX company. We ensure this and more – through employee representation in the TROX GROUP and through clear regulations in our Business Conduct Guideline.

**THE JOINT  
COMMITMENT  
MAKES US STRONG**





### You are welcome.

We want to make it very clear to TROX employees and to anyone who would like to become a TROX employee that what we offer at TROX is a working environment that values, supports and welcomes every individual.

At TROX GmbH, we emphasise this claim at an early stage:

### TROX Welcome Days

With the TROX Welcome Days, we make it easier for our new recruits to get started at TROX. For two half days, the management, the executives of all divisions and the works council introduce themselves and provide information about everything that makes the company tick. At the same time, the Welcome Days make it easy to get to know colleagues and to network well directly. In 2020, our Welcome Days started exclusively digitally due to the corona pandemic. In 2022, they could take place in attendance for the first time and thus promote personal contact.

### Girls' Day

At this year's Girls' Day in Bad Hersfeld, many girls took the opportunity to find out about the diverse job profiles and training opportunities – even in supposedly typical male professions – at TROX.

### Working students and student interns

Many of our current professionals were previously employed by us as working students or student interns. In order to continue to attract accomplished young professionals to TROX, we have doubled the employment of our working students and student interns from 25 in 2020 to 50 in 2022. They now work in all areas of the company, especially in technology, marketing and TROXellence. In 2022, nine of our working students decided to start their careers at TROX.

### TROX student meeting ('Studi-Treff')

In December 2022, we invited our working students and interns to the TROX student meeting for the first time. A successful event that ensured a lively interdisciplinary exchange, networking and strengthened the sense of community. The TROX student meeting is planned as a regular event and, in addition to providing better insights into general company topics, is intended to impart a much broader knowledge in all essential company processes and, in the long term, to build up a well-founded and thus also more critical as well as knowledge-based approach to challenges of the future.

### Student Energy Conference

In November 2022, TROX was again represented with a stand and as a sponsor at the 5th Student Energy Conference of the Ruhr West University of Applied Sciences in Bottrop. This student-organised conference offers a platform for expert presentations and discussions, brings attention to innovative ideas and projects, and brings together companies and young academics. Working students from TROX also contributed to this energy conference and thus acted as brand ambassadors for TROX at the same time.

With measures like these, we want to support existing and future young professionals in their personal development and present ourselves as an employer that values, respects and promotes people. At the same time, we benefit from the image transfer via the personal and social media contacts of our participants and discussion partners and from a network of high potentials for TROX in all disciplines that has been built up over the long term.

## TROX HAS SOUGHT-AFTER EMPLOYER QUALITIES

### We strengthen the development of our employees.

A team that likes to work, that is efficient, motivated and future-oriented cannot be taken for granted. It is our responsibility to create a basis for this with development potential.

### The TROX training concept

Our training concept offers encouragement and challenges. In 2022, 16 trainees at TROX GmbH successfully completed their exams, 14 of them with good and very good – among them the best graduate in the entire North Westphalia Chamber of Industry and Commerce region, in the profession of mechatronics technician. We attach great importance to supporting our trainees with the well thought-out, needs-oriented TROX training concept in the development and consolidation of their professional and personal skills. Starting 2023, TROX has a total of ten different apprenticeships to choose from, as we are now also training warehouse logistics specialists and warehouse clerks.

### Individual employee support

We support our employees in achieving their individual goals through offers that are geared to concrete needs. Thus, we counter language barriers in daily interaction with a variety of language courses at different levels. For good communication, the main focus is on job-related English skills. We counteract the shortage of skilled workers in Germany by offering German language courses for employees recruited abroad. We also financially support personal ambitions for further education. And special sustainability trainings sharpen the focus on the possibilities of individuals to jointly strengthen and expand TROX's contribution to a sustainable future.



### The TROX employee app

In 2022, we developed an employee app (planned introduction 2023) that makes every employee an active part of the TROX GROUP. Our employee magazine 'TROX aktuell' and the intranet news will be available. But also chats, document management, shift schedules or time sheets can also be carried out or viewed with this app – including real-time translation into the respective native language. And that is not all. With news channel, push messages, role authorisation concepts, user management, quicklinks and works council information, we focus on an information concept that is secure, personalised and comprehensive.

In addition, the TROX employee app makes it possible to write posts and to like and comment on the posts of others. One can take part in surveys, view the menu, or the marketplace, for example. Organise carpooling, look for flats or join communities that plan private meetings for barbecues, football matches or perhaps walking.

Many things are possible with the TROX employee app – from pure information to active personal involvement. A digital connection that we have developed for our employees, students and trainees, as well as for our retirees and friends of TROX.

## WE TAKE CARE OF OUR EMPLOYEES

### The TROX Innovation Award

In 2022, our employees again submitted numerous innovative ideas on our IDEAS platform. Three employees were awarded the TROX Innovation Prize, which was presented for the third time.

The prize for the best idea went to Henning Brinksken. His idea: to control ventilation and air conditioning systems depending on fluctuating network load and energy availability. The means that in phases of high energy availability, it would be possible to reduce the room temperature, creating a cushion for phases with low energy availability. Approaches of this type are becoming increasingly important due to the energy transition and also open up further innovative potential for the TROX system approach and TROX O<sub>x</sub>. The implementation in our products is being examined.

The idea of Peter Schwicker from TROX Austria is an extract air volume controller with integrated CO<sub>2</sub>-Sensor, which makes it very easy to realise a functioning air quality control. A patent application has already been filed for this idea.

Tim Bartikowski's idea also has enormous potential: the use of dimples (known from golf balls) in air diffusers could reduce pressure losses in aerodynamic components and thus save energy. The first trend-setting tests on an exemplary diffuser are being planned.

In addition to the ideas of our award winners, the TROX platform IDEAS platform has received a large number of other promising ideas, some of which have already been implemented. We are very proud of this enormous innovation potential of our employees.



### We promote the health of our employees.

Willingness to perform requires healthy foundations. In 2022, we have again expanded our care within the framework of TROX occupational health and safety management:

- As the only presence campaign due to corona, we were able to offer a heart age check at the Neukirchen-Vluyn location in cooperation with BARMER.
- Through our occupational health service ASD Rhein-Ruhr, a total of 122 flu vaccinations and 94 Corona booster vaccinations were carried out at the Neukirchen-Vluyn and Anholt sites.
- Online fitness courses are included in our TROX Benefits.
- The employee-financed provident fund for TROX employees provides financial support for certain health care costs. In addition, the subsidisation of contact lenses and operations to correct defective vision was included in 2022.

The health and well-being of our employees is important to us. For employees who feel good and look out for each other, and ultimately, of course, for functioning company processes. In any case, the human being comes first.

### Our attitude is honoured.

Every employer wants satisfied employees. The fact that our efforts for the well-being of our employees are oriented towards their actual needs, that they are well received and that they strengthen corporate loyalty is confirmed by the Top Company Award 2022 from the 'kununu' rating portal.

### Compliance being consistently further developed

We are convinced that the long-term existence of the TROX Group in the market will be more successful with adherence to the compliance principles. Based on this conviction, we refrain from doing business that violates these principles.

In order to fundamentally avoid compliance violations, we identify and assess risks. In addition, we inform our employees in a variety of ways and raise their awareness – through training, with checklists, via questionnaires on the level of knowledge, by means of contact points for questions and with clearly defined responsibilities.

In 2022, we have updated the TROX internal Business Conduct Guideline by, among other things, adding the topics of environment, energy and climate protection and deepening the topic of compliance with human rights. In parallel to this, the official declaration of commitment to upholding human rights and the official non-discrimination statement from the Board of Management were published around the world.

Our Group-wide compliance programme is aimed at ensuring compliance with legal regulations and internal corporate guidelines.

It is based on internationally applicable standards and summarises important laws as well as internal company regulations that go beyond them and regulate the conduct of TROX employees in their dealings with business partners, officials, colleagues and society.

At the core of our compliance programme is the global, uniform 'Business Conduct Guideline of the TROX GROUP', which every employee receives and to which all employees and managers commit.

Our stance expressed here is underpinned by the successful launch of the TROX whistleblower system – the TROX Trust Channel – which went online in early 2022. Employees, customers, suppliers and other business partners of TROX can report compliance and legal violations here openly or anonymously, such as corruption and bribery, anti-competitive practices or concerns regarding information security.

### Always on-hand with help

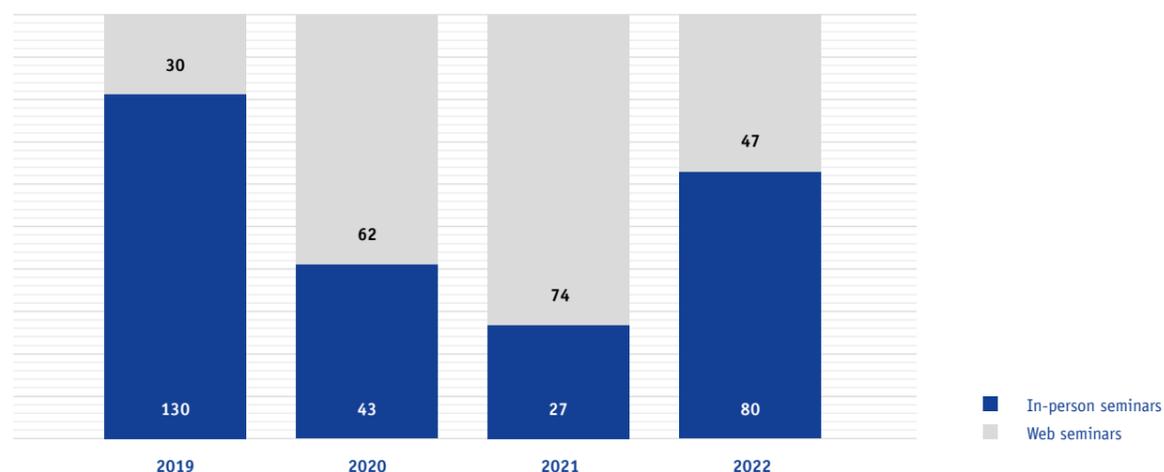
Based on our guiding principle 'The human being is the yardstick, and people's well-being is our goal', we see help in need as a matter of course. For example, we have supported people who have fled Ukraine due to the war with concrete offers of aid:

- 23 Ukrainian women received employment contracts at TROX KS Filter in the Czech Republic; this was done in cooperation with an agency that we generally support on the topic of integration, e.g. for language courses or team-building events.
- 20.000 € were donated by the Heinz Trox Foundation to local refugee organisations.
- We have delivered 40 air purifiers to reception facilities in Poland and Romania.
- We rented three hotel flats in Neukirchen-Vluyn for the uncomplicated accommodation of 22 people, including eleven children under 14. After nine months, all families were able to find a flat.
- In 2023, we will provide a semi-detached house in Anholt to accommodate Ukrainian refugees.

**26% MORE SEMINARS THAN IN THE PREVIOUS YEAR ORGANISED BY TROX ACADEMY 2022**



Face-to-face and online events of the TROX ACADEMY



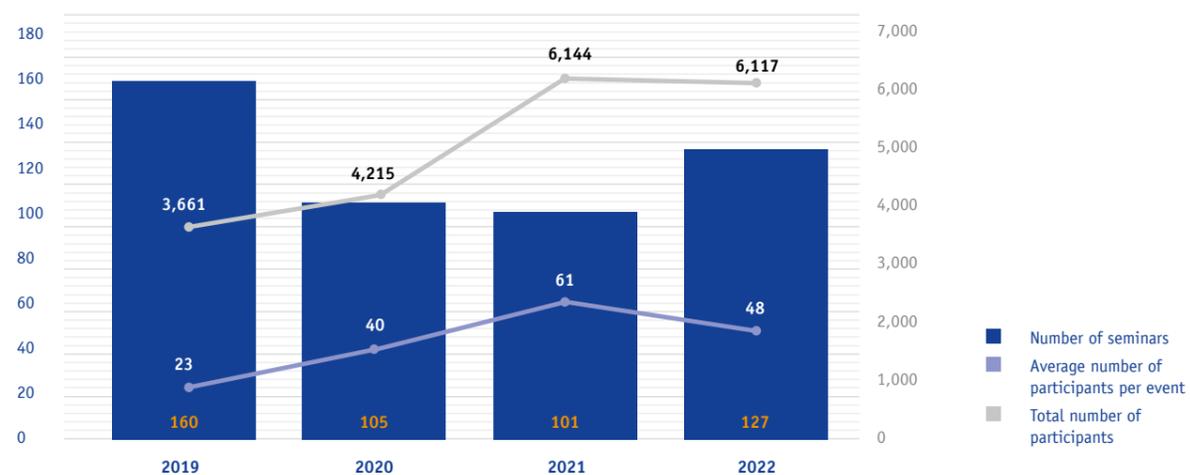
**Sharing knowledge to increase competence**

The services offered by the TROX ACADEMY reach numerous TROX employees and external interested parties year after year in the form of web seminars, classroom training, factory visits and symposia.

In 2022, the focus was on sustainability topics such as energy- and cost-saving filter replacement, heat recovery as a reliable technology in the energy crisis and the right product selection for school ventilation, taking into account energy concepts. Contemporary topics that demonstrate solutions and impart directly applicable knowledge.

With the end of the Corona pandemic, the number of face-to-face seminars has increased significantly again, although our web seminar offer is still more popular than before Corona. Overall, the number of our seminars rose to 127, an increase of 26% compared to the previous year. Due to the lower number of participants in face-to-face events, the average and absolute number of participants also decreased.

Number of seminars and participants in the TROX ACADEMY



**Social performance factors in the TROX GROUP**

	2018	2019	2020	2021	2022
Number of employees	3,789	4,007	4,316	4,571	4,710
Staff turnover rate (%)	7.6	7.8	6.9	7.3	10.6*
Average age in years	39.0	39.3	41.8	41	40.2
Average length of service in years	13.0	12.7	12.2	12.2	10.2
Number of employees with permanent employment contracts	3,474	3,681	3,960	4,286	4,305
Number of part-time employees	244	284	214	288	405
Number of jobs held by women	660	753	829	894	988
Number of women in management positions	43	49	53	58	70
Number of staff members with severe disabilities*	97	95	92	96	106
Number of apprentices*	58	65	78	68	72
Sickness rate (%)	4.5	5.4	5.7	4.6	5.6

\*5.3% due to the retirement of baby boomers.  
\*\*Only German companies (TROX GmbH, TROX X-FANS, TROX HGI, Dr. Ermer).

### The annual feedback from our customers: with obstacles, but positive.

2022 presented us with special challenges: Disrupted supply chains, rising prices and difficult material availability, as well as ongoing effects of the pandemic such as high sickness rates and associated delivery date postponements had a significant impact on our customers' satisfaction. Processing times increased and complaints increased. Accordingly, we sought intensive exchange with the affected customers in order to be able to offer the best possible solutions even under the difficult conditions of 2022 and to ensure the smooth running of customer projects. Despite all the imponderables of the past year, we have received positive feedback from our customers. 2023 we are working on concepts for further improvements.

### Standing firm through strong commitment

As the world's leading company in ventilation and air-conditioning technology, we believe that it is our duty to communicate the topic of 'good indoor air' to the outside world, in a way that is fully transparent and scientifically sound. We are also actively committed to establishing sustainable standards and improving existing ones. In doing so, we strive to promote a future-proof, sustainable consensus between politics, science and industry.

### Aachen Air Quality Day

For example, the 'Aachen Air Quality Day' initiated by the Heinz Trox Foundation on 20 September 2022 offered a highly interesting exchange of knowledge on the topic of 'Sustainable Future Nursing Homes'. Participation was possible on site and online.

The result: The 15.000 German care facilities are often undersupplied in terms of ventilation. Two extremely different groups of people meet here every day in terms of their needs: the majority of inactive people in need of care want a warm environment, while the physically hard-working care staff prefer it rather cooler. Considering that nurses top the list of absences due to illness, the issue of indoor air also takes on a clear business dimension in terms of staff performance.

With events like the Aachen Air Quality Day, we want to bring this issue to the forefront and advocate for officially supported solutions. Especially in view of the fact that the number of people in need of long-term care is steadily increasing and that the baby boomers of the 1960s will exacerbate the problem.

### Forum Air Hygiene 'LuftHygiene'

Through the Forum LuftHygiene, we share current knowledge in cooperation with RWTH Aachen University. For example, TGA managers can use the series of events 'Good air is system-relevant' to obtain comprehensive information and to talk to speakers from science and industry.

### Our association work ensures high standards

TROX is involved in the relevant associations, organisations and committees for regulations, guidelines and laws that enforce high sustainability requirements in our industry. In this way, we bring clarity and progress to the building industry and pave the way to sustainability that clearly identifies and improves its fundamentals.

In the VDI, we are currently pushing the urgently needed revision of guideline VDI 2074 'Recycling in Technical Building Equipment', for example, in order to advance circular value creation with forward-looking application instructions. In the TROX GROUP, too, the circular economy is one of the topics that we will increasingly address in the future.

Through actions like these, we have frequently shown our commitment to improving sustainability in building construction.

### On the road again

With significantly fewer trade fairs being held in 2022, the TROX trailer increasingly went on roadshows nationwide to provide information on the latest and best technical options for ensuring 'healthy air for our children'. This allowed us to keep in touch with our customers.

## GOOD AIR TECHNOLOGY GOES ON TOUR



### Our communication:

#### open, honest, informative and responsible.

In the way we present ourselves internally and externally as a leading global manufacturer of high-quality ventilation and air-conditioning technology, we also want to express the high values underlying our actions. For us, this includes open communication with our stakeholders that conveys valid and reliable information, that does not gloss over anything and that is comprehensible and transparent in every respect. We follow this claim as a competent, trustworthy and reliable partner in everything we say or do.

We do not regard good communication as a one-sided sprinkling of words and information. For us, good communication means interaction – with our customers, business partners, employees and friends – via video interviews, email newsletters, social media and ACADEMY events, at trade fairs, congresses and conferences or even by means of TROX Roadtruck.

We are in direct contact with our employees via intranet and soon also via employee app. We keep our customers updated via our homepage, e. g. with our videos on products and current topics. We reach out to shareholders and lenders through shareholders' meetings, board meetings, face-to-face and virtual meetings and regular written reporting.

In addition to the diverse and fast-moving possibilities of the digital world, we rely on print media that you can pick up and browse through at your leisure. Like the magazine TROX life, which illuminates social and contemporary topics

such as 'fire and smoke' or 'school and ventilation' in a well-founded and scientific manner, and is extremely entertaining at the same time. Because we take up topics that are of great interest to our stakeholders, regardless of age, digital affinity, function or position. We offer you all a little time-out with high information content and some surprising knowledge. After all, we want to focus on the people that we have been connected to for many years through mutual loyalty, and on their well-being.



# Successful sustainability management



## Our motto: lead by example, involve, implement!

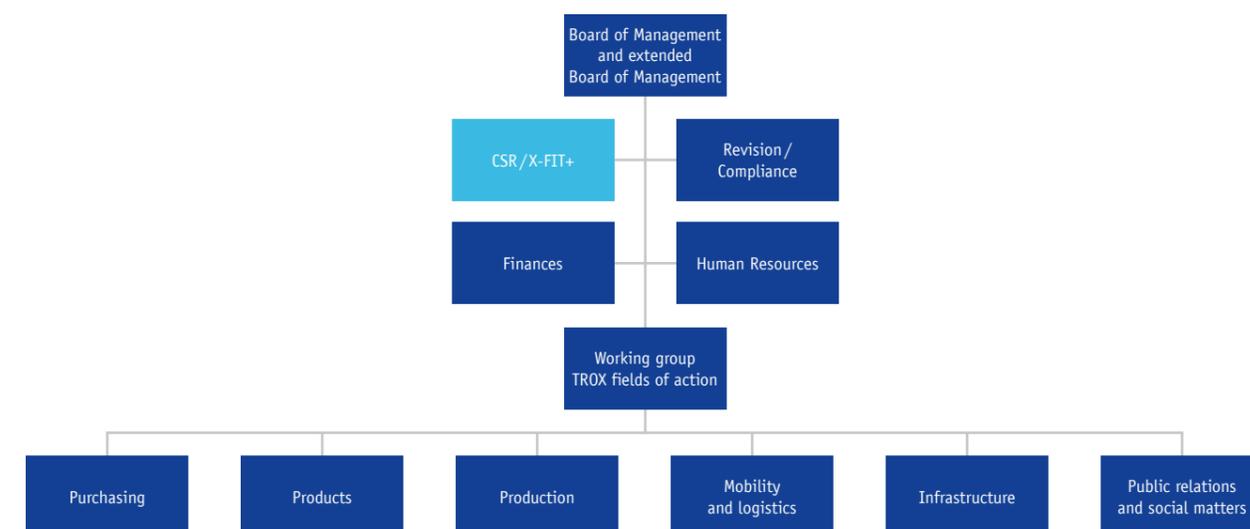
At TROX, successful sustainability management begins with managers who set a good example, who stand behind and not above their colleagues in the company, who create good conditions for the implementation of strong ideas.

Clear structures are what take the complexity out of complex issues, and this was the idea behind the creation of a modern organisational structure to help us achieve our ambitious goal of being climate-neutral by 2040. Within this structure, our management staff work to exemplify an open culture and way of working and they place a high value on cooperation. At TROX, management and employees are therefore in constant dialogue. In addition, clearly structured processes and responsibilities facilitate efficient cooperation throughout the development and implementation process of our sustainability measures.

Against this background, we set up a permanent working group for the six fields of action relevant to TROX. This working group is in constant touch with all areas of the company involved in our sustainability decisions and ensures that all aspects of successful sustainability development that are important to us are taken into account.

### CLEAR STRUCTURES FOR EFFICIENT SUSTAINABILITY WORK

The TROX CSR organisational structure



**A dialogue structure that promotes successful sustainability management**

To create a sustainability path that is supported by everyone, we strive to facilitate a constant exchange of opinions and ideas with our stakeholders. Our dialogue structure allows us to take into account their wishes and requirements in our sustainability decisions along with social, political and ecological developments.

At TROX, management and extended management are responsible for setting and achieving the company's sustainability goal. They set out a sustainability path and it is one that they themselves will subsequently follow with full conviction and dedication.

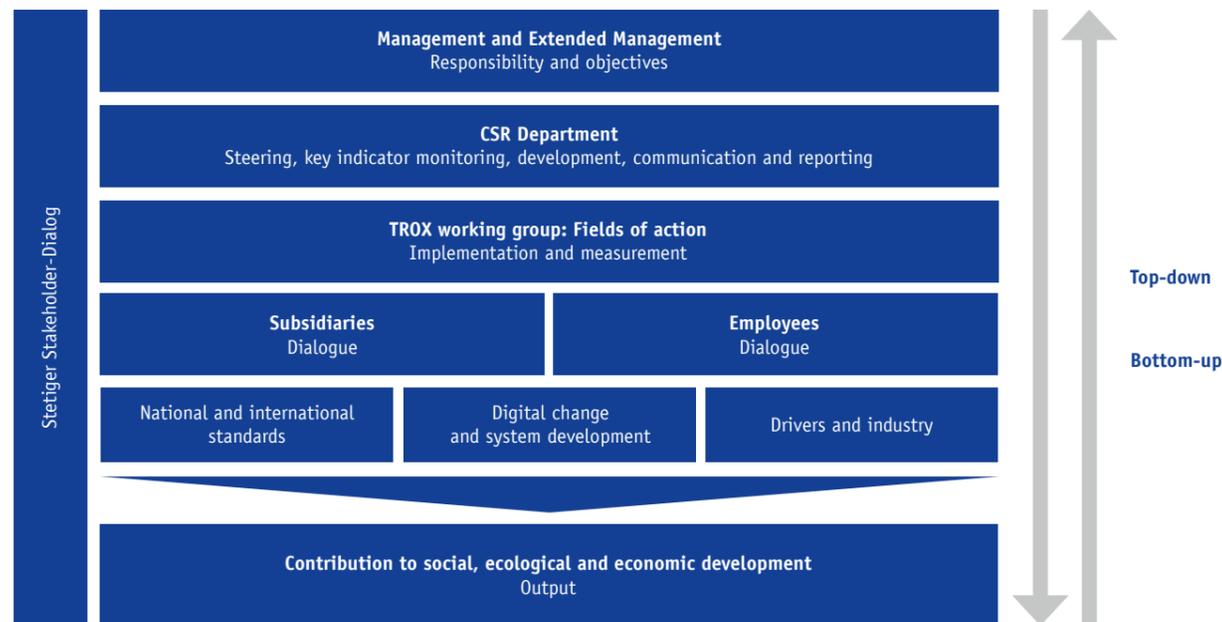
The CSR (Corporate Social Responsibility) department is responsible for regulating all the necessary processes to achieve the defined climate target. In 2022, it lay the foundation for the implementation of a CSR guideline that now applies across the entire TROX GROUP. Its tasks include recording and expanding the measurable key performance indicators of all areas of the company. It provides support in all directions by supplying information and, through direct contact with other companies and associations, it broadens the perspective of TROX's own sustainability management policy.

In the TROX working group for the fields of action, the input gathered from this process is used to ensure the accuracy of the key performance indicators and to constructively implement specified measures.

Thanks to the TROX dialogue structure, we can utilise a flow of information across all levels and thus ensure an efficient commitment to sustainability that finds support both within the company and among our stakeholders. For the benefit of everyone. Because this collaborative approach not only strengthens TROX's social, ecological and economic development, it also gives our sustainability decisions more power in the fight against climate change.

**OUR SUSTAINABILITY PATH RELIES ON DIALOGUE**

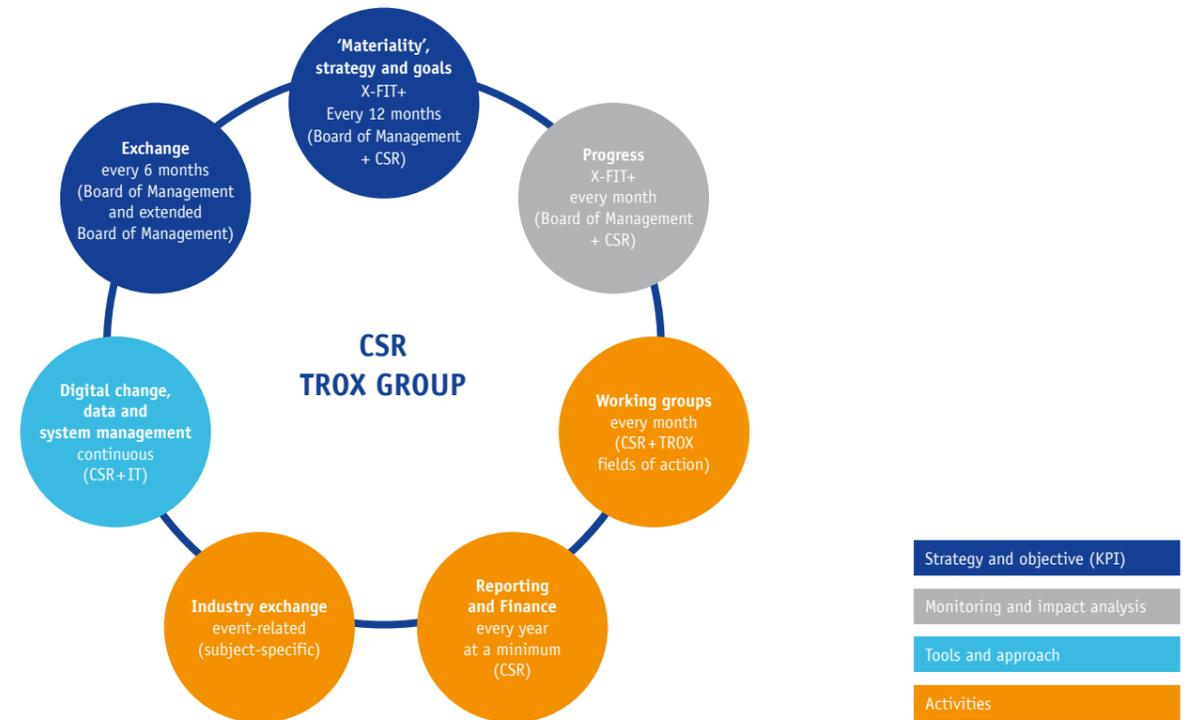
The TROX CSR dialogue structure



**The importance of regular exchange**

To ensure a smooth flow of information and to simplify the interaction processes between all parties involved, the exchange of information and knowledge at TROX takes place at set intervals.

The TROX CSR information and interaction cycle



**We are systematically improving – thanks to TROXellence.**

Embedded in our organisational structure, TROXellence is an improvement system that enables our employees to help shape and optimise humanity, productivity and collaboration at TROX. Two standardised methods help to identify and utilise potential: the TROX Production System (TPS, see p. 60) and the TROX Administration System (TAS). All measures and projects initiated via these systems are managed and monitored in our TROX X-FIT+ programmes.

In this way, we ensure that potential for improvement is identified and that it is systematically supported and controlled in terms of its realisation. Here, too, constant exchange between the specialist departments ensures maximum transparency and promotes cooperation.

The positive monitoring audit for the international environmental management standard ISO 14001 confirms that corrective measures have been implemented at TROX GmbH in 2022, and that management is being continuously developed.

# About this report



## Format and cycle

The TROX Sustainability Report 2022 is published in print and online. Its contents are available as a complete document in PDF format for download at [www.troxtechnik.de](http://www.troxtechnik.de). The Sustainability Report is published in a completely revised form on an annual basis.

## Global Reporting Initiative

In order to meet the diverse interests and concerns of our stakeholders in a holistic and transparent manner, we are guided by the internationally recognised standards of the Global Reporting Initiative (GRI). The GRI Index refers to the respective content in the sustainability report and also provides a link to the SDGs. TROX reports transparently on topics and content that are relevant from the perspective of the company and stakeholders.

## Sustainability initiatives

TROX is committed to the 17 Goals for Sustainable Development of the United Nations and outlines how it will help to achieve these goals in the report.

In 2022, the TROX GROUP committed to the ten principles of the United Nations Global Compact (UNGC). As a signatory company, we are now obliged to report on our progress in an annual 'Communication on Progress' (CoP).

## Check for sustainability

We are currently not subject to an audit, but voluntarily undergo an annual external audit by EcoVadis. Our improvement from 42 to 50 points led to us achieving bronze status for 2022.

## Report content

The 2022 Sustainability Report looks at the gas shortage caused by the Ukraine crisis and at how increasing energy efficiency and transparency can reduce the TROX GROUP's CO<sub>2</sub> emissions along the value chain.

In 2022, the strategic direction with respect to the SDGs was underpinned by the preparation of a materiality analysis. Sustainability management has linked this materiality analysis with the TROX sustainability strategy, the goals and measures. This resulted in a reorganisation of the fields of action for 2022: the 'Purchasing' field of action was added, and 'Public relations' and 'Social matters' were merged. In this way, the relevant topics of the materiality analysis are addressed in the six strategic fields of action: Purchasing, Products, Production, Mobility and Logistics, Infrastructure, Public and Social matters. The six fields are subject to the activities and effects of the TROX value chain.

The reporting period covers the entire 2022 financial year of the TROX GROUP (1 January to 31 December 2022). The editorial deadline for this report was 17 May 2023.

The target groups of the publication are customers, suppliers and business partners, employees, scientific institutions, media representatives and other interested stakeholders.

## Contact

Your opinion is important to us. You can email us with questions or suggestions: [christine.rosskothen@troxgroup.com](mailto:christine.rosskothen@troxgroup.com)

# 2022

# TROX GROUP

# 2022

## TROX GROUP at a glance – key figures

TROX GROUP sales in million €

**670** 2022 **600** 2021

Production sites globally

**20** 2022 **20** 2021

CO<sub>2</sub> emissions (Scope 1 and 2) in the TROX GROUP in t, per million € invoiced

**19.7** 2022 **27.1** 2021

### OUR VISION: GROWING TOGETHER

At TROX we rely on shared and continuous growth to secure a prosperous future of TROX GROUP as one of the world's biggest suppliers of ventilation and air-conditioning components and systems.

### OUR MISSION: GOOD AIR IS A FACTOR IN YOUR QUALITY OF LIFE

Striving to provide 'indoor life quality' for human beings, TROX provides fresh indoor air, focussing on well-being, safety and efficiency.

Operating subsidiaries of the TROX GROUP

**34 in 29** countries 2022

**34 in 29** countries 2021

CO<sub>2</sub> emissions (Scope 1 and 2) in the TROX GROUP in t

**13,204** 2022

**16,454** 2021

## Social performance indicators at the TROX GROUP

Employees at the end of the year Number

**4,710** 2022 **4,571** 2021

Staff turnover rate

**10.6 %\*** 2022 **7.3 %** 2021

Average period of employment in years

**10.2** 2022 **12.2** 2021

Permanent members of staff Number

**4,305** 2022 **4,286** 2021

Part-time employees Number

**405** 2022 **288** 2021

Average age in years

**40.2** 2022 **41** 2021

Positions filled by women Number

**988** 2022 **894** 2021

Women in senior positions Number

**70** 2022 **58** 2021

**2022**

\*5.3% due to the retirement of baby boomers

## GRI standards

INDICATOR	GRI STANDARD	DESIGNATION	REFERENCE SUSTAINABILITY REPORT 2022	PAGE	SDG	UNGC
<b>100s – General information</b>						
Organisational profile	102-1	Name of the organisation	Contact data	117		
Organisational profile	102-2	Activities, brands, products and services	The TROX GROUP in 2022	2, 3	2, 3	
Organisational profile	102-3	Headquarters of the organisation	Contact data	117		
Organisational profile	102-4	Business premises	The TROX GROUP in 2022	2, 3		
Organisational profile	102-5	Ownership and legal form	The TROX GROUP in 2022	2, 3		
Organisational profile	102-6	Markets served	The TROX GROUP in 2022	2, 3		
Organisational profile	102-7	Size of the organisation	The TROX GROUP in 2022	2, 3		
Organisational profile	102-8	Information on employees and other staff	Non-financial report	106, 107	8	
Organisational profile	102-9	Supply chain	Purchasing	38–45	8	
Organisational profile	102-10	Significant changes in the organisation and its supply chain	Publication of the Annual Report 2022 in the Federal Gazette			
Organisational profile	102-11	Precautionary principle or precautionary measures	Management, The TROX sustainability strategy, The TROX fields of action	100–103, 18–21, 30, 31		
Organisational profile	102-12	External initiatives	Stakeholders, public relations and social matters	22, 23, 101	17	
Organisational profile	102-13	Membership in associations and interest groups	Public relations and social matters	101	17	
Strategy	102-14	Statement from senior decision maker	Perspectives	6, 7		
Ethics and integrity	102-16	Values, guidelines, standards and norms of conduct	Our attitude	8, 9	8, 13	
Company management	102-18	Leadership culture	Management	100–103		
Involvement of stakeholders	102-40	List of stakeholder groups	Stakeholders	22, 23	17	
Involvement of stakeholders	102-41	Collective agreements	–			
Involvement of stakeholders	102-42	Identification and selection of stakeholders	Stakeholders	22, 23		
Involvement of stakeholders	102-43	Approach to stakeholder engagement	Stakeholders	22, 23	17	
Involvement of stakeholders	102-44	Key issues and concerns raised	Stakeholders	22, 23		
Reporting procedure	102-45	Entities mentioned in the consolidated financial statements	Publication of the Annual Report 2022 in the Federal Gazette			
Reporting procedure	102-46	Defining report content and topic boundaries	Our attitude Goals The TROX sustainability strategy The TROX fields of action	8, 9, 14, 15, 18–21, 30, 31		
Reporting procedure	102-47	List of essential topics	Materiality	24, 25		
Reporting procedure	102-48	Reformulation of information				
Reporting procedure	102-49	Reporting changes*	The TROX fields of action About this report	30, 31, 104, 105		
Reporting procedure	102-50	Reporting period	About this report	104, 105		
Reporting procedure	102-51	Date of most recent report	About this report	104, 105		
Reporting procedure	102-52	Reporting cycle	About this report	104, 105		
Reporting procedure	102-53	Contact details for questions about the report	About this report	104, 105		
Reporting procedure	102-54	Statements on reporting in accordance with the GRI standards	About this report	104, 105		
Reporting procedure	102-55	GRI content index	GRI standards	109, 110		
Reporting procedure	102-56	External audit**	About this report	104, 105		
Management approach	103-1	Explanation of the essential topic and its delimitation	Materiality	24, 25		
Management approach	103-2	The management approach and its components	Management, the TROX fields of action	100–103, 30, 31		
Management approach	103-3	Assessment of the management approach	Management	100–103		

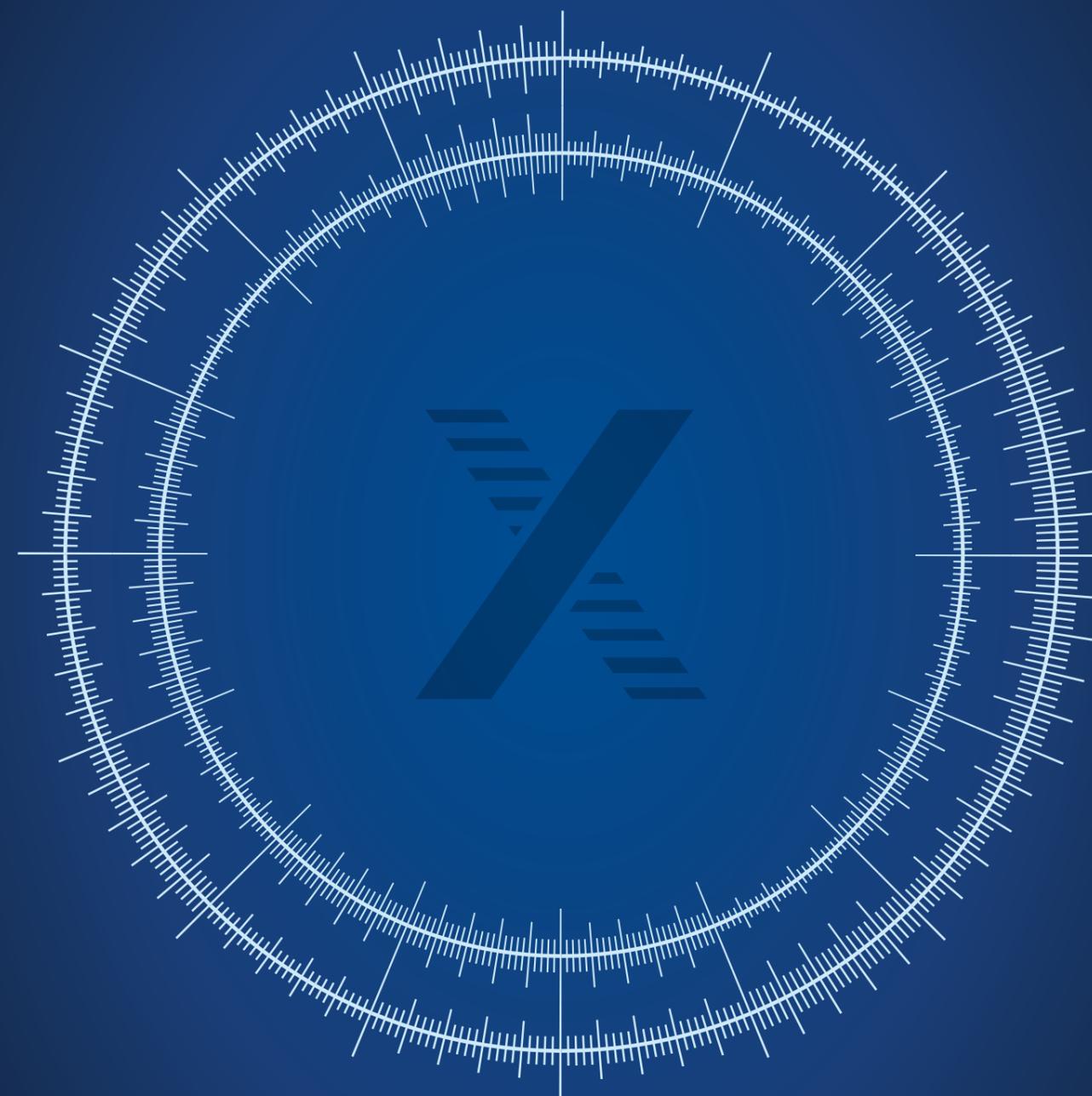
\* The action fields have been restructured.

\*\* This report is not externally audited. Nevertheless, the sustainability activities of the TROX GROUP are evaluated annually by EcoVadis.

INDICATOR	GRI STANDARD	DESIGNATION	REFERENCE SUSTAINABILITY REPORT 2022	PAGE	SDG	UNGC
<b>200s – Economy</b>						
<b>100s – General information</b>	<b>103</b>	<b>Management approach</b>				
Economic performance	201		Non-financial report	106, 107	8, 9, 13	
Indirect economic effects	203		Our attitude The TROX sustainability strategy	8, 9 18–21	8, 9, 13, 17	
Procurement practices	204		Purchasing	38–45	8	Principle 10
Anti-corruption	205		Purchasing Public relations and social matters	38–45 90–99	8	Principle 10
Anti-competitive behaviour	206		Purchasing Public relations and social matters	38–45 90–99	8	Principle 10

<b>300s – ENVIRONMENT</b>						
<b>100s – General information</b>	<b>103</b>	<b>Management approach</b>	<b>Purchasing</b>	<b>38–45</b>		
			<b>Products</b>	<b>48–55</b>		
			<b>Production</b>	<b>58–63</b>		
			<b>Mobility and logistics</b>	<b>66–73</b>		
			<b>Infrastructure</b>	<b>76–87</b>		
Materials	301		Products Production Mobility and logistics Infrastructure	48–55 58–63 66–73 76–87	9, 12, 13	Principle 7, 8
Energy	302		Products Production Infrastructure	48–55 58–63 76–87	7, 9, 12, 13	Principle 7, 8, 9
Emissions	305		Purchasing Products Production Mobility and logistics Infrastructure	38–45 48–55 58–63 66–73 76–87	3, 8, 9, 12, 13	Principle 7, 8, 9
Waste	306		Infrastructure	76–87	3, 9, 12, 13	Principle 7, 8
Supplier environmental assessment	308		Purchasing	38–45	13	Principle 7, 8

<b>400s – SOCIAL MATTERS</b>						
<b>100s – General information</b>	<b>103</b>	<b>Management approach</b>	<b>Production</b>	<b>58–63</b>		
			<b>Public relations and social matters</b>	<b>90–99</b>		
Employment	401		Public relations and social matters Non-financial report	90–99 106, 107	1, 8	Principle 1, 2, 3, 4, 5, 6
Employee-employer relationship	402		Public relations and social matters	90–99	8	Principle 1, 2
Occupational safety and health protection	403		Public relations and social matters	90–99	3, 8	Principle 1, 2
Training and further professional development	404		Public relations and social matters	90–99	8	Principle 1, 2, 6
Diversity and equal opportunities	405		Public relations and social matters Non-financial report	90–99 106, 107	8, 10	Principle 1, 2, 6
Non-discrimination	406		Public relations and social matters	90–99	5, 8, 10	Principle 1, 2, 6
Freedom of association and collective bargaining	407		Public relations and social matters	90–99	8	Principle 1, 2, 3
Child labour	408		Public relations and social matters	90–99	8	Principle 1, 2, 5
Forced or compulsory labour	409		Public relations and social matters	90–99	8	Principle 1, 2, 4
Checking for compliance with human rights	412		Purchasing	38–45	3, 8	Principle 1, 2
Supplier social rating	414		Purchasing	38–45	3, 8	Principle 1, 2
Socio-economic compliance	419		Public relations and social matters	90–99	8	Principle 1, 2



# Glossary

## A

### AIR POLLUTANTS

An air pollutant that can cause a harmful environmental impact, e.g. NO<sub>x</sub> or CO. The origin of an air pollutant can be both natural as well as human-induced.

## B

### BIODIVERSITY

Includes the three areas of ecosystem diversity, species diversity and genetic diversity within species.

### BUND

Association for the Environment and Nature Conservation Germany e. V. (Bund für Umwelt und Naturschutz Deutschland e. V.)

## C

### CARBON CAPTURE-AND STORAGE TECHNOLOGIES

Extracting CO<sub>2</sub> from the atmosphere and store it underground.

### CARBON DIOXIDE (CO<sub>2</sub>)

A chemical compound of carbon and oxygen. Greenhouse gas, non-toxic, colourless and odourless gas. Arises primarily mainly during the combustion of energy sources containing coal.

### CARBON MONOXIDE (CO)

Toxic, flammable and odourless gas. Arises from the incomplete combustion of energy sources containing coal.

### CIRCULAR ECONOMY

A regenerative system that minimises resource use and waste production, emissions and energy waste by slowing down, reducing and closing energy and material cycles.

### CLIMATE ADJUSTMENT

Measures to deal with global warming.

### CLIMATE FARMERS INITIATIVE

Promote a regenerative agriculture across Europe that retains more CO<sub>2</sub> in the soil, and help interested farmers to convert their farms accordingly with data-protected processes.

### CLIMATE NEUTRALITY

The production of a product or service does not increase the amount of climate-damaging gases in the atmosphere.

### CO<sub>2</sub>

Toxic, odourless, flammable gas. Around 37 billion t CO<sub>2</sub> are blown into the atmosphere every year. The largest emitters are: China (33%), USA (23%), India (7%) and Russia (5%). Today, there is more CO<sub>2</sub> in the air than during the last 3 million years. Example for the avoidance of CO<sub>2</sub>: A diesel car driver cycles to work instead of using a car (approx. 8,000 km p.a.). In this way it avoids the generation of approx. 1,200 kg CO<sub>2</sub>.

### CO<sub>2</sub> CERTIFICATES

Allow companies to emit a certain amount of CO<sub>2</sub>. Only a part is given out free of charge by the EU. Those who consume more must buy additional CO<sub>2</sub> certificates, while those who operate in a climate-friendly way can sell them.

### CO<sub>2</sub> EQUIVALENTS

Unit of mass used to standardise, compare and summarise different greenhouse gases.

### CORPORATE SOCIAL RESPONSIBILITY

Corporate social responsibility that goes beyond the legal requirements.

## D

### DIESEL EMISSIONS

Emissions resulting from the combustion of diesel fuels, e.g. NO<sub>x</sub>, HC, SO<sub>2</sub>, CO and NMHC. Diesel emissions also include particulate matter.

### DIESEL SOOT

See diesel emissions.

### DIN EN ISO 14001

European standard for environmental management.

### DIN EN ISO 9001

European standard for quality management.

### DIVERSITY

Conscious, appreciative interaction with the diverse, different individuals of a society.

## E

### EARTH HOUR

1 hour power cut on buildings.

### EARTH OVERSHOOT DAY

The date on which all the natural resources that the earth can regenerate in the course of a year are used up.

### ECOLOGICAL FOOTPRINT

Indicator of sustainability that shows how much strain is being placed on the earth's ecosystem and natural resources.

### ECOTAX

Tax on environmentally harmful substances and energy sources, in Germany taxation of mineral oil and electricity.

### EMISSION

Substance or radiation, emanating from a source, e.g. CO<sub>2</sub> emissions or noise.

### EMISSIONS TRADING

Trading with certificates permitting emissions.

### ENERGY

Ability to do work (in the physical sense), measured in joules or watts.

### ENVIRONMENTAL PERFORMANCE INDEX (EPI)

Assesses the environmental performance of 180 countries.

### ESG REPORTING

Reporting obligation recommended by the Sustainable Finance Advisory Board from 2022 for all companies with more than 250 employees based on the three pillars of sustainability: environmental, social matters and corporate governance principles.

### EUROPEAN CLIMATE LAW

Adopted by the EU Commission in April 2021. To establish EU-wide climate neutrality by 2050, to legally anchor the new climate target for 2030 – a 55% reduction in greenhouse gas emissions instead of the previous 40% – to regulate adaptation measures and progress monitoring, and to ensure public participation.

## F

### FAIRTRADE LABEL

Label used to identify goods that originate wholly or partly from 'fair trade', which is defined according to certain criteria.

### FCKW

Chlorofluorocarbons that have been used as propellants, refrigerants or solvents. These led to disaster for the ozone layer and were banned in 1989. Since then, the ozone layer has regenerated.

### FINAL ENERGY CONSUMPTION

Energy, calculated from consumer demand (e.g. Diesel from petrol pump, electricity from pantograph).

### FONA STRATEGY

With the FONA strategy (Research for Sustainability), the Federal Ministry of Education and Research is concretising its research funding for climate protection and greater sustainability-oriented towards the 17 SDGs of the United Nations.

### FRIDAYS FOR FUTURE

Global and social initiative of pupils and students with the aim of implementing comprehensive climate protection measures as quickly as possible.

### FSC LOGO

The logo of the Forest Stewardship Council stands for sustainable forestry and identifies products that have been created with wood from sustainable forestry.

## G

**GEOENGINEERING**

The endeavour to fix what has been destroyed on earth in the past, through various measures.

**GERMAN SUSTAINABILITY CODE (DNK)**

Supports the development of sustainability reporting with 20 GSC criteria, which are checked for formal completeness including qualified feedback.

**GREENHOUSE EFFECT**

Effect the greenhouse gases in an atmosphere have on the temperature of the surface of planets. As long-wave radiation cannot pass through CO<sub>2</sub>, heat produced is reflected to the earth, causing the greenhouse effect. Greenhouse gases are produced, for example, through intensive livestock farming. About 1.6 billion cattle populate the planet and release methane into the environment. One cow produces the same amount of greenhouse gas as a car with an annual mileage of approx. 18,000 km.

**GREENHOUSE GAS PROTOCOL (GHG PROTOCOL OR GHGP)**

Internationally recognised tool for the assessment and calculation of greenhouse gas emissions.

**GRI STANDARD**

Internationally recognised guidelines for the preparation of sustainability reports, developed by the Global Reporting Initiative.

## H

**HALF-LIFE PERIOD**

Period of time in which half of the atoms of a substance decay.

## I

**INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC)**

This world climate council was founded in 1988 by the World Meteorological Organisation and the United Nations Environment Programme. The results of the work are the basis for the international climate negotiations within the framework of the UN Framework Convention on Climate Change.

**ISO 14001**

International standard for environmental management.

**ISO 26000**

Guidelines regarding the social responsibility of organisations.

## K

**KYOTO PROTOCOL**

International treaty for the reduction of greenhouse gases. Named after the place of signature: Kyoto, Japan (1997). German target: By 2012, a reduction in CO<sub>2</sub> emissions by 21% compared to 1990 levels.

## L

**LCC (LIFE CYCLE COSTS)**

Life cycle costs: Costs of a product from the product idea to its withdrawal from the market.

**LIGNITE (BROWN COAL)**

Energy sources with poor CO<sub>2</sub> balance: three times as much CO<sub>2</sub> is released than with the same output in a gas-fired power plant. Extraction in large-scale open cast mines goes hand in hand with massive interventions in nature. Supplies 35% of global electricity generation.

**LINEAR ECONOMY**

Also called the throw-away economy. A major share of raw materials goes to landfill or is burned after the respective period of use.

**LOCAL TRANSPORT**

Journeys with a length <50 km or a travel time <1 hour.

## M

**MEAT CONSUMPTION**

Global meat consumption – an average of 43 kg per capita per year – has increased fivefold since 1961. Top performer with 128 kg: the USA. In the most populous countries, China and India, the figures are 64 kg and 5 kg respectively.

**METHANE (CH<sub>4</sub>)**

Greenhouse gas, colourless and odourless hydrocarbon, main component of natural gas.

**MINERAL OIL TAX**

Excise duty on mineral oils and natural gas.

## N

**NITROGEN STICKOXIDE NO<sub>x</sub>**

Collective term for gaseous oxides of nitrogen.

**NUCLEAR POWER STATION**

In 2022, 422 reactors were in operation worldwide. 92 in the USA, 56 in France, 55 in China, 33 in Japan, 37 in Russia, and 149 in other countries around the world.

## O

**OECD**

Organisation for Economic Co-operation and Development.

**OFFSETTING, CLIMATE COMPENSATION**

Describes the compensation of CO<sub>2</sub> emissions by financing climate protection projects such as tree planting.

**OZONE LAYER**

Atmospheric layer that shields the earth from UV radiation.

## P

**PARIS CLIMATE AGREEMENT**

On 12 December 2015, 195 countries committed to mitigating climate change and transforming the global economy in a climate-friendly way at the UN Climate Change Conference. The goal is to limit the global temperature increase compared to the pre-industrial era to 1.5 °C, but in any case to below 2 °C.

**PARTICLES**

Small particles, e.g. dust; see also diesel emissions.

**PARTICULATE MATTER (FINE DUST)**

Smallest particles, e.g. PM10 with a maximum diameter of 10 µm or PM2.5 with a maximum diameter of 2.5 µm.

**PRIMARY ENERGY**

The energy directly available in the energy sources (e.g. fuel value of coal). Primary energy sources are e.g. Hard coal, lignite, mineral oil, natural gas, water, wind, nuclear fuels and solar radiation.

**PROCESS**

The totality of interacting operations within a system.

**PRODUCT LIFE CYCLE**

Life span of a product from development via use to (possible) recycling.

## R

**RECYCLING**

Material recovery.

**RECYCLED PAPER**

Paper made from waste paper.

**REGENERATIVE CAPACITY**

Ability to return to ecological balance after external disturbances.

**REGENERATIVE ENERGIES**

See Renewable Energies.

**RENEWABLE ENERGIES**

Energy sources that are renewable and in principle unlimited, e.g. wind or sunlight.

**RESOURCE**

Natural stock of utilities/materials, needed, for example, for commercial production.

**RESOURCE EFFICIENCY**

Ratio of benefits and the required input of resources.

## S

**SOOT PARTICLES**

Main component of fine dust. Formed during the combustion of organic substances such as wood or diesel.

**STAKEHOLDERS**

Internal as well as external groups of people who are currently or in the future directly or indirectly affected by all entrepreneurial activities (e.g. Shareholders, suppliers, customers).

**STANDARD**

A standard is considered to be a comparatively uniform, widely accepted and considered course of action. A standard is often the result of a standardisation process. Whether a standard is established by a public law or other formalised procedure or by general recognition is not decisive.

**SULPHUR DIOXIDE (SO<sub>2</sub>)**

Colourless, pungent-smelling, water-soluble gas that has negative effects on humans and the environment.

#### SUPPLY CHAIN

Multi-stage overall process of upstream and downstream connections between companies from a customer's order to delivery and payment for the product or service.

#### SUSTAINABILITY

Guiding principle of reconciling ecological, social and economic goals to allow for future-oriented development in line with intergenerational justice.

#### SUSTAINABILITY COUNCIL

Advisory body of the Federal Government for sustainable development.

#### SUSTAINABILITY STRATEGY

Practical orientation to facilitate sustainable action by policy-makers and society. The goal is ecologically, economically and socially balanced development.

#### SUSTAINABLE DEVELOPMENT GOALS (SDGs)

17 Sustainable Development Goals adopted by the United Nations in 2015.

#### SUSTAINABLE FINANCE ADVISORY BOARD

Launched by the German government in June 2019 with the aim of developing concrete, actionable recommendations for shaping the necessary sustainable transformation process in the real and financial economy.

#### SUSTAINABLE SOCIETY INDEX (SSI)

This index of the Technical University of Cologne evaluates data from the World Economic Forum in Switzerland as well as the World Bank and the International Monetary Fund in the USA, among others, and thus puts 213 countries and regions under the microscope in terms of sustainability.

## U

#### UN CLIMATE CHANGE CONFERENCE

The countries that signed the UN Framework Convention on Climate Change in 1992 meet here every year.

#### UNITED NATIONS GLOBAL COMPACT

Global initiative for responsible corporate governance.

#### UTILISATION

Real share of use of all possible capacities.

## V

#### VALUE CHAIN

Also called value-added chain. Depiction of production as a sequence of value adding activities during which resources are used.

## W

#### WASTE

Waste within the meaning of the German Law on Closed Cycle Management and Waste (Kreislaufwirtschaftsgesetz = KrWG) is any substance or object which its owner discards, intends to discard or is required to discard. The KrWG distinguishes between waste for recovery and waste for disposal. Waste for recovery is waste that is recovered; waste that is not recovered is waste for disposal.

#### WWF

World Wide Fund for Nature, a nature conservation organisation.

## Z

#### ZERO WASTE

A philosophy that strives for sustainability with the aim of producing as little waste as possible and not wasting raw materials.

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