Climate Report 2022

arvato

Dear reader,

Operational excellence is at the heart of how we do business, and therefore it is the basis for our customers' success. However, it is not sufficient anymore. The impact of the global pandemic, the war in Ukraine, and high energy costs are just examples that have led to a very dynamic and highly uncertain market environment over the last three years. Customer centric, resilient, sustainable, scalable and data-driven solutions will be the defining factors of modern supply chains. An important lever for us: modern logistics solutions that take ecological, ethical and social aspects into account. Environmental protection is an integral part of our corporate responsibility towards our employees as well as our customers and is indispensable in our corporate strategy.

Our climate targets follow the strategy to prioritize measures that lead to the avoidance and reduction of emissions over the compensation of remaining emissions. We seek a responsible use of natural resources in our service offering and environmentally conscious sourcing of materials.

In 2022, we have focused on balancing impactful measures with awareness campaigns and the anchoring of environmental aspects in our strategic approach. We have worked on securing renewable sources of electricity for our global warehouses – either by changing contracts of electricity supply, planning and installing solar systems on our warehouse roofs or surrounding greens, or in the absence of better solutions, by securing electricity certificates from nearby regions. Moreover, local environmental initiatives and programs at a variety of our sites highlighted the importance to our own workforce. You will find some examples in this report, along with the targets achieved in 2022. The Climate Report also highlights opportunities and challenges and is intended to give you an overview of what our priorities are in 2023.

We would like to thank our customers for their great support and trust. Only together can we succeed in sustainably reducing emissions along the supply chains.

Sincerely,

Frank Schirrmeister
CEO Arvato

Andreas Barth
President Industry Vertical TECH &
Arvato Head of CR and Sustainability

Executive Summary

STRATEGY & REVIEW 2022

- Arvato is a solution group of Bertelsmann SE & Co. KGaA, and headquartered in Gütersloh, Germany. We fully support **Bertelsmann's Science Based Target to reduce greenhouse gas emissions by 50% from a 2018 baseline and reach climate neutrality by 2030.**

- Transparency and reliable data is the foundation for our climate targets and actions. **Since 2008, we have been collecting and analyzing environmental data** across our warehouse sites, and **since 2018, we have been leveraging our Environmental Data Management Platform green.screen**. This is the second Climate Report published by Arvato.

- In the reporting year 2022, our **key focus** was to globally secure the **purchase of renewable electricity at all our sites as of January 2023**. We prioritized local contracts wherever possible, to support the transition toward renewable energy.

- We continued to **invest in photovoltaic systems** to increase the share of **self-produced electricity** at our warehouse sites. The lighthouse project was the go live of a **3,35 MWh PV system at our headquarter**, which could power over a thousand households.

- Moreover, we invested in **gaining further transparency** on our indirect Scope 3 data, especially regarding transportation emissions. With the **newly established partnership with EcoTransIT World**, we are able to calculate transport emission data on shipment level, with a previously unmatched level of accuracy. The next steps will include pilot projects on **carbon neutral transportation alternatives**, in collaboration with our transportation partners and customers.

- In this report, you will find detailed information on our 2022 carbon emissions (following GHG protocol), as well as our ambition level, **achievements 2022** and outlooks on next steps. We know that despite our efforts, there is still a way to go in order to **decarbonize global supply chains**. Collaboration, support and transparency across value chains will become more important than ever to overcome the **challenges** we are facing – in the logistics industry, but also as a society of global citizens.

CLIMATE TARGET DEVELOPMENT

Status 2022

1. 100% **green electricity** worldwide as of January 2023 — 76 %

2. Scope 1&2[*]: **50% absolute reduction** until 2030 (base line 2018) — - 32 %

3. Scope 1-3[*]: **50% relative reduction** per package until 2030 (base line 2018) — - 46 %

4. **100% offsetting** of remaining unavoidable emissions **as of 2030** (excluding Scope 3 service-related emissions[*]) — 5.000 t

* Scope 1: Emissions from operations that are owned or controlled by Arvato
  Scope 2: Emissions from the generation of purchased or acquired electricity, heating, or cooling consumed by Arvato
  Scope 3: All indirect emissions (not included in Scope 2) that occur in the value chain of Arvato, e.g. from external transportation services. For a full list of Scope 3 indirect emission sources considered for this report please refer to the Appendix.

KEY FINDINGS

- At our warehouse sites, we achieved a reduction of Scope 1 & 2 emissions of more than 30% compared to 2018, mostly driven by a reduction of **Scope 2 electricity emissions**.

- Indirect **Scope 3** emissions have increased since 2018, while **Arvato experienced a substantial growth** in terms of space, staff, and parcel volume. Our KPIs (e.g., per parcel or per sqm) have therefore improved.

Scope[*]	Metric tonnes CO2e			Delta 2018 vs. 2022
	2018	2021	2022	
1	18.600	20.100	19.100	+ 3 %
2	36.800	23.800	18.600	- 50 %
3	135.600	174.700	177.600	+ 31 %
Total	**191.000**	**218.600**	**215.300**	**+ 13 %**

Overview

Chapter	Title	Page

WELCOME TO ARVATO
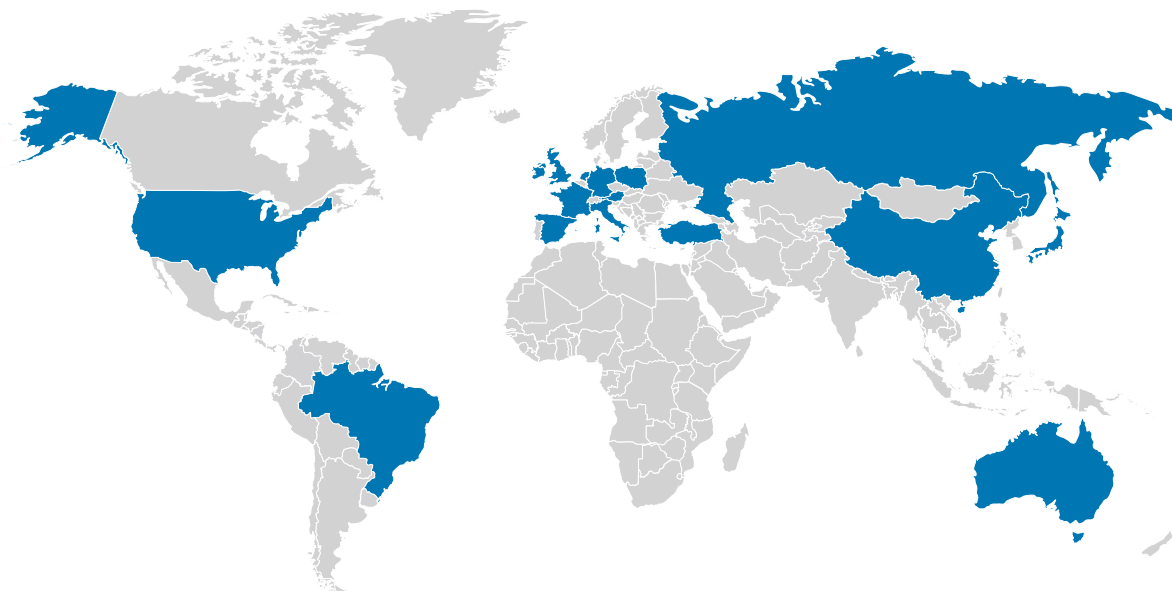
Dortmund, Germany

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INTRODUCTION

Arvato at a glance

Arvato is an innovative and leading international **service provider in the field of supply chain management and e-commerce**. By combining deep industry expertise with the right technologies, we develop innovative supply chain management and e-commerce solutions for our customers.

We focus on **Consumer Products, Tech, Healthcare, Automotive and Publisher** industries and have aligned our organization to the needs of our global customers and their industries. More than **17,000 employees work at around 100 locations** with state-of-the-art cloud technologies. This enables us to provide our customers with the best possible support for their growth objectives. Our daily work is clearly aligned with our vision: Our ambition is to be the **most client-oriented** international supply-chain company with the **strongest focus on people and technology**.

Arvato is a wholly owned subsidiary of Bertelsmann SE & Co. KGaA. With 145,000 employees, Bertelsmann operates as a media, services and education company worldwide.

BRANDS TRUST IN US

DOUGLAS   C&A   KOSMOS   TOUS   VW   OLYMPUS   Penguin Random House   T··   SENNHEISER   ZEISS   ESPRIT

Microsoft   Marc O'Polo   Vodafone   Biogen   RITUALS...   H&M   SEPHORA   Roche   Triumph   HARMAN   FLEiSSNER

KEY FIGURES

> 200 mn	17,000	17	> 2.5 mn	€ 2.3 bn	500
outbound packages & returns worldwide	employees	countries	sqm footprint worldwide	revenue	satisfied customers

GOVERNANCE

Shanghai, China
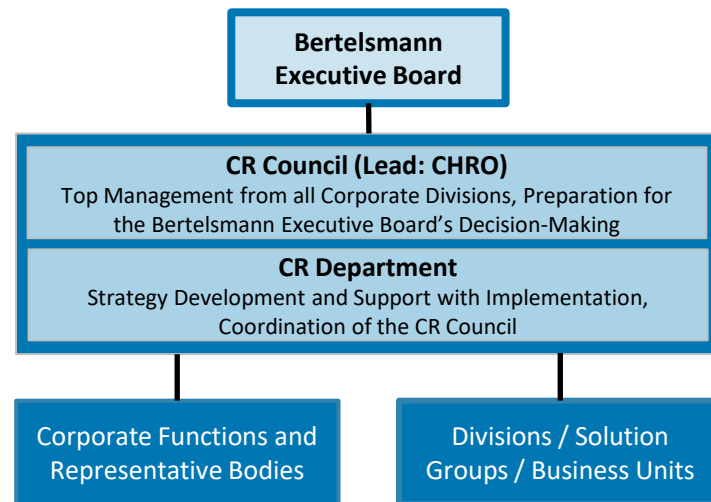
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GOVERNANCE

Anchoring Sustainability in the Organization

Sustainability as part of Corporate Responsibility @Bertelsmann

```
Bertelsmann
Executive Board
        |
CR Council (Lead: CHRO)
Top Management from all Corporate Divisions, Preparation for
the Bertelsmann Executive Board's Decision-Making

CR Department
Strategy Development and Support with Implementation,
Coordination of the CR Council
    |                           |
Corporate Functions and     Divisions / Solution
Representative Bodies        Groups / Business Units
```

As a fully consolidated subsidiary of Bertelsmann, Arvato operates in a decentralized corporate structure that has grown over decades. However, decentralized action does not mean the abandonment of a planned and targeted approach.

Executives from the Bertelsmann divisions meet regularly in the **Bertelsmann Corporate Responsibility Council** under the leadership of the Chief Human Resources Officer. The council discusses the further development of group-wide ESG priorities that flank the corporate strategy, the anchoring of corporate responsibility in the divisions and the cross-divisional coordination of ESG activities. Find more details here. Arvato is represented by Andreas Barth, President Industry Vertical TECH and Arvato Head of CR & Sustainability.

Sustainability as part of Corporate Responsibility @Arvato

The **Arvato Corporate Responsibility Council** takes steps to provide a structured and conceptional approach across all business units. The council members meet at least eight times per year to discuss measures, analyze results and take necessary steps to align the ESG topic development with the strategy. The CR Council is chaired by Andreas Barth, President Industry Vertical TECH and Arvato Head of CR & Sustainability.

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Arvato CR Council

Building &
Environment Team

Industry / Country
Green Leads

Arvato Global
Green Community
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The focus topic "Climate Change" is managed by the Arvato Central **Building & Environment team.** In close collaboration with Bertelsmann and the Arvato management, they define key milestones, manage central projects, and take care to align the environmental strategy across all Arvato sites.

On Industry and Country level, the local **Green Leads** spread the message into the organization, train our employees, and support in bringing the strategy to life.

Our **Global Green Community** with more than 100 participants connects the climate change team with quality managers, project leads and site directors worldwide. Thereby, our program is implemented on a local level.

GOVERNANCE

German Supply Chain Act

How do Arvato and Bertelsmann respond?

To cover the most relevant CR topics and provide a structured and conceptional approach across all business units, our Corporate Responsibility Council takes reasonable and manageable steps, such as:

- A Bertelsmann-wide Supplier Code of Conduct is a mandatory annex to any supplier contract.

- Arvato and Bertelsmann already maintain a "whistleblower"-system.

Even before the German Supply Chain Act (Lieferkettensorgfaltspflichtengesetz, LkSG) came into force, Arvato and Bertelsmann took the first steps and made investments to implement a group-wide fast and comprehensive solution to screen all suppliers.

- New implemented software will scan existing and upcoming suppliers for human rights- and environmental issues.

- We will comply with the provisions set out in the LkSG and implement each in a timely manner.

STRATEGY

Heijen, Netherlands

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STRATEGY
Stakeholder Dialogue

How do we determine topics of relevance?

Arvato participates in so-called relevance analyses of our parent company Bertelsmann to determine which ESG topics should be primarily focused on.

This process is used to identify the CR priorities that are necessary for understanding the business performance and results, the Group's position and the impact of its activities on employees, society and the environment.

How is the dialogue organized?

In 2020, a total of more than 100 external and internal stakeholders were surveyed on pre-selected non-financial topics: The external stakeholders assessed the impact of Bertelsmann's business activities on non-financial topics, while the internal stakeholders evaluated their business relevance.

Arvato plans to participate in a new stakeholder dialogue process of Bertelsmann in the course of 2023, to assess our progress in our ESG focus topics, and to take adjusting measures if needed.

Who takes part in the stakeholder dialogue?

To combine an internal with an external view, we addressed top executives and experts from the divisions as well as business partners, potential employees, bankers, ESG experts, journalists and politicians.

What was the outcome of the last dialogue?

The results of the 2020 relevance analysis showed that five ESG topics are of prime importance to the Arvato stakeholders: "Climate Change", "Learning", "Fair Working Conditions", "Diversity, Equity & Inclusion", and "Health, Well-being & Safety". If you are interested to learn more about the different ESG topics relevant for Bertelsmann, please visit this link.
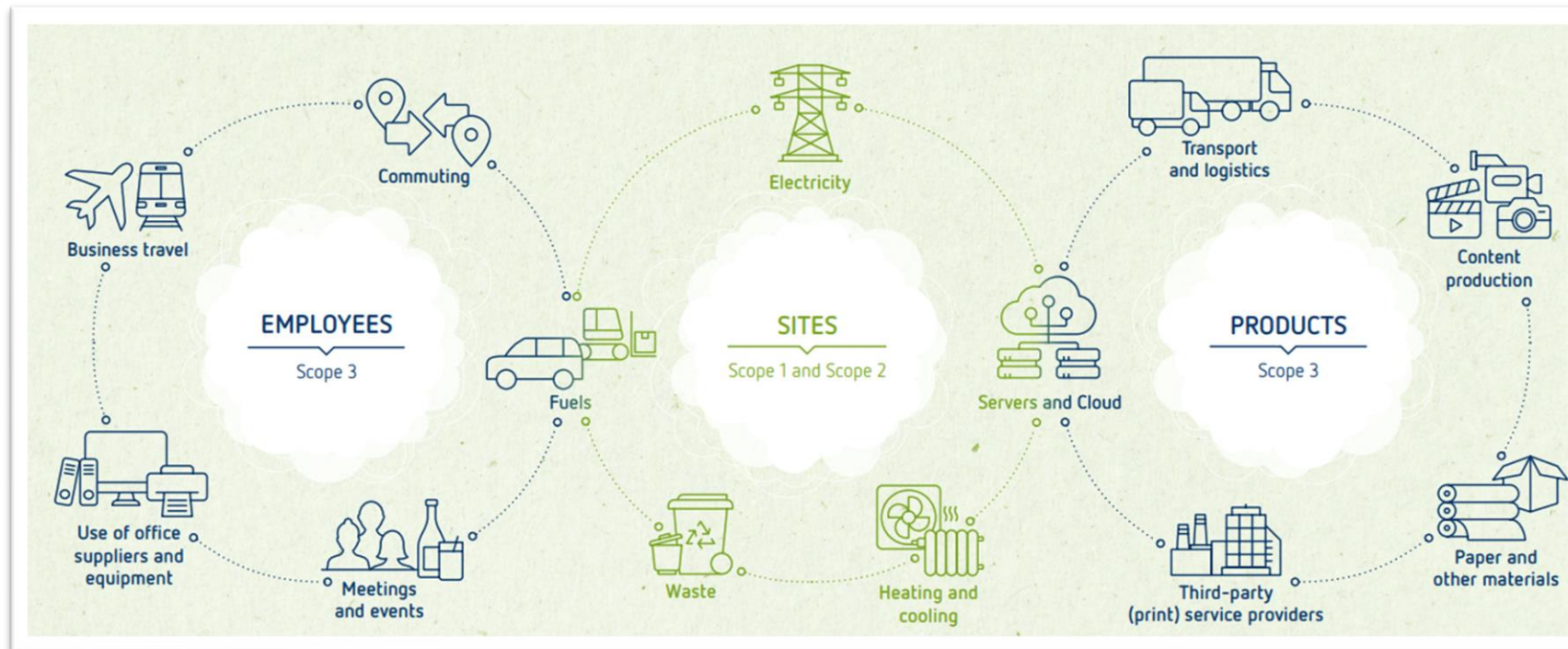
This report focuses on the topic of "Climate Change".

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STRATEGY

Bertelsmann Climate Targets

Climate Neutral by 2030

Bertelsmann aspires to become climate neutral by 2030, by cutting absolute greenhouse gas emissions by 50 percent by 2030 compared to 2018.

Unavoidable emissions are offset via a voluntary climate-protection project. Further projects are to be added in the years ahead and together form a project portfolio. Projects are carefully selected on the basis of defined criteria. For example, the projects must have a long-term orientation and ensure as best as possible that compensated CO2 emissions are not returned to the atmosphere. The projects should be independent and certified according to established standards (e.g., Gold Standard, Verified Carbon Standard) and also provide other environmental and social benefits in addition to climate protection. Please find further details here.

The reduction target was validated by the Science Based Targets Initiative (SBTi) in March 2021. The SBTi confirmed that Bertelsmann's climate target is ambitious and in line with the 1.5° C target of the Paris Climate Agreement.

The Bertelsmann approach on how to cluster corporate emissions.
Please find details in the Appendix.

STRATEGY

Arvato Climate Targets

We at Arvato have a clear orientation towards growth and are planning to increase our global footprint both in terms of space and employees until 2030.

To account for future growth, we are not only looking at absolute emissions, but also pursue the goal to minimize the negative impact per parcel.

1 100% **green electricity purchase worldwide** as of January 2023

2 **Scope 1&2*:** 50% absolute reduction until 2030 *(base line 2018)*

3 **Scope 1-3*:** 50% relative reduction per package until 2030 *(base line 2018)*

4 100% **offsetting** of remaining unavoidable emissions as of 2030 *(excl. Scope 3* service-related emissions)*

* Scope 1: Emissions from operations that are owned or controlled by Arvato
Scope 2: Emissions from the generation of purchased or acquired electricity, heating, or cooling consumed by Arvato
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STRATEGY

Employee Engagement around the World

ENERGY SAVING IN ACTION

In the Netherlands, our Energy Ambassadors motivated all employees to share their ideas for energy saving actions. All ideas were carefully checked, all promising ideas implemented, and the Unplugged Trophy was handed over for the winning idea: air leakage sealing.
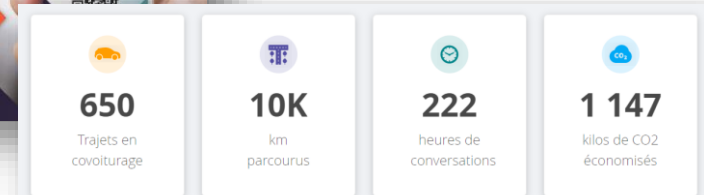
AMERICA RECYCLES DAY

Our three distribution centers in Louisville, US, conducted a visual waste audit to identify how much recyclable and non-recyclable items could be found in the trash bins. On average, 44% of the materials in the trash could have been recycled. As a result, new waste signage in multiple languages is available, more recycling bins were ordered, and a training conducted together with the janitorial staff to improve recycling quotas.

ZERO HERO AWARD

Arvato created and awarded the Zero Hero Award for the first time in 2022. It is an ecological sustainability competition of our logistic sites to highlight best practices and exemplary progress. In the assessment process, we considered a variety of criteria, among these absolute consumption and emission data of 2021 as well as reductions achieved in comparison to the previous year. And the winner 2021 was… Hong Kong! Congratulations!

WORKWEAR FEELGOOD

In our warehouse site in Alcalá de Henares, Spain, the clothing material used for workwear was replaced with sustainably manufactured fabrics like recycled cotton.

NEW HOME FOR ENDANGERED SPECIES

An unusual question reached our Hannover colleagues, when the local Angler's Associations asked to use Arvato's water retention basin for a species conservation project. In November 2022, 15 parent animals were released in the hopes that a new population will start soon.

CARPOOLING FOR A CAUSE

Since November 2022, the French Arvato sites are running a pilot to support the use of carpooling. The partnership with the App Klaxit, which is financed by Arvato, allows employees to "match" and share a ride. More than a metric tonne of CO_2 has been saved by over 650 shared rides.

STRATEGY

Circular Economy in Logistics

Societies and companies have made themselves dependent on **increasingly scarce natural resources**, with negative impacts on the ecosystems and the **invaluable ecosystem services** they provide for societies, as well as flexibility and production costs. With current resources depleting faster and faster, the concept of **'Circular Economy (CE)'** has been introduced. Materials and products should be kept at their **highest value**, using both a technical as well as a bio-based cycle.
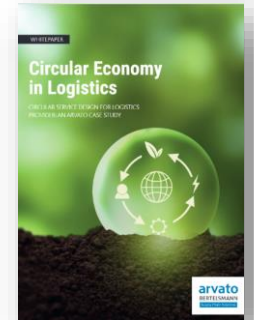
The basic idea of this model is to 'close the loop': avoid the use of virgin raw materials, and if not possible, extend the life cycle of a product.

There are several strategies, called the **10 Rs** that can be implemented by companies. These strategies focus on different aspects of the product: Better product design focuses on **refusing** and **reducing** material during production but also **rethinking** value creation. Extending a product's lifespan can be done through **reusing** (sharing) or **repairing**, **refurbishing**, **remanufacturing** or **repurposing** if it is broken or outdated. Last, if the product cannot be used anymore, raw materials or energy should be **recovered** by **recycling** the components.

Design, production, logistics, and the material flow has to be reconsidered to achieve a closed loop.

Logistic companies facilitate the **efficient flow of materials** to and from a consumer back to the manufacturer. They can strategically leverage and design the supply chain network to **support the life-cycle extension** and product recycling through reverse logistics. This means that logistics providers could not only collect and transport materials but think of **value-adding services** such as repairing, refurbishing, recycling and redistributing.

Circularity as a concept stresses the importance of collaboration along the Supply Chain.

Source and further information:
Arvato (2022):
Circular Economy in Logistics. A case study.
Click here to download.

How do we support the development towards a more circular economy together with our customers?

Automatic **tray erectors and carton sealers** are already installed at 14 sites in Germany, the Netherlands and France. By reducing parcel size, we avoid filling material and fit more parcels onto a pallet, reducing the need for transport runs.

Reverse logistics for a TECH customer's products is supported by **grading returns** in order to enable refurbishment and **reusing of still usable products** at our warehouse in Venlo, the Netherlands.

Technical testing and refurbishment of routers and media receivers at our warehouse in Landsberg, Germany.

Removing paper from logistics processes like pick lists as well as from parcels themselves is a big opportunity for raw material and emission reduction. One example of a successful project is the Harman B2C business managed in our warehouse in Heijen, the Netherlands.

Eliminating the **physical paper printouts** saves about 220.000 A4 sheets of paper per year, while increasing throughput and productivity – a major milestone both for Harman as well as for Arvato.

PERFORMANCE

Landsberg, Germany

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PERFORMANCE

Key KPI Development 2022

1 — 100% **green electricity purchase worldwide** as of January 2023

2 — **Scope 1&2*:** 50% absolute reduction until 2030 *(base line 2018)*
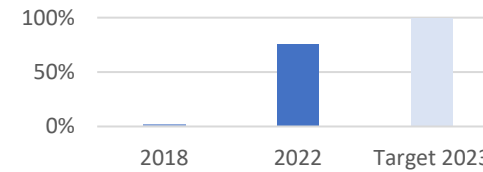
3 — **Scope 1-3*:** 50% relative reduction per package until 2030 *(base line 2018)*
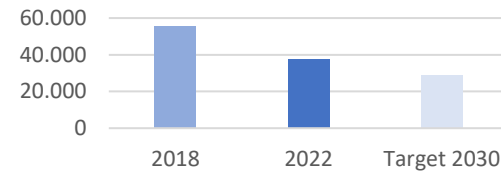
4 — 100% **offsetting** of remaining unavoidable emissions as of 2030
(excl. Scope 3 service-related emissions*)

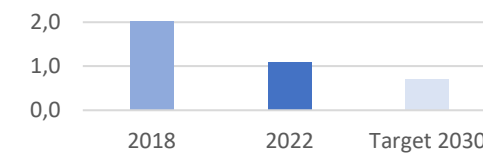* See the appendix for details on the Scope Model.

Renew. Electricity (% of grid electricity)

	2018	2022	Target 2023
100% / 50% / 0%	~2%	~76%	100%

Scope 1&2 (t CO2e)

	2018	2022	Target 2030
	~55.000	~38.000	~29.000

Scope 1-3 (kg CO2e / parcel)

	2018	2022	Target 2030
	2,0	~1,1	~0,7

Offset volume (t CO2e)

	2018	2022
	~100	~4.500

Status 2022

In 2022, 76% of our global electricity consumption was covered by renewable sources (wind, solar, hydro), an increase of 13% compared to 2021.

As of 2022, we have achieved a reduction of 32% compared to 2018.

As of 2022, we have achieved a reduction of 46% compared to 2018.

We have started offsetting initiatives ahead of schedule. In 2022, almost 5000 t CO2e were offset through voluntary carbon credits.

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Overall emissions development

TRENDS & CHALLENGES

Since 2018, the base year of our emission calculations, **the largest share of emissions can be attributed to (indirect) Scope 3 emissions:** In 2022, they made up 83% of the overall emissions. This comes as no surprise, given the increase in parcel volume, and the fact that important sources like transportation and packaging material are summarized in this category.

KEY DRIVERS OF EMISSION DEVELOPMENT*

Scope 1

Compared to 2018, Scope 1 emissions have remained stable – although Arvato has increased the global warehouse volume by more than 30% at the same time. Our ambition to decouple growth from emission has shown to succeed. Find details on **heating-related emissions,** a part of Scope 1 emissions, here.
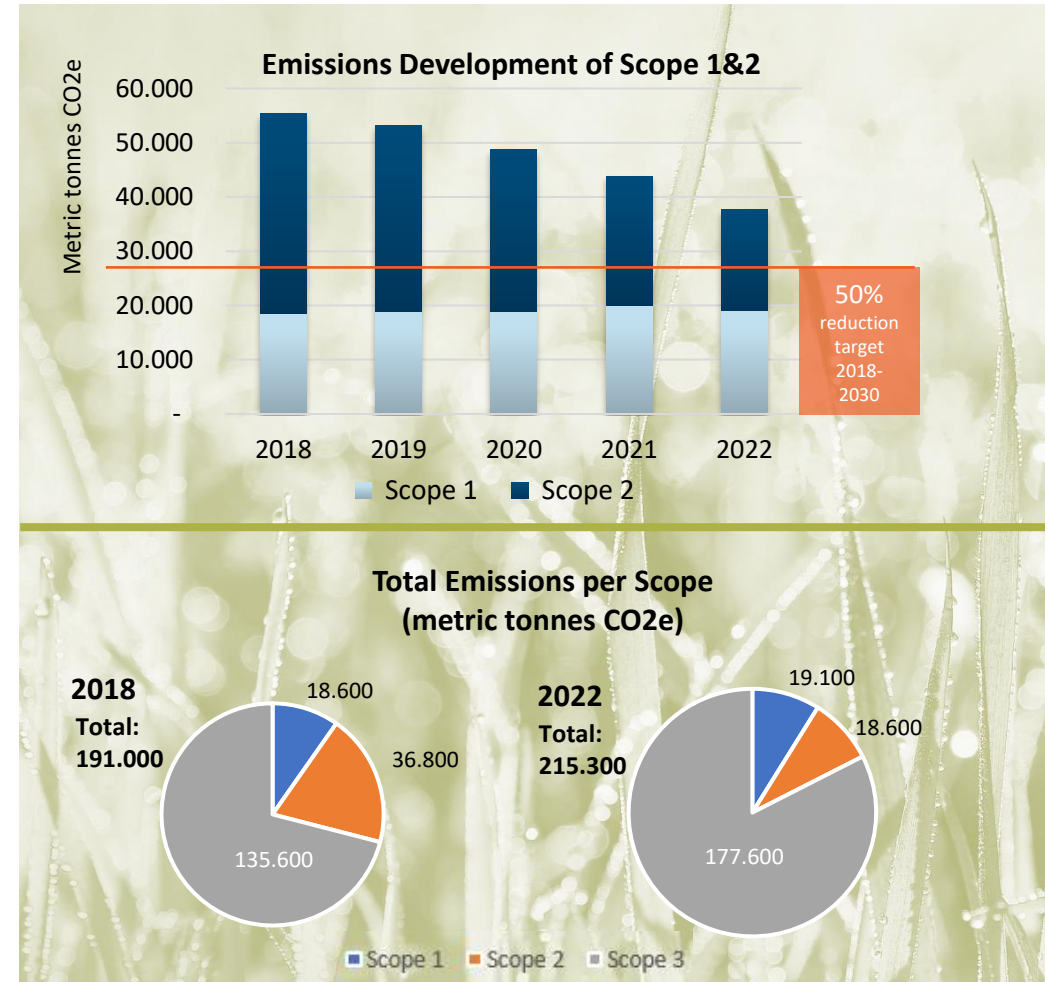
Scope 2

The reduction of Scope 2 emissions by 50% is mostly driven by our strategy to only procure 100% renewable electricity worldwide as of January 2023. In 2022, it led to a **reduction of electricity-related emissions of more than 70% compared to 2018**. Read more about our electricity strategy here.

Scope 3

The **global parcel volume** is still rising, and a part of our reported Scope 3 emissions can be attributed to this ongoing trend. At the same time, the world – and Arvato – have **moved on from a pandemic situation**, which also becomes visible in increased employee mobility emissions.
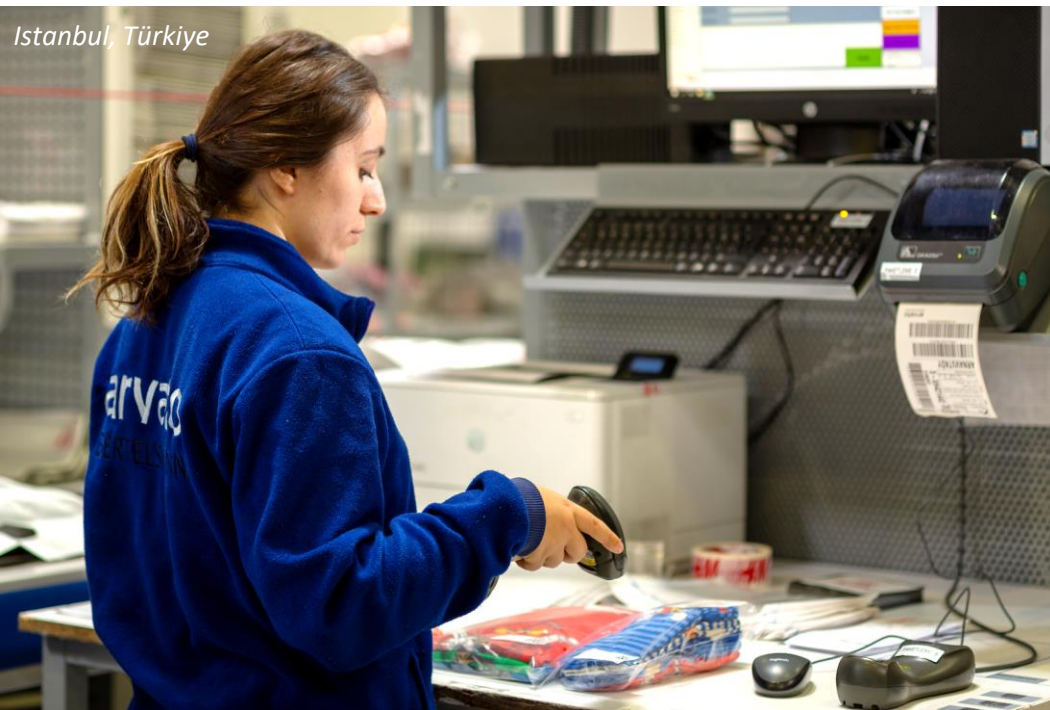
As gaining further insights into global transportation systems become vital to decarbonize logistics processes, Arvato has started a **partnership last year that allows us to interpret transport emissions like never before.** Read the details about the new methodology here.

Emissions Development of Scope 1&2

Metric tonnes CO2e

Scope 1 | Scope 2

50% reduction target 2018-2030

Total Emissions per Scope (metric tonnes CO2e)

2018 Total: **191.000**
- 18.600
- 36.800
- 135.600

2022 Total: **215.300**
- 19.100
- 18.600
- 177.600

Scope 1 | Scope 2 | Scope 3

* See the appendix for details on the Scope Model.

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SITE RELATED - Heating

Istanbul, Türkiye

HOW DO WE HEAT OUR BUILDINGS?

In Europe and the US, we use **different methods to heat our offices and warehouses**: Fossil-fueled gas and oil heating and increasing share of heating with electrical heat pumps. Our facilities in Asia and Brazil as well as some overflow storages do not need any heating. We differentiate between consumption of fossil fuels to generate heating (Scope 1) and district heating which is provided by the landlord (Scope 2).

WHAT IS THE CURRENT STATUS OF CLIMATE NEUTRAL HEATING OPTIONS?

Since 2018, our warehouse **space has grown by more than 30%,** while the heating-related emissions have remained stable. Still, we acknowledge the need to absolutely reduce heating-related emissions further, and current political developments in many countries support this ambition.

A **central challenge** remains the fact that reworking facilities often still comes with technical constraints, high costs and long payback periods. Balancing the interest of property owners and Arvato at leased or rented sites is therefore crucial. Arvato is however absolutely committed to continue working on this topic together with all partners globally.

WHAT IS ARVATO WORKING ON TO TACKLE HEATING-RELATED EMISSIONS?

Energy efficiency remains the foundation for all measures, but it is not enough. Therefore, Arvato has begun to look into **climate neutral heating concepts** like electrical heat pumps, and several lighthouse projects are currently ongoing.

It is however equally important to steer the growth into an environmentally friendly direction. Therefore, we have drafted the first chapter on "Green Building Standards" of what is to become a "**Global Sustainable Building Guideline**" – a binding document that lines out the standards how Arvato plans to grow carbon neutrally, as far as technology is available.

	2018	2021	2022	Δ 2018 vs. 2022
Scope 1* Stationary Fuels (t CO2e)	14.800	16.500	15.400	+ 5%
Scope 2* Heat (t CO2e)	10.100	12.700	11.400	+ 12%
TOTAL heat related emissions (t CO2e)	**24.900**	**29.200**	**26.800**	**+ 8%**

* See the appendix for details on the Scope Model.

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SITE RELATED - Electricity

RENEWABLE ELECTRICITY: OUR KEY MILESTONE

As of 2022, **more than three quarters of our global electricity demand** has been covered by renewable energy sources. Compared to 2018, we have saved almost 20.000 tonnes CO2e.

By January 2023, we achieved one of our key milestones: the **global switch to 100% renewable electricity**. For us, renewable means **solar, wind, or water** - we do not consider energy from nuclear sources or from natural gas as being renewable.

We consider **RE 100 criteria** in our renewable energy purchasing decision and apply these wherever this is possible.

	2018	2021	2022	Δ 2018 vs. 2022
Green Electricity (% of grid electricity)	3%	68%	76%	-
Self-generated green electricity (% of total electricity consumption)	2%	3%	7%	-
Scope 2* Electricity emissions (t CO2e)	26.700	11.000	7.200	**- 73%**

* See the appendix for details on the Scope Model.

GENERATING OUR OWN ELECTRICITY ON SITE

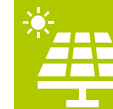As the global demand for electricity is increasing, the next logical step is to become part of the transition to sustainable electricity. Many logistics sites offer **large roof areas** that can potentially be used as space for photovoltaic systems.

Since 2018, we have more than tripled the amount of kWh that have been generated on the roofs of our warehouses and surrounding areas. For instance in 2022, **further photovoltaic installations** at our headquarter in Gütersloh could finally go live. The city of Gütersloh actually won a prize in the competition Wattbewerb because of our solar installation. Congratulations – we were happy to support!

Unfortunately however, not all warehouse sites are constructed in a way to bear the **additional weight** on the roof. Therefore, we analyse our global sites if they can support a PV system installation and are already planning to install more than 3000 MWh of electricity generation capacity on our owned sites in 2023.

Key Facts around the new photovoltaic system at our headquarter in Gütersloh, Germany:

- In total two PV systems across seven warehouse roofs
- Yearly electricity creation capacity of around 3.350 MWh, which could power over a thousand average households
- The total output is fully used on our campus
- Investment sum of around € 2,89 m

Have a look at the new PV system at our Gütersloh Headquarter, presented by Andreas Barth (President Industry Vertical TECH & Arvato Head of CR and Sustainability) in this video.

PERFORMANCE

EMPLOYEE RELATED – Mobility

Gütersloh, Germany

SUSTAINABLE EMPLOYEE MOBILITY AS A CHALLENGE

For us, sustainable employee mobility is a challenge due to the fact that most of our warehouse sites are **located outside of city centres**. Hence for the most part, there is unfortunately only very limited public transport available. However, with the COVID-19 pandemic, a large portion of our employees started **working from home** in full time, while the majority of our workforce needed to be on site to ship out our customer's products in time.

With travel becoming available again, the mobility related emissions have seen a sharp increase compared to last year. Being close to our customers and exchanging ideas and best practices is at the heart of our business. The challenge remains therefore to find more climate-friendly alternatives.

SETTING GUIDELINES FOR GREENER TRAVEL

In 2022, about 20% of the total global commuting kilometres were already travelled with a sustainable means of transport (e.g., public mass transport, bikes, electric vehicles). Knowing that mobility solutions most often still relies on fossil-fuelled means of transport due to the location of our warehouse sites, what have we done so far to offer alternatives?

Electric vehicles are now becoming more and more common. Arvato supports the decarbonisation of mobility by installing **charging stations** at a majority of our sites both for employees as well as visitors. Public mass transport is however key. We are building **bus stops** together with selected municipalities in Germany, support **job tickets**/public transport tickets, or even organize our own **shuttle services** in areas where no public transport is available (e.g., in Turkey or Poland). In France, we have started an **app-based car pooling pilot** which allows our employees to share a ride. Last not least, company bike offerings with matching **ebike charging stations** support a healthy commuting style.

	2018	2021	2022	Δ 2018 vs. 2022
Scope 3* Business Travel (t CO2e)	4.700	900	3.400	- 28%
Scope 3* Employee Commuting (t CO2e)	20.300	9.100	18.500	- 9%

* See the appendix for details on the Scope Model.

PERFORMANCE

SERVICE RELATED – Transportation

With the **growing parcel volumes**, especially driven by the rise of ecommerce, more global transportation is needed. Calculating transportation emissions is therefore a central step to gain **transparency on one of the main drivers of our Scope 3 emissions**. At Arvato, we report on emissions resulting from transportation contracts held and managed on behalf of the customers.

In the past, we relied on publicly available emission factor data and global averages on selected supplier-level data as well. For the reporting year 2022, we have changed the methodology: our **partner EcoTransIT World** enhances our shipment data with further variables to calculate energy consumption, carbon emissions, and air pollutants among others. This approach provides **more accurate, country-specific routing and energy data**, which results in more precise emission calculations. It has proven to be successful with the shipment data available in our central intelligence system, while shipment data from other sources were extrapolated. Consequently, the reported emissions have declined sharply compared to 2021, although we have experienced rising shipment levels over the last years.

For the reporting year 2023, we aim to fully calculate the Arvato transportation data with EcoTransIT World's algorithm.

	2018	2021	2022	Δ 2018 vs. 2022
Scope 3* External Transport Services (t CO2e)	76.800	101.400	75.100	- 2%

* See the appendix for details on the Scope Model.

EcoTransIT World (ETW) is the **leading provider** of automated transport-related emissions calculations with an **energy-based bottom-up approach** including internal routing.

EcoTransIT World
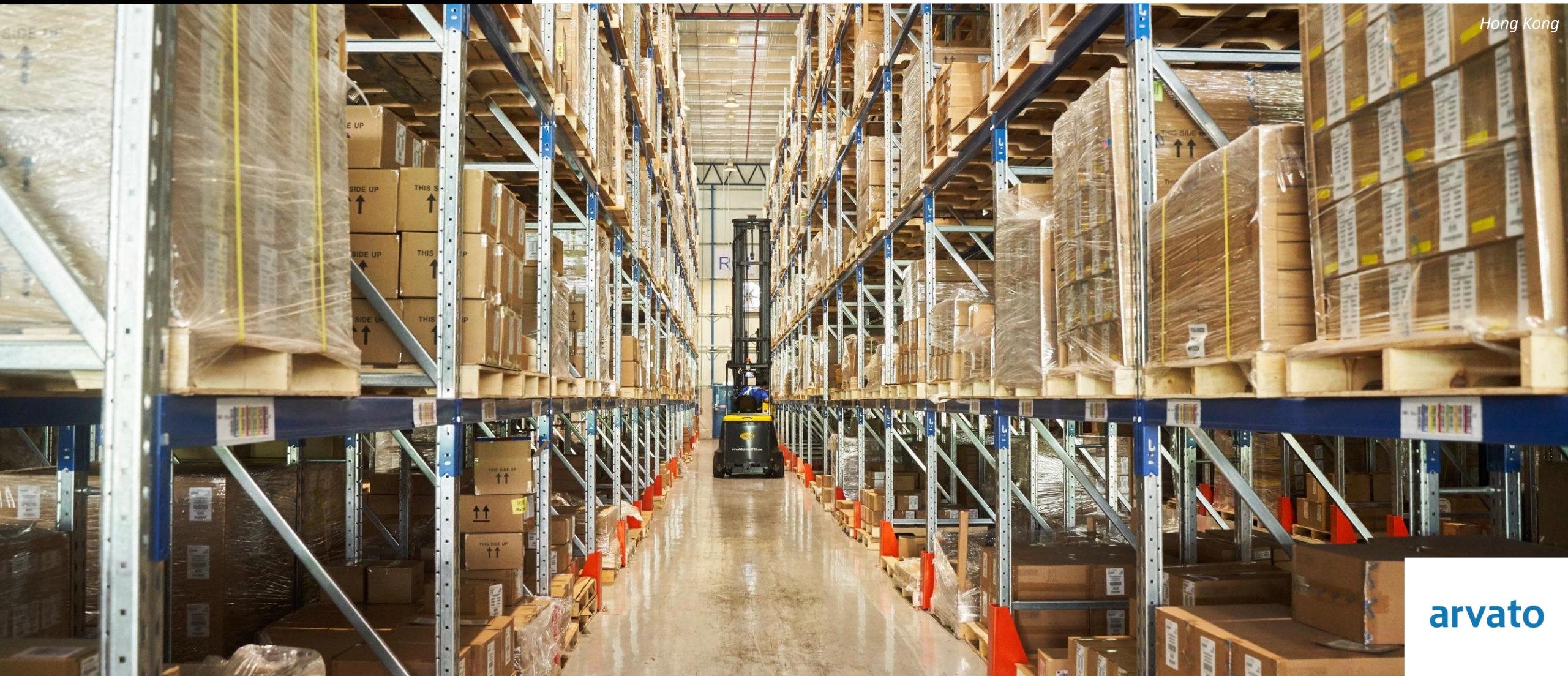
Compliance with current Standards
- GLEC Framework
- EN 16258
- GHG Protocol (Corporate Standard)
- ISO 14083 compliant

Methodology

Developed by scientific institutes:
- Ifeu
- INFRAS
- Fraunhofer IML

Public
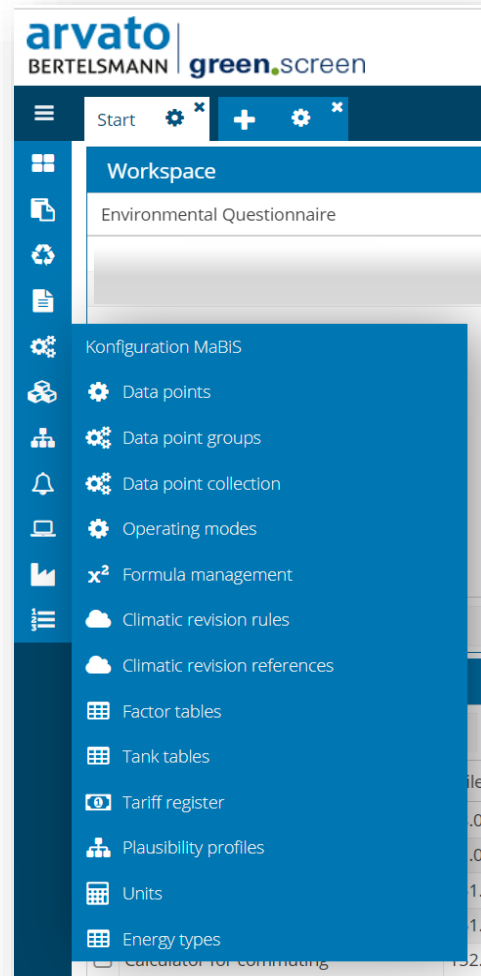
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Environmental Management Platform

What is green.screen?

- green.screen is an IT platform to collect, store and analyze **energy and environmental data.**
- Basis for our **annual environmental data collection** as well as **monthly data analysis.**
- The results of the annual environmental data collection are part of the **Bertelsmann Annual Report** (link). The auditor KPMG has conducted the 2022 audit of our Scope 1&2 emissions on a **reasonable assurance** base.

How does it work?

- Depending on type, the data is collected at **site level, company level or group level.**
- Consumption data (e.g., kWh or metric tonnes) is multiplied with **specific, (country) individual CO2-factors** to calculate emissions. Factor libraries include DEFRA, IEA and EcoInvent.
- Other data types are evaluated outside of green.screen and are added to the system afterwards.

How do we work with green.screen?

- **Dashboards at all organizational levels** visualize the data and trends over the course of months and years.
- Consumption and emission KPIs (e.g., per m²) allow comparisons.
- As green.screen is a living system, further functionalities and data points can be added.

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Reporting Approach

This report presents the development of relevant environmental indicators for Arvato for the **calendar year 2022** including (among others) the following types: energy consumption, business travel, commuting, paper, packaging, distribution and waste. Please see the Appendix for a full overview.

To report on Scope 3 emissions that result from transportation as well as the usage of packaging material, we have defined the reporting boundaries as follows: We include in our calculations only downstream transport activities and package material use that **Arvato is organizing, purchasing, and managing for our customers on their behalf**. Thereby, we exclude transport activities and package material use which is directly organized, purchased, and managed by our customers to avoid double emission accounting.

For Scope 2 Electricity emissions, we follow the market-based reporting approach.

Reliable data is the backbone to take actions for achieving our climate targets. Therefore, we continuously strive to improve our data base which means that from time to time, we **add new data types and emission sources**. This makes data comparison across different years more difficult but helps us to understand underlying effects more precisely.

For example, in 2022, we reported for the first time on **end of life-related emissions** resulting from the packaging material that we procure on behalf of our customers. We re-calculated this emission type as well for previous years, which results in a slight adjustment for data from 2018-2021.

The data forms part of **Bertelsmann's annual environmental data collection** which is reported online on the Bertelsmann homepage. The Bertelsmann reporting follows the international **standards of the Global Reporting Initiative (GRI)** ("Core Option"), the world's leading framework for sustainability reporting by international companies and organizations.

The data in this report represent a share in the consolidated Bertelsmann environmental report and cover Arvato's sites with more than **2,5 million square meters** of logistics space in **17 countries** worldwide.

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Scope Model

Arvato emission lens	Scope	Emission type	Definition	Examples
Site related emissions	Scope 1	Direct emissions	Emissions from operations that are owned or controlled by the reporting company	Emissions from power generation, fossil fuel combustion in owned boilers, furnaces, vehicles, etc.
Site related emissions	Scope 2	Indirect emissions	Emissions from the generation of purchased or acquired electricity, steam, heating, or cooling consumed by the reporting company	Use of purchased electricity, steam, heating, or cooling
Employee- / Service-related emissions	Scope 3	Indirect emissions	All indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions	Production/Service provision/transportation of products, use of sold products

We cluster all relevant **Scope 1** and **Scope 2** emissions as well as a specific **selection of Scope 3** emissions into **site-related emissions.**

Further **Scope 3** emissions are clustered into **employee related emissions** respectively **service-related emissions**.

Why do we use the term "CO2e" instead of "CO2"?

"CO2e, or carbon dioxide equivalent, is a standard unit for measuring carbon footprints. The idea is to express the impact of each different greenhouse gas in terms of the amount of CO2 that would create the same amount of warming. That way, a carbon footprint consisting of lots of different greenhouse gases can be expressed as a single number. […] Standard ratios are used to convert the various gases into equivalent amounts of CO2."

Source: The Guardian (2011): What are CO2e and global warming potential (GWP)?, online available
https://www.theguardian.com/environment/2011/apr/27/co2e-global-warming-potential (accessed 10th May 2023).

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APPENDIX

Overview on CO2e emission data

Site related emissions	unit	2018	2021	2022	2022 vs. 2018
Scope 1 Stationary Fuels	t CO2e	14.800	16.500	15.400	5%
Scope 1 Refrigerant Losses	t CO2e	800	400	1.000	38%
Scope 2 Electricity	t CO2e	26.700	11.000	7.200	-73%
Scope 2 Heat	t CO2e	10.100	12.700	11.400	12%
Total Scope 1+2 Site related	**t CO2e**	**52.400**	**40.600**	**35.100**	**-33%**
Total Scope 3 Site related	**t CO2e**	**10.000**	**10.100**	**11.100**	**11%**
Total Scope 1,2 & 3 Site related	**t CO2e**	**62.400**	**50.700**	**46.200**	**-26%**
Employee related emissions	**unit**	**2018**	**2021**	**2022**	**2022 vs. 2018**
Scope 1 Mobile Fuels	t CO2e	3.100	3.200	2.600	-16%
Total Scope 3 Employee related	**t CO2e**	**28.300**	**14.700**	**25.700**	**-9%**
thereof Scope 3 Business Travel (t CO2e)	*t CO2e*	*4.700*	*900*	*3.400*	*-28%*
thereof Scope 3 Employee Commuting (t CO2e)	*t CO2e*	*20.300*	*9.100*	*18.500*	*-9%*
Total Scope 1 & 3 Employee related	**t CO2e**	**31.400**	**17.900**	**28.300**	**-10%**
Service related emissions	**unit**	**2018**	**2021**	**2022**	**2022 vs. 2018**
Total Scope 3 Service related	**t CO2e**	**97.300**	**150.800**	**140.800**	**45%**
thereof Scope 3 External Transport Services (t CO2e)	*t CO2e*	*76.800*	*101.400*	*75.100*	*-2%*
Total Emissions	**t CO2e**	**191.000**	**219.400**	**215.300**	**13%**

Please note that rounded values may result in inaccurate delta calculations.

APPENDIX

Overview on emission source scope

Scope	Emission Cluster	Emission Source	Explanation
1	Site-related	Stationary Fuels	Natural gas/biogas/liquefied gas/wood/coal/diesel input that was used at the location itself to produce heat for that location.
1	Site-related	Refrigerant Losses	Total amount of refrigerant losses that are determined during maintenance and service work via the refill quantities. Refrigerants are usually used in cooling and air conditioning systems or in heat pumps.
1	Employee-related	Mobile Fuels	Amount of petrol, and diesel consumed by the company's own vehicles with focus on purchased and/or leased vehicles (such as those used by field sales representatives, managers, etc.) or vans and trucks.
2	Site-related	Electricity	Electricity consumed that was either purchased from the grid or generated by our own photovoltaic systems.
2	Site-related	Heat	Amount of heat energy consumed that was procured from a third-party local/district heating system or provided by a landlord.
3	Site-related	Waste	Amount of waste that is intended for reuse/recycling/composting, energy recovery, or incineration.
3	Site-related	Energy related emissions	Emissions from the upstream chain of a) energy generation as well as from distribution losses of the electricity grid; b) natural gas and district heating; and c) heating oil and other fuels.
3	Site-related	End of Life (product waste)	Emissions that occur when the customer disposes of the packaging material (waste logistics)
3	Employee-related	Business Travel	Total amount of kilometers travelled by employees by airplane, train, rental car, as well as the number of nights spent in standard hotels as part of business trips.
3	Employee-related	Employee Commuting	Total distance travelled by all employees by car, public service, ride sharing, or emissions free for the daily journey to work.
3	Employee-related	IT Devices	Number of notebooks/laptops, desktop PCs, monitors, and mobile phones/tables purchased during the reporting period.
3	Employee-related	Office Paper	All amounts of paper that were used in the context of office work (e.g., printer paper, stationary, paper for company or marketing brochures). We do not report paper here that was used by publishing houses, print shops, or logistic units to produce printed products for customers such as books, magazines, or packaging.
3	Service-related	External Transport Services	Downstream transportation services managed by Arvato SCS on behalf of our customers.
3	Service-related	Packaging and Transport Materials	Material that was used for packaging (cardboard, paper, foils, plastics, and pallets) and procured by Arvato SCS on behalf of our customers.
3	Service-related	Third-party print service providers	The amount and origin of paper purchased and received from customers, production materials (such as printing plates, ink, etc.), packaging materials (such as foils, pallets, etc.), and transportation services for our printing facility.
3	Service-related	Warehouse Services	External rented warehouse space from third companies as well as short-time rented warehouses.

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