C0. Introduction

C0.1

(C0.1) Give a general description and introduction to your organization.

Tracing its roots to 1877 in Cleveland, Ohio, Greif, Inc. is a world leader in industrial packaging products. Our offerings include steel, plastic and fibre drums, intermediate bulk containers, reconditioned containers, flexible products, containerboard, uncoated recycled paperboard, coated recycled paperboard, tubes and cores and a diverse mix of specialty products. We provide filling and packaging services such as warehousing, reconditioning flexible intermediate bulk containers and container life cycle management for a wide range of industries. Our subsidiary, Soterra, sustainably manages more than 175,000 acres of timberland in the Southeastern United States and offers land management services including consulting, wildlife stewardship, recreation and wetlands mitigation bank development. With operating locations in more than 40 countries, we are positioned to serve global as well as regional customers. Our operations, wherever we are in the world, follow The Greif Way. These principles guide our decisions and actions throughout our operations. We use financial, natural, and human resources wisely without compromising the ability of future generations to meet their needs. In 2010, Greif established Container Life Cycle Management LLC, a joint venture focused on reconditioning rigid industrial packaging in North America. With the 2011 acquisition of pack2pack in Europe, we launched Earthminded® Life Cycle Services (LCS), one of the leading global reconditioning networks. In 2019, Greif acquired Caraustar Industries, Inc. expanding our manufacturing and service capabilities of high-quality recycled materials and paper products. Greif is committed to creating sustainable products, across all product groups, from supply chain through end of life, lowering greenhouse gas emissions and meeting our customers' needs.

All statements, other than statements of historical facts, included in this report or incorporated herein, including, without limitation, statements regarding our future financial position, business strategy, budgets, projected costs, goals and plan and objectives of management for future operations, are forward-looking statements within the meaning of Section 21E of the Securities Exchange Act of 1934, as amended. Forward-looking statements generally can be identified by the use of forward-looking terminology such as "may," "will," "expect," "intend," "estimate," "anticipate," "project," "believe," "continue," "on track" or "target" or the negative thereof or variations thereon or similar terminology. All forward-looking statements speak only as of the date the statements we made. Although we believe that the expectations reflected in forward-looking statements have a reasonable basis, we can give no assurance that these expectations will prove to be correct. Forward-looking statements are subject to risks and uncertainties that could cause our actual results to differ materially from those projected. All forward-looking statements made in this report are expressly qualified in their entirety by reference to such risks and uncertainties. We undertake no obligation to update or revise any forward-looking statements, whether as a result of new information, future events or otherwise.

C0.2

(C0.2) State the start and end date of the year for which you are reporting data.

	Start date	End date	Indicate if you are providing emissions data for past reporting years	Select the number of past reporting years you will be providing emissions data for
Reporting year	November 1 2020	October 31 2021	No	<Not Applicable>

C0.3

(C0.3) Select the countries/areas in which you operate.

Algeria
Argentina
Austria
Belgium
Brazil
Canada
Chile
China
Colombia
Costa Rica
Czechia
Denmark
Egypt
France
Germany
Greece
Guatemala
Hungary
Israel
Italy
Kenya
Malaysia
Mexico
Morocco
Netherlands
Poland
Portugal
Romania
Russian Federation
Saudi Arabia
Singapore
South Africa
Spain
Sweden
Turkey
Ukraine
United Kingdom of Great Britain and Northern Ireland
United States of America
Viet Nam

C0.4

(C0.4) Select the currency used for all financial information disclosed throughout your response.

USD

C0.5

(C0.5) Select the option that describes the reporting boundary for which climate-related impacts on your business are being reported. Note that this option should align with your chosen approach for consolidating your GHG inventory.

Operational control

C-AC0.6/C-FB0.6/C-PF0.6

(C-AC0.6/C-FB0.6/C-PF0.6) Are emissions from agricultural/forestry, processing/manufacturing, distribution activities or emissions from the consumption of your products – whether in your direct operations or in other parts of your value chain – relevant to your current CDP climate change disclosure?

	Relevance
Agriculture/Forestry	Please select
Processing/Manufacturing	Please select
Distribution	Please select
Consumption	Please select

C-AC0.7/C-FB0.7/C-PF0.7

(C-AC0.7/C-FB0.7/C-PF0.7) Which agricultural commodity(ies) that your organization produces and/or sources are the most significant to your business by revenue? Select up to five.

C0.8

(C0.8) Does your organization have an ISIN code or another unique identifier (e.g., Ticker, CUSIP, etc.)?

Indicate whether you are able to provide a unique identifier for your organization	Provide your unique identifier
Yes, a Ticker symbol	GEF

C1. Governance

C1.1

(C1.1) Is there board-level oversight of climate-related issues within your organization?

Yes

C1.1a

(C1.1a) Identify the position(s) (do not include any names) of the individual(s) on the board with responsibility for climate-related issues.

Position of individual(s)	Please explain
Board Chair	(Position in corporate structure) Since 2016, Greif's entire board, and ultimately the Board Chair, has held responsibility for climate-related issues and sustainability. At each Board meeting, either Greif's CEO or Greif's Vice President of Investor Relations, External Relations and Sustainability reports to the Board. (Connection to climate change) At least one board meeting annually is dedicated to discussing climate change and sustainability issues. Climate change topics that were raised to the Board and Board Chair in 2021 include GHG reduction targets and roadmaps as well as tying executive compensation to performance on climate and ESG metrics. (Recent examples) The Board Chair actively engaged with climate-related issues throughout 2021. For instance, early in the year the Board Chair analyzed and approved Greif's new target to reduce greenhouse gasses 28% by 2030 relative to a 2019 base year, which was made public in April of 2021. (Future expectations) In August 2022, we plan to provide a one-hour training to the Board. The agenda has not yet been set, but we anticipate covering climate topics including external trends/expectations, benchmarking results, changes in the regulatory space, results of the climate scenario analysis, gaps in our climate strategy/governance, what Greif has done to date, and next steps. We also anticipate holding another hour-long training in December on a different ESG topic.

C1.1b

(C1.1b) Provide further details on the board's oversight of climate-related issues.

Frequency with which climate-related issues are a scheduled agenda item	Governance mechanisms into which climate-related issues are integrated	Scope of board-level oversight	Please explain
Scheduled – all meetings	Reviewing and guiding strategy Reviewing and guiding risk management policies Reviewing and guiding annual budgets Reviewing and guiding business plans Monitoring and overseeing progress against goals and targets for addressing climate-related issues	<Not Applicable>	Greif's Board of Directors receives updates on sustainability and its ESG scores from either its CEO or Vice President of Investor Relations, External Relations and Sustainability at each quarterly board meeting. Annually, one board meeting is dedicated to a more in-depth discussion of sustainability issues, including climate change. Additionally, outside resources are asked to provide education and insight to the board on ESG topics during quarterly board meetings. In 2021, our Executive Leadership Team reviewed climate-related scenarios and how the associated transition and physical risks might impact Greif. This work will be reviewed by the Board in the future. Additionally, in Q2 of 2021, slides presented to the board included the need to integrate risks and opportunities to business strategy. Feedback and guidance received from the board is communicated to the Sustainability Steering Committee and used to drive Greif's strategies and implementation.

C1.1d

(C1.1d) Does your organization have at least one board member with competence on climate-related issues?

	Board member(s) have competence on climate-related issues	Criteria used to assess competence of board member(s) on climate-related issues	Primary reason for no board-level competence on climate-related issues	Explain why your organization does not have at least one board member with competence on climate-related issues and any plans to address board-level competence in the future
Row 1	Yes	Greif considers all of its board to have competence on climate-related issues as it is regularly briefed on climate topics, including greenhouse gas emissions, targets, and scenario analysis. Additionally, outside resources are brought in to discuss ESG topics with the board, including climate-related issues. For example, in 2021 our Executive Leadership Team reviewed climate-related scenarios and how the associated transition and physical risks might impact Greif, and this work will be reviewed by the Board in the future.	<Not Applicable>	<Not Applicable>

C1.2

(C1.2) Provide the highest management-level position(s) or committee(s) with responsibility for climate-related issues.

Name of the position(s) and/or committee(s)	Reporting line	Responsibility	Coverage of responsibility	Frequency of reporting to the board on climate-related issues
Other C-Suite Officer, please specify (Vice President, Investor Relations, External Relations and Sustainability)	<Not Applicable>	Both assessing and managing climate-related risks and opportunities	<Not Applicable>	Quarterly

C1.2a

(C1.2a) Describe where in the organizational structure this/these position(s) and/or committees lie, what their associated responsibilities are, and how climate-related issues are monitored (do not include the names of individuals).

Greif's Board of Directors receives annual updates from its Vice President of Investor Relations, External Relations and Sustainability. This role assumed responsibility for leading climate change efforts and sustainability across Greif. Greif's aim was to further embed sustainability into its business strategy and the company believes that the individual in this role is strategically positioned to do so. This role is also part of Greif's Sustainability Steering Committee (SSC), which includes ten representatives from Greif's Executive Leadership Team (ELT) and seven representatives from the Sustainability Management Team (SMT). The SSC is tasked with further integrating sustainability into our strategy and operations, reviewing our sustainability progress and priorities quarterly and ensuring accountability at all levels of our organization. In addition to this individual, the SSC includes members of Greif's Executive Leadership Team, President and Chief Executive Officer; Executive Vice President, Chief Financial Officer; Executive Vice President, Chief Human Resources Officer; Executive Vice President, General Counsel and Secretary; Vice President and Chief Administrative Officer; Vice President and Group President of Global Industrial Packaging; Vice President and Division President, Senior Vice President and Group President, Paper Packaging & Services and Soterra LLC; Senior Vice President Enterprise Strategy, Global Sourcing and Supply Chain; and VP of Sustainability.

The SSC is tasked with further integrating climate change into Greif's business strategy and operations, reviewing progress on climate- and sustainability-related topics and priorities quarterly and ensuring accountability at all levels of the organization. The SSC, which is subject to Board oversight, was formed including Senior leadership to signal to the organization and its stakeholders the importance of climate change, ensure an enterprise view of climate change, accelerate progress of initiatives and ensure the SSC has the authority to implement change in the organization. The Board of Directors holds the SSC accountable for reaching annual goals, which directly impacts the remuneration of the Vice President of Investor Relations, External Relations and Sustainability and VP of Sustainability, and determines the level of funding for Greif's climate change and sustainability programs.

The SSC guides the activities of the seven-member Sustainability Management Team, which works with topic teams, including the Global Climate Team, consisting of representatives from each region and business unit to drive operational projects and priorities. The Sustainability Management Team meets quarterly with the ELT to review progress against goals through energy and emission performance dashboards and facility level roadmaps detailing energy and emission reduction initiatives that are active in Greif facilities and reports meeting outcomes to Greif's Vice President, Investor Relations, External Relations and Sustainability and VP of Sustainability. Greif's VP of Sustainability meets quarterly with Greif's CEO, CFO and other members of the Executive Leadership Team to discuss progress of climate initiatives and funding required for energy and emissions reduction projects. Additionally, the VP of Sustainability and Director of Sustainability meet with the CEO quarterly.

C1.3

(C1.3) Do you provide incentives for the management of climate-related issues, including the attainment of targets?

	Provide incentives for the management of climate-related issues	Comment
Row 1	Yes	

C1.3a

(C1.3a) Provide further details on the incentives provided for the management of climate-related issues (do not include the names of individuals).

Entitled to incentive	Type of incentive	Activity incentivized	Comment
Procurement manager	Monetary reward	Environmental criteria included in purchases	Part of Greif's Senior Director, North American Sourcing & Supply Chain's performance is based on their ability to lead Greif's Procurement Sustainability projects to ensure / hold to account we are meeting Greif's 2025 goals. Many of Greif's buyers are working on specific sustainability projects, for example sourcing more recycled materials. These buyers have sustainability criteria integrated into their performance reviews.
Corporate executive team	Non-monetary reward	Emissions reduction target Efficiency project Supply chain engagement	One member of Greif's corporate executive team is tasked with creating and implementing climate-related projects and targets. This individual's performance is evaluated in large part on their ability to execute climate-related projects successfully.

C2. Risks and opportunities

C2.1

(C2.1) Does your organization have a process for identifying, assessing, and responding to climate-related risks and opportunities?

Yes

C2.1a

(C2.1a) How does your organization define short-, medium- and long-term time horizons?

	From (years)	To (years)	Comment
Short-term	0	3	
Medium-term	3	5	
Long-term	5	10	

C2.1b

(C2.1b) How does your organization define substantive financial or strategic impact on your business?

Definition of Substantive Financial or Strategic Impact:

Greif defines substantive financial or strategic impact as any impact that exceeds $1M in a given year. Greif further classifies substantive financial impacts as follows: Low = less than $50M, moderate = between $50M and $100M, and high = greater than $100M. Risks that fall below the above threshold but are significant due to customer, operational or regulatory demands are also considered as part of Greif's ongoing risk management process and prioritized based on potential financial impact and likelihood of occurrence. As part of this process, Greif evaluates climate risks including policy and legal, market, technology, reputation, and acute and chronic physical risks using the TCFD framework.

Description of Quantifiable Indicators used to Define Substantive Financial or Strategic Impact:

(Potential financial impact to Greif's operations) Financial impacts are estimated in varying ways, depending on the type of risk or opportunity that is being analyzed. Some methods include TCFD-aligned scenario analysis, assessment of historical financial impact ranges from similar events, and expert assessment. Financial impacts are assessed over short-, medium-, and long-term time horizons to contextualize findings.

C2.2

(C2.2) Describe your process(es) for identifying, assessing and responding to climate-related risks and opportunities.

Value chain stage(s) covered
Direct operations
Upstream
Downstream

Risk management process
Integrated into multi-disciplinary company-wide risk management process

Frequency of assessment
More than once a year

Time horizon(s) covered
Short-term
Medium-term
Long-term

Description of process
The process used to determine which risks and opportunities could have a substantive financial or strategic impact on the organization:

Climate-related risks and opportunities are integrated into Greif's Enterprise Risk Management (ERM) process, which considers all Greif Business Units and geographies as well as risks and opportunities that present themselves upstream and downstream from the company's direct operations. Climate-related risks and opportunities are evaluated by the Sustainability Steering Committee (SSC) several times a year as they come to the attention of committee members. Risks and opportunities that are considered sufficiently large and/or likely when compared against Greif's ERM framework are brought to the attention of senior leaders. In addition to its regular meetings, the SSC is periodically informed about the results of in-depth analyses of climate-related risks and opportunities and takes decisions based on the severity of the risks or size of the opportunities.

In 2021, Greif held workshops with stakeholders from across all primary business units and functional areas led by the Head of Strategy and Sourcing who was also an Executive Leadership Team (ELT) member. During the workshops inter-disciplinary groups were formed to analyze individual climate-related risk and opportunity categories that may affect Greif. For instance, one group of members from varying business units and functional areas solely analyzed the potential market risks (i.e., shifting customer preferences or lack of raw material supply) that may arise from a transition to a low-carbon economy. Risks and opportunities are considered across all of the categories enumerated by the TCFD (e.g., market, policy and legal, reputation, technology, acute and chronic physical, etc.) and across the short- (0-3 years), medium- (3-5 years), and long-term (5-10 years). After individual groups conducted their assessment of particular risk and opportunity categories, they were brought together to create an extended registry of all risks and opportunities that were identified in the workshops. Risks and opportunities in the registry were aggregated, when possible, and prioritized based on their expected impact to Greif's operations as well as the likelihood of their occurrence. Those that were deemed the most likely and/or impactful to Greif's business were modelled quantitatively using publicly available financial data, socio-economic data from publicly available climate change scenario's (e.g., scenarios from the International Energy Agency), and industry reports to gather a directional understanding of the magnitude of each risk and opportunity. The analyzed risks and opportunities were then categorized as either minor, moderate, severe, or critical based on their potential financial impact and perceived likelihood of occurrence. Lastly, risks and opportunities were brought to the attention of senior decision makers if their placement within the ERM framework's materiality threshold warranted continued consideration.

How your organization makes decisions to mitigate, transfer, accept or control the identified climate-related risks and to capitalize on opportunities:

Risks and opportunities that have gone through the above process and have been deemed considerable enough to warrant action are brought to the attention of the Risk Leadership Committee (RLC), CEO, and CFO by the VP of Sustainability. The RLC meets quarterly and is responsible for analyzing emerging risks and opportunities within Greif's business. The RLC evaluates risks and opportunities in conjunction with the Audit Committee of Greif's Board of Directors to determine the most critical risks and identify areas of opportunity within them. Quarterly, the RLC reports to the Audit Committee and, when appropriate, the Audit Committee chair reports on risk management topics to the full Board of Directors. The top 15 risks, as assessed by the RLC using the financial and likelihood thresholds established in the ERM framework, are assigned to a risk owner, a subject matter expert responsible for informing business units of these risks and reporting on mitigation activities to the RLC, regularly, and the Audit Committee, when appropriate. The RLC evaluates whether risk mitigation is appropriate to reduce risk to an acceptable level or requires further mitigation. When further mitigation activities are warranted, the risk owner is notified and monitored by the RLC to ensure that the mitigation process proceeds as planned.

Case Study:

(Situation) Carbon pricing was identified as a key risk to Greif's business during the inter-disciplinary workshops that inform the SSC, as it was deemed to be very likely to increase in both prevalence and size across Greif's operating regions in the near future. While Greif is already taxed under the EU ETS, workshop teams feared that carbon pricing may occur within the broader North American context that Greif operates in as well. (Task) In order to reduce exposure to current and potential future carbon pricing mechanisms, Greif had to isolate potential levers that could be used to reduce the GHG intensity of its products. (Action) Greif tasked facility operators and engineers with assessing the scope of potential efficiency enhancements that could reasonably be conducted at each site. (Result) Greif conducted 55 energy efficiency projects in 2020, and 21 in 2021 and achieved 14.3 million kWh and 11 million kWh of annual energy savings, respectively (n.b., 2021 figures do not include Greif's numerous but smaller energy efficiency initiatives that were included in 2020 calculations).

C2.2a

(C2.2a) Which risk types are considered in your organization's climate-related risk assessments?

	Relevance & inclusion	Please explain
Current regulation	Relevant, always included	Relevance: As an organization with operations across the globe, current regulations such as carbon taxes, cap and trade programs, and reporting requirements are considered as part of Greif's ongoing climate-related risk assessments. Each Regional VP is responsible for monitoring the regulatory environment and ensuring their operations are compliant with all applicable regulations. The Sustainability Steering Committee (SSC) is responsible for maintaining awareness of climate-related regulations globally and helping to identify risk and opportunity within these regulations, based on input from Regional VPs and the Risk Leadership Committee. Current regulatory risks are discussed at SSC meetings. Climate-related regulatory risk is incorporated into Greif's Enterprise Risk Management process, which is reviewed quarterly by Greif's Audit Committee and members of the Executive Leadership Team (ELT), and annually by Greif's Board of Directors. Specific Example: A recent risk assessment found that carbon pricing mechanisms in the EU and in other markets that Greif or its suppliers operate in are a material risk to Greif as they impose additional operating costs above and beyond those already incurred in the normal course of business. In 2021, Greif paid €211,314 ($249,984) in carbon taxes in Sweden to account for emissions from its local facilities in the country. Swedish emissions account for 0.16% of Greif's overall Scope 1 emissions globally. To respond to this risk, Greif's facility managers have undergone efficiency assessments to reduce emissions at the site level. Their findings have been provided to the SSC, which will use this data to inform future roadmaps for efficiency enhancement projects.

	Relevance & inclusion	Please explain
Emerging regulation	Relevant, always included	Relevance: Emerging regulations, like new and strengthening carbon pricing mechanisms or increased disclosure requirements, are considered as part of Greif's ongoing climate-related risk assessments. Each Regional VP is responsible for monitoring the regulatory environment in their region and notifying executive leadership of emerging changes. The SSC is notified when regulatory changes with potential climate-related impacts are identified by regional VPs and the Vice President of Sustainability. Emerging regulatory risks are discussed at SSC meetings. Climate-related regulatory risk is incorporated into Greif's ERM process, which is reviewed quarterly by Greif's Audit Committee and members of the ELT, and annually by Greif's Board of Directors. Specific Example: Greif actively monitors the status of carbon pricing mechanisms across North America due to its emissions concentration on the continent (93% of Greif's scope 1 emissions occur in North America). While, at present, a strong cap and trade program exists in California and a growing carbon pricing mechanism exists in Canada, shifting requirements for inclusion in either system or new carbon pricing schemes in other North American markets could lead to new and substantial operating costs for Greif. Specifically, 99% of Greif's emissions in North America occur in locations where Greif does not currently make payments in accordance with a carbon pricing scheme. Given this concentration of emissions outside of regulated areas, carbon prices in North America could have a substantial impact on Greif's operations. For example, a $100/MT CO2e would generate a risk sufficiently large to be considered 'moderate' in the financial thresholds documented in Greif's ERM framework. In order to mitigate exposure to potential carbon pricing, Greif has set greenhouse gas reduction targets for both direct and indirect emissions and has undergone the evaluation of emissions reduction opportunities across several of its North American facilities.
Technology	Relevant, always included	Relevance: Pressure from customers to reduce life-cycle emissions associated with the company's products has spurred competition among industrial packaging companies in the development of technologies and processes that reduce packaging product GHG emissions. Examples along the value chain include low-carbon and/or recycled inputs, higher-efficiency production processes, and the use of innovative distribution network technologies. To mitigate this risk, Greif engages customers daily to ensure the company remains abreast of concerns. Greif tracks a Customer Satisfaction Index and Net Promotor Scores annually to ensure it is addressing customer needs and uses feedback to monitor emerging concerns. Greif collaborates with customers on product development and innovation efforts to help meet their sustainability goals. These efforts have led to a variety of products, including NexDrum and EcoBalance that increase the use of recycled materials, reduce weight and emissions compared to conventional products. Specific Example: If Greif is unable to utilize innovative technology and processes effectively to reduce product lifecycle emissions, it may begin to lose business with companies seeking to decarbonize their supply chain. 20% of Greif's top 50 customers have announced a scope 3 decarbonization goal that includes their supply chain and is aligned with the Science-based Targets Initiative. Greif stands to lose substantial revenue if these companies choose to change packaging suppliers to reach their decarbonization goals. In response to this risk, Greif business units have focused their efforts on innovative technological advances that reduce product emissions. Greif Sweden/Nordic developed the capability to replace ink jet markings with laser markings on Intermediate Bulk Containers (IBCs), reducing the use of solvent-based ink during production. By eliminating the use of solvents and ink, resin use in production decreases by 6.7 percent which reduces the product's GHG footprint. Each year, Greif's Climate Team oversees the development of operational energy and emissions roadmaps to identify projects, including technology replacements that will contribute to climate-related goals like the one mentioned above. This information is incorporated into Greif's ERM process and progress against the goals is discussed at each quarterly SSC Meeting. In 2021, Greif completed 21 projects, reducing energy consumption by over 11.1 million kWh, annually.
Legal	Relevant, always included	Relevance: As a public industrial company that operates in Europe and North America, Greif is currently, and may increasingly become, subject to legal requirements around disclosure of climate risks and opportunities as well as climate metrics. Failure to comply with climate-related legal obligations may lead to litigation claims against Greif which could drive significant risks to its business. Specific Example: The SEC recently published a draft disclosure rule that may require the disclosure of greenhouse gas data, and a breakdown of climate-related costs to the business. Failure to comply with the SEC's potential disclosure ruling may lead to climate-related litigation claims against Greif, since it is publicly traded on a stock exchange in the United States.
Market	Relevant, always included	Relevance: Greif has witnessed a rise in customer and investor expectations around GHG reductions and the development of innovative, low-carbon products. As a provider of upstream products in its customers' value chains, Greif's business is prone to scrutiny from customer-led supply chain decarbonize efforts. As such, market shifts driven by GHG and climate change concerns pose a significant business risk to Greif. Thus, Greif has a vested interest in delivering on climate goals and appropriately disclosing the company's progress and initiatives. In 2020, Greif's materiality assessment identified climate strategy as one of the most important topics to internal and external stakeholders. Based on this assessment, the Greif Executive Leadership team reviewed and updated its strategy to integrate high-priority climate topics, including climate strategy, into the overall business strategy. Specifically, the Protecting our Future pillar of our Build to Last strategy focuses on decarbonization and circularity. Greif also developed a new goal to reduce absolute Scope 1 and 2 GHG emissions 28 percent over a 2019 baseline by 2030, and intends to complete an assessment of Scope 3 emissions and the feasibility of a long-term net zero emissions aspiration by the end of 2023. Specific Example: Failure to meet Greif's stated GHG reduction targets may lead to a market disadvantage relative to peers. Reactions to this may cause loss of business from customers seeking to decarbonize their supply chain or a reduction of investment in Greif from climate- and sustainability-focused investors. In response, Greif undertook 21 GHG reduction initiatives in 2021 to lower its operational and product GHG footprint by 4,390 MT. To capitalize on its initiatives and highlight its consideration of climate topics, Greif publishes annual sustainability reports in accordance with GRI Standards Core requirements. Greif continuously updates its sustainability reports to align with emerging and influential disclosure frameworks. For instance, Greif's 2020 Sustainability Report enhanced climate reporting to align with recommendations from the Task Force on Climate-related Financial Disclosure (TCFD). Lastly, Greif publicly partners with external stakeholders to conduct additional analyses of its GHG footprint and climate risks, such as the publication of "From Cradle to Grave: Greif's Life Cycle Analysis (LCA)" in partnership with World Business Council for Sustainable Development (WBCSD).
Reputation	Relevant, always included	Relevance: Acknowledgment and management of climate risk is increasingly becoming an expectation. Some of our reputational risk is driven by growing customer awareness around the detrimental impacts associated with packaging and the desire to have carbon neutral and circular solutions. As such, Greif has a vested interest in both delivering on climate goals and appropriately disclosing the company's progress and initiatives to key stakeholders. Specific example: In addition to other factors, Greif considers customer perception in its risk assessment process, as a negative reputation on climate issues may lead to reduced sales. To respond to this risk, Greif publishes an annual sustainability report which outlines Greif's stance and progress on a number of important climate topics as well as shares relevant greenhouse gas metrics for use by stakeholders. In regard to initiatives, Greif provides clear publicly-available information about programs, including the Green Tool. The Greif Green Tool is a flexible calculator that uses independent lifecycle data of Greif industrial packaging products – designed to assist our customers in making informed decisions about which industrial packaging best suits their products and to achieve their sustainability goals. The Green Tool allows customers to review and compare the environmental impact of plastic drums, steel drums, IBCs, fibre drums and big bags specifically related to their business. Results can be used to create an environmental baseline and help customers make meaningful comparisons between different packaging types and track their progress over time. To supplement the Greif Green Tool, we launched the Greif Green Tool Lite, which allows us to provide information more quickly to our customers. The Greif Green Tool Lite provides carbon footprint and reduction metrics that our customers can achieve by switching to a more sustainable product.
Acute physical	Relevant, always included	Relevance: Greif's business relies on the steady procurement of raw materials, the timely and efficient production of finished goods, and the transportation of those goods to their intended market. Chronic physical risks can disrupt all these phases of Greif's operations by, for example, interrupting either Greif's or its suppliers' operations because of chronic weather patterns that surpass the engineering threshold of key elements of production facilities or water stress making the production and transportation of upstream raw materials more difficult. As such, Greif routinely evaluates the role of chronic physical risks in all aspects of its business to ensure operations are robust against likely eventualities. Specific example: 19 Greif facilities are situated in low-lying coastal areas, accounting for 10% of Greif's revenue from the manufacture of rigid industrial packaging products and closures. According to the Fifth Assessment of the Intergovernmental Panel on Climate Change (IPCC), such areas are at risk of exposure to the knock-on effects of sea-level rise. In particular, sea level rise may impose costs at these sites by requiring additional CAPEX to ensure they are protected against chronic water-related risks arising from higher sea levels nearby. Additionally, loss of coastline to sea level rise may force Greif or its suppliers to relocate facilities further inland, which may impose significant costs on the business. In order to address chronic physical risks like the one above, Greif is in the process of implementing risk-based cost allocations, which will use a site's relative risk as a rate factor for how the facility allocates costs to promote loss control investment, and better mirror cost generation.
Chronic physical	Relevant, always included	Relevance: Greif's business relies on the steady procurement of raw materials, the timely and efficient production of finished goods, and the transportation of those goods to their intended market. Acute physical risks can disrupt all of these phases of Greif's operations by, for example, taking suppliers' facilities offline and creating a lag in input production, by damaging Greif's manufacturing facilities, or by disrupting the transportation of Greif's finished products to its customers. As such, Greif routinely evaluates the role of acute physical risks in all aspects of its business to ensure operations are robust against likely eventualities. Specific example: Greif considers the possibility of extreme wind storm events as part of its risk assessment process. For example, in 2020 Greif Paper Packaging & Services' Tama facility experienced a derecho (i.e., a widespread and long-lived windstorm) that took the facility offline for a week. Greif's Sweetwater and Los Angeles facilities covered the necessary supply to continue meeting customer demand. When repairing the damage to the roof, Greif used upgraded decking materials to make the roof stronger. Greif also upgrades its facilities to improve their resilience should they be impacted by wind events again in the future. Additionally, Greif is in the process of implementing risk-based cost allocations, which will use a site's relative risk as a rate factor for how the facility allocates costs to promote loss control investment, and better mirror cost generation.

C2.3

(C2.3) Have you identified any inherent climate-related risks with the potential to have a substantive financial or strategic impact on your business?

Yes

C2.3a

(C2.3a) Provide details of risks identified with the potential to have a substantive financial or strategic impact on your business.

Identifier
Risk 1

Where in the value chain does the risk driver occur?
Direct operations

Risk type & Primary climate-related risk driver

Current regulation	Carbon pricing mechanisms

Primary potential financial impact
Increased direct costs

Climate risk type mapped to traditional financial services industry risk classification
<Not Applicable>

Company-specific description
One of Greif's main regulatory risks as a producer of industrial packaging products in North America and the EU is the potential additional cost imposed on operations, either through direct payments or pass-through costs from regulated suppliers and energy companies, by carbon pricing mechanisms like the EU ETS. Currently, 3% of Greif's scope 1 emissions are subject to carbon pricing under the EU ETS. Greif's exposure to the EU ETS is mostly limited to its Global Industrial Packaging (GIP) operations as the business unit's main manufacturing facilities are located in the EU. Carbon pricing under the ETS may lead to a competitive disadvantage when competing against non-EU based manufacturers of rival products. To mitigate this risk, Greif has undertaken a number of energy efficiency programs throughout the last several years, which has had the dual benefit of lowering energy costs as well as reducing exposure to carbon pricing mechanisms.

Time horizon
Long-term

Likelihood
Likely

Magnitude of impact
High

Are you able to provide a potential financial impact figure?
Yes, an estimated range

Potential financial impact figure (currency)
<Not Applicable>

Potential financial impact figure – minimum (currency)
23000000

Potential financial impact figure – maximum (currency)
177000000

Explanation of financial impact figure
(Context) This financial impact range reflects the cost of carbon pricing in the IEA's NZE scenario in 2040 applied to Greif's operations.

(Approach) 1) Greif's emissions profile was projected until 2040 under two scenarios: one in which emissions keep pace with assumed long-term business growth, and one in which all current and proposed site-level emissions reduction programs are instituted, and emissions growth is somewhat decoupled from business activity; 2) the IEA's STEPS and NZE carbon pricing is applied to Greif's scope 1 emissions on the country-level; 3) carbon pricing is aggregated company wide. Specifically, the maximum potential impact figure above was calculated by multiplying Greif's forecasted emissions from advanced and developing economies in 2040 (845k and 26k, respectively) by the carbon prices associated with those two regions in the IEA's NZE Scenario ($205 and $160 per MT CO2e, respectively). The minimum financial impact to Greif is calculated by multiplying the same carbon prices by region ($205 and $160 per MT CO2e) by Greif's forecasted emissions under a scenario in which emissions reductions occur in line with a 1.5-degree aligned GHG reduction target (107k MT CO2e in advanced economies and 3k MT CO2e in developing economies). Maximum financial impact: ($205* 107,000 MT CO2e) + ($160* 3,000 MT CO2e) = $177,000,000. Minimum financial impact: ($205 * 107,000 MT CO2e) + ($160 * 3,000 MT CO2e) = $23,000,000.

(Assumptions) 1) Greif's business is assumed to grow at the same rate as the IEA's GDP forecast for the markets it operates in; 2) emission reduction programs are assumed to be exactly as effective as estimated; 3) no new emission reduction initiatives are introduced from now until 2040; and 4) the carbon prices introduced in the IEA's NZE scenario are implemented.

Cost of response to risk
135345000

Description of response and explanation of cost calculation
(Description of response) Greif proactively manages its exposure to carbon pricing mechanisms by systematically increasing the energy efficiency of its operations, creating new, less energy-intensive products. In the future, Greif may also utilize zero-carbon energy sources to reduce the emissions associated with its products.

(Case Study) Greif seeks to make continuous energy efficiency improvements when they are economically feasible to reduce the company's exposure to carbon pricing mechanisms. To that effect, Greif conducted 21 energy efficiency projects in 2021 that reduced annual energy consumption by 11 million kWh.

(Explanation of cost calculation) The above cost of response is composed of the cost of all current and proposed mitigation activities that Greif has begun or compiled to reduce its exposure to carbon pricing mechanisms. This includes the cost of consultancy ($275k), the estimated cost of onsite solar site selection and strategy development ($50k), the costs associated with all possible facility-level energy efficiency enhancements for Greif's Paper Packaging and Services (PPS) business unit ($135MM), and additional staff and software costs ($20k). Therefore, $275K + $50K + $135,000K + $20K = $135,345K. Notably, the above figure is a gross cost and does not consider the savings associated with reduced energy consumption.

Comment

C2.4

(C2.4) Have you identified any climate-related opportunities with the potential to have a substantive financial or strategic impact on your business?
Yes

C2.4a

(C2.4a) Provide details of opportunities identified with the potential to have a substantive financial or strategic impact on your business.

Identifier
Opp1

Where in the value chain does the opportunity occur?
Downstream

Opportunity type
Products and services

Primary climate-related opportunity driver
Development and/or expansion of low emission goods and services

Primary potential financial impact
Increased revenues resulting from increased demand for products and services

Company-specific description
As a producer of industrial packaging, Greif has an opportunity to benefit from an increased supply of recycled products that can be reconditioned and resold. Climate-related market dynamics are expected to lead to an increase of both recycled plastic and steel supply as recycled and reconditioned products require fewer emissions to sell back into production compared to their virgin counterparts. For several years, Greif has been expanding its recycling and reconditioning efforts and is poised to benefit from an increase in corporate adoption of recycling programs. This is particularly true in European operations where Greif already has robust recycling operations. In 2020, Greif recycled and reconditioned approximately 536 thousand Polyethylene (PE) drums, 3 million steel drums, and 661 thousand Intermediate Bulk Containers (IBCs). In 2021, Greif recycled and reconditioned approximately 237 thousand PE drums, 3.2 million steel drums, and 900 thousand IBCs.

Time horizon
Medium-term

Likelihood
Virtually certain

Magnitude of impact
High

Are you able to provide a potential financial impact figure?
Yes, an estimated range

Potential financial impact figure (currency)
<Not Applicable>

Potential financial impact figure – minimum (currency)
225000000

Potential financial impact figure – maximum (currency)
299000000

Explanation of financial impact figure
(Context) This financial impact value is representative of Greif's estimated growth in reconditioned Polyethylene (PE) drum, steel drum, and Intermediate Bulk Container (IBC) sales in 2040.

(Approach) 1) PE drum, steel drum, and IBC recycling rates for European operations were projected into the future based on the IEA's steel and plastic recycling figures; 2) historical data was used to derive the proportion of recycled materials that could be reconditioned and sold; and 3) revenue was estimated by applying per-unit prices to the derived reconditioned material volume. The Maximum financial impact is calculated as the projected amount of reconditioned steel drums, PE drums, and IBCs that Greif will have access to in a net zero scenario multiplied by an average per-unit cost. Therefore, the maximum financial impact is as follows: (4,293,178 reconditioned steel drums * $25) + (164,272 reconditioned PE drums * $20) + (1,187,135 reconditioned IBCs * $159) = $299,000,000. The minimum financial impact figure is similarly calculated by multiplying the amount of reconditioned steel drums, PE drums, and IBCs that Greif will have access to in a business-as-usual scenario multiplied by an average per-unit cost. Therefore, the minimum financial impact is as follows: (3,161,839 reconditioned steel drums * $25) + (124,423 reconditioned PE drums * $20) + (899,164 reconditioned IBCs * $159) = $225,000,000.

(Assumptions) 1) The percentage of recycled materials that were successfully reconditioned and sold was assumed to stay constant at the historical average; 2) per-unit prices for reconditioned products were assumed to stay constant and at the historical average; and 3) corporate recycling is assumed to scale at the same rate as global recycling in the IEA's NZE scenario.

Cost to realize opportunity
204600000

Strategy to realize opportunity and explanation of cost calculation
(Strategy to realize opportunity) Greif's primary strategy to realize the opportunity provided by the increasing demand for refurbished products is to grow its existing Life Cycle Services (LCS) business, which currently refurbishes, and ultimately resells steel drums, PE drums, and IBCs back to customers or recycles containers unable to be reconditioned or resold.

(Case Study) -Situation- To capitalize on the above opportunity, Greif's recycling business has needed to scale in size and efficiency. -Task- A key factor in meeting the demand for refurbished products is the ability to refurbish a large percentage of the materials that are recycled as supply is limited. -Action- To improve its efficiency, Greif sought to improve its ability to refurbish recycled materials through customer engagement and process improvements. -Result- Greif's actions increased the rate at which recycled IBCs were refurbished and sold instead of scrapped for parts from 66% in 2017 to 94% in 2021, thereby allowing Greif to help meet the growing demand for recycled, lower-carbon products.

(Explanation of cost calculation) The above figure includes the cost of business unit expansion ($200MM), demand research ($50k), extra staffing costs ($150k), and the cost of three additional operating lines ($4.4MM). Therefore, $200,000k + $50k + $150k + $4,400k = $204,600k.

Comment

C3. Business Strategy

C3.1

(C3.1) Does your organization's strategy include a transition plan that aligns with a 1.5°C world?

Row 1

Transition plan

No, but our strategy has been influenced by climate-related risks and opportunities, and we are developing a transition plan within two years

Publicly available transition plan

<Not Applicable>

Mechanism by which feedback is collected from shareholders on your transition plan

<Not Applicable>

Description of feedback mechanism

<Not Applicable>

Frequency of feedback collection

<Not Applicable>

Attach any relevant documents which detail your transition plan (optional)

<Not Applicable>

Explain why your organization does not have a transition plan that aligns with a 1.5°C world and any plans to develop one in the future

Greif currently does not have a climate transition plan that aligns with a 1.5°C world since it has focused its efforts over the past several years on developing a framework to achieve the, then best practice standard, of a well-below 2°C world. That said, aspects of Greif's climate strategy are 1.5°C-aligned. For instance, Greif's recent scenario analysis made use of the IEA's NZE scenario to assess the magnitude of transitional impacts on Greif's business in a 1.5°C world. Additionally, Greif intends to create a 1.5°C-aligned transition plan within the next two years to keep pace with current best practice and holistically assess the company's exposure the climate-related risks and opportunities.

Explain why climate-related risks and opportunities have not influenced your strategy

<Not Applicable>

C3.2

(C3.2) Does your organization use climate-related scenario analysis to inform its strategy?

	Use of climate-related scenario analysis to inform strategy	Primary reason why your organization does not use climate-related scenario analysis to inform its strategy	Explain why your organization does not use climate-related scenario analysis to inform its strategy and any plans to use it in the future
Row 1	Yes, qualitative and quantitative	<Not Applicable>	<Not Applicable>

C3.2a

(C3.2a) Provide details of your organization's use of climate-related scenario analysis.

Climate-related scenario	Scenario analysis coverage	Temperature alignment of scenario	Parameters, assumptions, analytical choices
Transition scenarios: IEA NZE 2050	Company-wide	<Not Applicable>	(Parameters) Carbon pricing data, GDP, sectoral carbon budgets, oil and gas volume and prices. (Assumptions) Linear interpolation was used to create data for years that were not covered in the IEA. (Analytical choices) Climate-related impacts were assessed through 2040, and publicly available financial data and industry reports were used to contextualize climate impacts.

C3.2b

(C3.2b) Provide details of the focal questions your organization seeks to address by using climate-related scenario analysis, and summarize the results with respect to these questions.

Row 1

Focal questions

(Focal question 1) What are the most pertinent climate-related risks to Greif's business?
(Focal question 2) Where along Greif's value chain are climate-related risks concentrated?
(Rationale for selecting scenarios disclosed in 3.2a) Greif used the IEA's NZE 2050 scenario in to understand the upper bound of potential transition risks that the company and its value chain may face. By using the most ambitious scenario offered by the IEA, Greif also hoped to analyze risks that may not have been as apparent under less ambitious scenarios and thereby form a comprehensive understanding of climate-related transition risks that the company may face in the future. Furthermore, Greif utilized a bespoke physical risk scenario in order to contextualize potential physical impacts from climate change along its unique value chain and thereby derive decision-useful data for use in its climate strategy.

Results of the climate-related scenario analysis with respect to the focal questions

(Summary of results) -Answer to Focal Question 1 - Greif's recent scenario analysis further highlighted the importance of market, regulatory, reputational, and physical risks for Greif's business and across all parts of its value chain. Select company specific examples include failure to meet Greif's stated GHG reduction targets leading to a market disadvantage relative to peers and sea level rise that may impact the 19 Greif facilities that are in low-lying coastal areas. -Answer to Focal Question 2- An example of key risks that Greif analyzed through the scenario analysis process are those that stem from the greenhouse gasses associated with Greif's products. This is both a regulatory and market risk as Greif may face increasingly severe carbon pricing in the future, especially in in other North American markets where the majority of Greif's scope 1 emissions occur, thereby increasing the costs associated with carbon-intensive processes both in its operations and upstream through increased input prices, and a market risk as Greif's downstream customers are increasingly establishing targets to reduce the emissions in their supply chain which could lead to a loss of business if Greif does not continue to meet their environmental standards in the future through efforts such as the 21 GHG reduction initiatives undertaken by Greif in 2021 to lower the GHG footprint of its operations and products 4,390 MT.

(How results have informed Greif's actions, business strategy, and financial planning) In order to reduce its exposure to carbon pricing mechanisms and pre-empt customer demands for reduced emissions, Greif established a greenhouse gas reduction target in 2021: to reduce scope 1 and 2 emissions by 28% by 2030 relative to a 2019 baseline. To achieve this goal Greif has focused its efforts on systematically increasing the efficiency of its facilities, as well as by developing low-carbon products in partnership with its customers. For example, Greif conducted 21 efficiency enhancement projects in 2021 that are expected to reduce total annual energy consumption by 11 million kWh per year. Additionally, Greif is currently updating its roadmap to achieve its greenhouse gas reduction target to keep it aligned with current best practices as new opportunities for emissions reductions emerge.

C3.3

(C3.3) Describe where and how climate-related risks and opportunities have influenced your strategy.

	Have climate-related risks and opportunities influenced your strategy in this area?	Description of influence
Products and services	Yes	The climate-related risks and opportunities that Greif has identified through scenario analysis impact the manufacturing and delivery of products and services through the company's efforts to monitor and reduce volatility in input costs; to hedge against the risk of business interruption due to changing weather patterns; to mitigate product, and service price increases due to carbon pricing schemes; as well as the creation of lower-carbon products to meet changing customer preferences. Input price volatility: Mitigating raw material price volatility is one of the primary goals of Greif's efforts to lightweight and downgauge each product line. The core of this effort is reducing the amount of virgin raw materials used in Greif products, which directly impacts exposure to this risk. Downgauging results in approximately $1 mil. in raw material savings annually and has proven an effective means of rationalizing exposure to upstream petrochemical suppliers. Carbon pricing & energy efficiency: Each Greif product benefits from energy efficiency programs because of lowered operating expenses impacting overall cost of production. Since each facility is expected to identify and complete energy efficiency projects each year, all product lines benefit from this opportunity. In 2021, we completed 21 projects, leading to a 11 million kWh reduction in annual energy consumption. Shifting customer preferences: Changes in customer preferences towards low emission packaging require changes to Greif's products to remain competitive. Greif has identified 8 sustainability criteria to factor into new product development, set sourcing goals for green material inputs and launched numerous products. As of year-end 2021, Greif realized $1.3BN in revenues from product and service lines as sustainable. Greif's products and services are impacted by the company's reputation to the extent that we can effectively communicate and prove the benefits to the market/customers. Additionally, the Greif Green Tool allows its customers to identify the emission impact of their selected Greif products in their value chain, including raw materials, production, transportation, and end-of-life, and evaluate the benefits of moving to low/lower carbon products. In the last couple of years alone, over 80 customers have used the tool.
Supply chain and/or value chain	Yes	The risks and opportunities identified through scenario analysis are integrated into Greif's efforts to engage it suppliers to reduce upstream emissions through logistical and efficiency enhancements, as well as to meet changing customer preferences by pushing suppliers to implement sustainable material sourcing practices. Supplier engagement: Greif engages its suppliers in order to reach a target of reducing raw materials/logistical costs used to produce current product offering by 1% and move to green material sourcing if it is economically feasible and doing so provides high quality products to Greif's customers by the end of fiscal year 2025. Greif's innovation efforts offer positive impact to its customers, who may experience lowered prices (for Greif products and transportation), increased performance, and/or reduced environmental impact for product changes. To achieve these goals, Greif requests climate and sustainability data from its core suppliers through the EcoVadis platform. In 2021, Greif was able to assess 20% of its suppliers by total spend by the end of the fiscal year. Greif is now using this data to help better understand its upstream scope 3 emissions profile to drive reductions in the lifecycle emissions associated with the company's products.
Investment in R&D	Yes	Greif integrates the risks and opportunities identified through scenario analysis into the R&D process by strategically investing in the development of sustainable products and processes that reduce the amount virgin materials used in production to meet the growing customer demand for sustainable and lower-carbon goods. Customer preference for sustainable and lower-carbon products: Greif's product development and innovation efforts are supported by R&D investments to develop products that reduce Greif's reliance on virgin raw materials through light weighting, downgauging, improving production methods, and increasing the use of recycled materials without compromising required performance standards and regulations. In 2021, Greif invested approximately $11.3 million in R&D for sustainability-tagged products, which represent approximately 24% of Greif's revenue from sustainable products and services. Down gauging and increasing the use of post-customer resin (PCR) in its products directly reduces the raw materials required to produce products such as our JCR jerry cans, NexDrum, and faceted drum from LATAM. We also developed Intermediate Bulk Containers (IBCs) made with 40% PCR that were recently UN certified and closures made from PCR. Innovative production methods that deliver material and energy efficiency: We also invest in R&D to develop new production methods, in part to support producing such products. For example, to produce the NexDrum plastic drum, Greif developed an innovative injection and welding process that works with reduced material inputs, without negatively affecting the performance and stability of the drum. This process allows us to produce the NexDrum using 15% less material and results in a 12% reduction in CO2 emissions compared to the standard blow-molded plastic drum.
Operations	Yes	Greif integrates the risks and opportunities identified through scenario analysis in operations through disaster response planning to mitigate the risk posed by changing weather patterns and acute weather events; the implementation of energy efficiency programs to reduce current and potential exposure to carbon pricing mechanisms as well as meet growing customer demand for lower carbon products; and third-party audits to increase transparency into Greif's sustainability claims for the benefit of customers. Disaster response planning: Sea level rise and changes in precipitation may lead to operational shut-downs and associated expenses, per the risk description, financial implication and strategy to mitigate described in 2.3, Greif operations include facilities in low-lying coastal areas and those at risk for hurricanes, for example Florida, Texas, Louisiana, Georgia, Virginia, North Carolina, and South Carolina in the United States. Greif's disaster response program mandates that all products must be able to be co-produced at multiple facilities so that we can maintain production in the event of a shut-down. Accordingly, all of Greif's operations, not just those directly at risk of these events, must be prepared to respond to them. Energy efficiency: As an asset-heavy industrial manufacturer, we have significant energy efficiency opportunities in Greif's direct operations. The Sustainability Steering Committee and Sustainability Management Team work with the Global Climate Team to develop annual project roadmaps identifying energy efficiency opportunities at each Greif facility. In 2021, 21 energy efficiency projects with a combined impact of 11 million kWh in annual energy savings across Greif's operations.

C3.4

(C3.4) Describe where and how climate-related risks and opportunities have influenced your financial planning.

	Financial planning elements that have been influenced	Description of influence
Row 1	Revenues Direct costs Indirect costs	(Revenues) Climate related risks and opportunities influence all elements of Greif's financial planning. Greif's opportunity in changing customer behavior has factored into Greif's revenue forecast through a predicted shift in product mix from conventional to sustainable and/or low emission products (e.g., NexDrum). (Direct and indirect costs) Greif's profitability can also be impacted by raw material price volatility that may result from climate-related regulatory action or shifting customer preferences. In the event raw material prices lead to increased prices to Greif's customers, we are at risk of losing their business. Greif reduces exposure to this risk and addresses its customer behavior opportunity, in part, through its efforts to lightweight and downgauge its product lines. In doing so, Greif offsets potential revenue losses from conventional packaging and addressing market demand, providing revenue growth. Revenue from Greif's sustainability-tagged products and services totalled $1.3BN, 24% of total revenue from sustainable products and services in 2021. Raw material price volatility poses a direct risk to Greif's operating costs, specifically energy, water, and transportation costs. Price volatility may be compounded by the risks of sea level rise and changes in precipitation extremes, which may lead to operational shutdowns in at risk facilities. 10% of Greif's revenues ship from facilities that are at risk of sea level rise and changes in precipitation. If these facilities are impacted by these risks, Greif could lose revenues due to lost customer orders. Greif accounts for this in its financial planning process by establishing a natural disaster response protocol, across Greif's Global Industrial Products North America business unit, mandating that all Greif products can be manufactured at multiple facilities and purchase business interruption insurance coverage protecting from loss of revenue and customer business due to a loss from covered natural disasters. In the event of a shutdown, Greif's Disaster Recovery / Business Continuity program outlines the processes for fulfilling customer orders at back-up production facilities. Changes in production and shipping locations have meaningful impacts on Greif's transportation costs, both incoming for raw materials and outgoing to customer locations. Climate-related weather impacts are included in Greif's Enterprise Risk Management process and factored into the Sales and Operations Planning process (S&OP), including planning maintenance and upgrades to Greif's existing facilities.

C4. Targets and performance

C4.1

(C4.1) Did you have an emissions target that was active in the reporting year?
Absolute target

C4.1a

(C4.1a) Provide details of your absolute emissions target(s) and progress made against those targets.

Target reference number
Abs 1

Year target was set
2021

Target coverage
Company-wide

Scope(s)
Scope 1
Scope 2

Scope 2 accounting method
Market-based

Scope 3 category(ies)
<Not Applicable>

Base year
2019

Base year Scope 1 emissions covered by target (metric tons CO2e)
676000

Base year Scope 2 emissions covered by target (metric tons CO2e)
636000

Base year Scope 3 emissions covered by target (metric tons CO2e)
<Not Applicable>

Total base year emissions covered by target in all selected Scopes (metric tons CO2e)
1312000

Base year Scope 1 emissions covered by target as % of total base year emissions in Scope 1
52

Base year Scope 2 emissions covered by target as % of total base year emissions in Scope 2
48

Base year Scope 3 emissions covered by target as % of total base year emissions in Scope 3 (in all Scope 3 categories)
<Not Applicable>

Base year emissions covered by target in all selected Scopes as % of total base year emissions in all selected Scopes
100

Target year
2030

Targeted reduction from base year (%)
28

Total emissions in target year covered by target in all selected Scopes (metric tons CO2e) [auto-calculated]
944640

Scope 1 emissions in reporting year covered by target (metric tons CO2e)
690000

Scope 2 emissions in reporting year covered by target (metric tons CO2e)
571900

Scope 3 emissions in reporting year covered by target (metric tons CO2e)
<Not Applicable>

Total emissions in reporting year covered by target in all selected scopes (metric tons CO2e)
1261900

% of target achieved relative to base year [auto-calculated]
13.6378484320558

Target status in reporting year
Underway

Is this a science-based target?
No, but we anticipate setting one in the next 2 years

Target ambition
<Not Applicable>

Please explain target coverage and identify any exclusions
As part of the development of Greif's 2030 goal to reduce absolute Scope 1 and Scope 2 GHG emissions 28 percent over a 2019 baseline we conducted scenario analysis and modelling to determine the feasibility and implications of aligning Greif's target to be consistent with the level of decarbonization required to keep global temperatures to well-below 2-degrees Celsius, 1.5-degrees Celsius, and business-as-usual considering existing business forecasts and energy and emissions reduction plans. We selected these scenarios in alignment with the criteria established by the Science Based Targets Initiative for setting climate targets aligned with climate science.

Plan for achieving target, and progress made to the end of the reporting year
Greif intends to achieve its GHG reduction target through efficiency enhancement programs and renewable energy procurement. Greif continuously monitors its facilities for efficiency enhancement opportunities. In 2021, Greif conducted 21 efficiency projects that reduced annual energy consumption by 11 million kWh. Greif will continue to systematically increase the energy efficiency of its facilities to meet its ambitious GHG reduction target.

List the emissions reduction initiatives which contributed most to achieving this target
<Not Applicable>

C4.2

(C4.2) Did you have any other climate-related targets that were active in the reporting year?
No other climate-related targets

C4.3

(C4.3) Did you have emissions reduction initiatives that were active within the reporting year? Note that this can include those in the planning and/or implementation phases.
Yes

C4.3a

(C4.3a) Identify the total number of initiatives at each stage of development, and for those in the implementation stages, the estimated CO2e savings.

	Number of initiatives	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation	3	14
To be implemented*	3	568
Implementation commenced*	3	35
Implemented*	21	4390
Not to be implemented	0	0

C4.3b

(C4.3b) Provide details on the initiatives implemented in the reporting year in the table below.

Initiative category & Initiative type

Energy efficiency in buildings	Lighting

Estimated annual CO2e savings (metric tonnes CO2e)
45

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
10500

Investment required (unit currency – as specified in C0.4)
27000

Payback period
1-3 years

Estimated lifetime of the initiative
6-10 years

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Cooling technology

Estimated annual CO2e savings (metric tonnes CO2e)
50

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Mandatory

Annual monetary savings (unit currency – as specified in C0.4)
20000

Investment required (unit currency – as specified in C0.4)
135000

Payback period
4-10 years

Estimated lifetime of the initiative
16-20 years

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)
2

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
546

Investment required (unit currency – as specified in C0.4)
375

Payback period
<1 year

Estimated lifetime of the initiative
3-5 years

Comment

Initiative category & Initiative type

Energy efficiency in buildings	Solar shading

Estimated annual CO2e savings (metric tonnes CO2e)
2

Scope(s) or Scope 3 category(ies) where emissions savings occur

Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
1786

Investment required (unit currency – as specified in C0.4)
8000

Payback period
4-10 years

Estimated lifetime of the initiative
16-20 years

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)
11

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
5892

Investment required (unit currency – as specified in C0.4)
0

Payback period
<1 year

Estimated lifetime of the initiative
6-10 years

Comment

Initiative category & Initiative type

Energy efficiency in buildings	Lighting

Estimated annual CO2e savings (metric tonnes CO2e)
0

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
1250

Investment required (unit currency – as specified in C0.4)
3250

Payback period
1-3 years

Estimated lifetime of the initiative
6-10 years

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement

Estimated annual CO2e savings (metric tonnes CO2e)
57

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
10164

Investment required (unit currency – as specified in C0.4)
24240

Payback period
1-3 years

Estimated lifetime of the initiative
11-15 years

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement

Estimated annual CO2e savings (metric tonnes CO2e)
71

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
12705

Investment required (unit currency – as specified in C0.4)
16200

Payback period
1-3 years

Estimated lifetime of the initiative
6-10 years

Comment

Initiative category & Initiative type

Energy efficiency in buildings	Maintenance program

Estimated annual CO2e savings (metric tonnes CO2e)
101

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
55913

Investment required (unit currency – as specified in C0.4)
5350

Payback period
<1 year

Estimated lifetime of the initiative
>30 years

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Reuse of water

Estimated annual CO2e savings (metric tonnes CO2e)
12

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Mandatory

Annual monetary savings (unit currency – as specified in C0.4)
2138

Investment required (unit currency – as specified in C0.4)

0

Payback period
<1 year

Estimated lifetime of the initiative
>30 years

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement

Estimated annual CO2e savings (metric tonnes CO2e)
2

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
442

Investment required (unit currency – as specified in C0.4)
0

Payback period
<1 year

Estimated lifetime of the initiative
>30 years

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)
1877

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
150520

Investment required (unit currency – as specified in C0.4)
10000

Payback period
<1 year

Estimated lifetime of the initiative
3-5 years

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization

Estimated annual CO2e savings (metric tonnes CO2e)
752

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
56164

Investment required (unit currency – as specified in C0.4)
10000

Payback period
<1 year

Estimated lifetime of the initiative
3-5 years

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Waste heat recovery

Estimated annual CO2e savings (metric tonnes CO2e)
1278

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
89632

Investment required (unit currency – as specified in C0.4)
24567

Payback period
<1 year

Estimated lifetime of the initiative
3-5 years

Comment

Initiative category & Initiative type

Energy efficiency in buildings	Motors and drives

Estimated annual CO2e savings (metric tonnes CO2e)
3

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
561

Investment required (unit currency – as specified in C0.4)
0

Payback period
<1 year

Estimated lifetime of the initiative
6-10 years

Comment

Initiative category & Initiative type

Energy efficiency in buildings	Motors and drives

Estimated annual CO2e savings (metric tonnes CO2e)
5

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
814

Investment required (unit currency – as specified in C0.4)
0

Payback period
<1 year

Estimated lifetime of the initiative
6-10 years

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Fuel switch

Estimated annual CO2e savings (metric tonnes CO2e)
8

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
664

Investment required (unit currency – as specified in C0.4)
7471

Payback period
11-15 years

Estimated lifetime of the initiative
16-20 years

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement

Estimated annual CO2e savings (metric tonnes CO2e)
57

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
109000

Investment required (unit currency – as specified in C0.4)
1600000

Payback period
11-15 years

Estimated lifetime of the initiative
>30 years

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Smart control system

Estimated annual CO2e savings (metric tonnes CO2e)
11

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
1738

Investment required (unit currency – as specified in C0.4)
275000

Payback period
11-15 years

Estimated lifetime of the initiative
11-15 years

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement

Estimated annual CO2e savings (metric tonnes CO2e)
31

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
22000

Investment required (unit currency – as specified in C0.4)
36222

Payback period
1-3 years

Estimated lifetime of the initiative
6-10 years

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Other, please specify (Lighting)

Estimated annual CO2e savings (metric tonnes CO2e)
12

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
9000

Investment required (unit currency – as specified in C0.4)
18000

Payback period
1-3 years

Estimated lifetime of the initiative
11-15 years

Comment

C4.3c

(C4.3c) What methods do you use to drive investment in emissions reduction activities?

Method	Comment
Internal finance mechanisms	Greif integrates environmental aspects of its business into our overall business strategy, including research and development, and operations.
Internal finance mechanisms	Energy and emission reductions are factored into all capital expenditure requests.
Internal incentives/recognition programs	The Michael J. Gasser Global Sustainability Award recognizes superior effort and achievement in furthering the improvement of the environment and the company. The award recognizes teams that create innovative sustainable initiatives in Energy Excellence, Ecosystem Improvement and Sustainable Innovation. Winning teams are recognized by the CEO and the Board, in addition to receiving a trophy and celebratory lunch or dinner. Several of Greif's SBUs provide financial incentives to facilities that reduce energy consumption.
Internal incentives/recognition programs	In 2014, Greif introduced the Operations Best In Class program in the drum manufacturing plants of the EMEA region to reinforce a pattern of excellence by ranking each plant as gold, silver, bronze, yellow or red, reward workers for outstanding accomplishments and identify areas of opportunity to promote year-over-year improvements. Due to the success of the program at driving incremental improvements the program was expended globally in 2017. Ratings are based on safety, people, productivity, customer satisfaction, and sustainability, including climate change, specifically energy reduction. Each facility achieving Gold, Silver or Bronze performance levels across all categories receives a medal recognizing the achievement. In addition, Gold, Silver and Bronze winners receive a non-financial award for the entire plant such as an award dinner.

C4.5

(C4.5) Do you classify any of your existing goods and/or services as low-carbon products?
Yes

C4.5a

(C4.5a) Provide details of your products and/or services that you classify as low-carbon products.

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (Plastic drums)

Description of product(s) or service(s)
NexDRUM (US): Large plastic drum, filling volume approx. 55 gallons

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions.)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 275 gallons in product

Reference product/service or baseline scenario used
Standard blowmolded TH drum, same filling volume

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.01483

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Regarding the end of life stage and benefits and loads beyond the system boundaries, end of life burdens and credits were included by using the allocation factor 100 and also including the final lifecycle burdens. For the recycling/landfilling/incineration quotas of the different material types, a specific split was assumed equally for both, the low-carbon products and the reference products.

Some of the low carbon products and services exist in different product variants. For example, jerry cans made by using PCR material are produced in sizes from 1 to 50 liters.

For the review of the estimated avoided emissions, just one product size/variant was chosen as a proxy in these cases, typically the most relevant size/variant.

For bundled IBCs, the specific bundle combination can vary between single offers. To estimate the impact, one exemplary scenario/combination was chosen as a proxy, too.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
0.34

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (Plastic drums)

Description of product(s) or service(s)
Valerex Drums (Europe): Large plastic drum, filling volume approx. 208 liters

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 1.000 liters in product

Reference product/service or baseline scenario used
Standard blowmolded TH drum, same filling volume

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.01114

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Regarding the end of life stage and benefits and loads beyond the system boundaries, end of life burdens and credits were included by using the allocation factor 100 and also including the final lifecycle burdens. For the recycling/landfilling/incineration quotas of the different material types, a specific split was assumed equally for both, the low-carbon products and the reference products.

Some of the low carbon products and services exist in different product variants. For example, jerry cans made by using PCR material are produced in sizes from 1 to 50 liters.

For the review of the estimated avoided emissions, just one product size/variant was chosen as a proxy in these cases, typically the most relevant size/variant.

For bundled IBCs, the specific bundle combination can vary between single offers. To estimate the impact, one exemplary scenario/combination was chosen as a proxy, too.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
0.15

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (Steel products)

Description of product(s) or service(s)
Spiraltainer: Large steel drum, filling volume approx. 208 liters

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 1.000 liters in product

Reference product/service or baseline scenario used
Standard 1.0/1.0/1.0 TH steel drum, same filling volume

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.0333

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Regarding the end of life stage and benefits and loads beyond the system boundaries, end of life burdens and credits were included by using the allocation factor 100 and also including the final lifecycle burdens. For the recycling/landfilling/incineration quotas of the different material types, a specific split was assumed equally for both, the low-carbon products and the reference products.

Some of the low carbon products and services exist in different product variants. For example, jerry cans made by using PCR material are produced in sizes from 1 to 50 liters.

For the review of the estimated avoided emissions, just one product size/variant was chosen as a proxy in these cases, typically the most relevant size/variant.

For bundled IBCs, the specific bundle combination can vary between single offers. To estimate the impact, one exemplary scenario/combination was chosen as a proxy, too.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
8.84

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (Steel products)

Description of product(s) or service(s)
Large Conical Steel Drums: Large steel drum, filling volume approx. 208 liters

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions.)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 1.000 liters in product

Reference product/service or baseline scenario used
Standard 0.8/0.8 OH steel drum, same filling volume

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.0274

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Regarding the end of life stage and benefits and loads beyond the system boundaries, end of life burdens and credits were included by using the allocation factor 100 and also including the final lifecycle burdens. For the recycling/landfilling/incineration quotas of the different material types, a specific split was assumed equally for both, the low-carbon products and the reference products.

Some of the low carbon products and services exist in different product variants. For example, jerry cans made by using PCR material are produced in sizes from 1 to 50 liters.

For the review of the estimated avoided emissions, just one product size/variant was chosen as a proxy in these cases, typically the most relevant size/variant.

For bundled IBCs, the specific bundle combination can vary between single offers. To estimate the impact, one exemplary scenario/combination was chosen as a proxy, too.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
1.12

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (Intermediate bulk containers (IBCs))

Description of product(s) or service(s)
Bundled IBC (New or Recon): Offer of new and re-conditioned composite IBCs in a bundle (some IBCs get re-collected and washed or re-bottled; re-usage)

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 1.000 liters in product

Reference product/service or baseline scenario used
Delivery of new IBCs only

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.0268

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Regarding the end of life stage and benefits and loads beyond the system boundaries, end of life burdens and credits were included by using the allocation factor 100 and also including the final lifecycle burdens. For the recycling/landfilling/incineration quotas of the different material types, a specific split was assumed equally for both, the low-carbon products and the reference products.

Some of the low carbon products and services exist in different product variants. For example, jerry cans made by using PCR material are produced in sizes from 1 to 50 liters.

For the review of the estimated avoided emissions, just one product size/variant was chosen as a proxy in these cases, typically the most relevant size/variant. Assumption: Bundle IBC consits of 50% new and 50% re-conditioned IBCs (half washed / half re-bottled).

For bundled IBCs, the specific bundle combination can vary between single offers. To estimate the impact, one exemplary scenario/combination was chosen as a proxy, too.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
0.02

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (Intermediate bulk containers (IBCs))

Description of product(s) or service(s)
Injected IBC pallet: Plastic pallet for composite IBCs

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions.)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
1 pallet for a 1.000 liters IBC

Reference product/service or baseline scenario used
Plastic pallets for composite IBCs with an old standard design

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.0013

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Regarding the end of life stage and benefits and loads beyond the system boundaries, end of life burdens and credits were included by using the allocation factor 100 and also including the final lifecycle burdens. For the recycling/landfilling/incineration quotas of the different material types, a specific split was assumed equally for both, the low-carbon products and the reference products.

Some of the low carbon products and services exist in different product variants. For example, jerry cans made by using PCR material are produced in sizes from 1 to 50 liters.

For the review of the estimated avoided emissions, just one product size/variant was chosen as a proxy in these cases, typically the most relevant size/variant.

For bundled IBCs, the specific bundle combination can vary between single offers. To estimate the impact, one exemplary scenario/combination was chosen as a proxy, too.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
0.14

Level of aggregation

Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (PCR products)

Description of product(s) or service(s)
Small Blowmoulded Jerry Cans: Jerry cans which are made from a mixture of virgin HDPE and PCR

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions.)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 1.000 liters in product

Reference product/service or baseline scenario used
Jerry cans made of virgin PE

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.045

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Regarding the end of life stage and benefits and loads beyond the system boundaries, end of life burdens and credits were included by using the allocation factor 100 and also including the final lifecycle burdens. For the recycling/landfilling/incineration quotas of the different material types, a specific split was assumed equally for both, the low-carbon products and the reference products.

Some of the low carbon products and services exist in different product variants. For example, jerry cans made by using PCR material are produced in sizes from 1 to 50 liters.

For the review of the estimated avoided emissions, just one product size/variant was chosen as a proxy in these cases, typically the most relevant size/variant. Based on 20 liters design, 75% PCR share

For bundled IBCs, the specific bundle combination can vary between single offers. To estimate the impact, one exemplary scenario/combination was chosen as a proxy, too.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
0

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (PCR products)

Description of product(s) or service(s)
Small Blowmoulded Drums (Mono): Small plastic drums which are made from a mixture of virgin HDPE and PCR

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions.)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 1.000 liters in product

Reference product/service or baseline scenario used
Drums made of virgin PE

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.0307

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Regarding the end of life stage and benefits and loads beyond the system boundaries, end of life burdens and credits were included by using the allocation factor 100 and also including the final lifecycle burdens. For the recycling/landfilling/incineration quotas of the different material types, a specific split was assumed equally for both, the low-carbon products and the reference products.

Some of the low carbon products and services exist in different product variants. For example, jerry cans made by using PCR material are produced in sizes from 1 to 50 liters.

For the review of the estimated avoided emissions, just one product size/variant was chosen as a proxy in these cases, typically the most relevant size/variant. Based on 120 liters design, 75% PCR share

For bundled IBCs, the specific bundle combination can vary between single offers. To estimate the impact, one exemplary scenario/combination was chosen as a proxy, too.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
0.02

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (PCR products)

Description of product(s) or service(s)
Int. Plastic Blowmoulded Drums: Large plastic drums which are made from a mixture of virgin HDPE and PCR

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions.)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 1.000 liters in product

Reference product/service or baseline scenario used
Drums made of virgin PE

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.0368

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Regarding the end of life stage and benefits and loads beyond the system boundaries, end of life burdens and credits were included by using the allocation factor 100 and also including the final lifecycle burdens. For the recycling/landfilling/incineration quotas of the different material types, a specific split was assumed equally for both, the low-carbon products and the reference products.

Some of the low carbon products and services exist in different product variants. For example, jerry cans made by using PCR material are produced in sizes from 1 to 50 liters.

For the review of the estimated avoided emissions, just one product size/variant was chosen as a proxy in these cases, typically the most relevant size/variant. Based on 208 liters design, 75% PCR share.

For bundled IBCs, the specific bundle combination can vary between single offers. To estimate the impact, one exemplary scenario/combination was chosen as a proxy, too.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
0.14

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (PCR products)

Description of product(s) or service(s)
PCR IBCs: Composite IBCs with bottles which are made from a mixture of virgin HDPE and PCR

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions.)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 1.000 liters in product

Reference product/service or baseline scenario used
IBCs made of virgin PE

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.0069

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Regarding the end of life stage and benefits and loads beyond the system boundaries, end of life burdens and credits were included by using the allocation factor 100 and also including the final lifecycle burdens. For the recycling/landfilling/incineration quotas of the different material types, a specific split was assumed equally for both, the low-carbon products and the reference products.

Some of the low carbon products and services exist in different product variants. For example, jerry cans made by using PCR material are produced in sizes from 1 to 50 liters.

For the review of the estimated avoided emissions, just one product size/variant was chosen as a proxy in these cases, typically the most relevant size/variant. Based on 14,5 kg bottle type, 40% PCR share.

For bundled IBCs, the specific bundle combination can vary between single offers. To estimate the impact, one exemplary scenario/combination was chosen as a proxy, too.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
0

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (Jerry cans)

Description of product(s) or service(s)
JCR jerry cans mono & coex LATAM (1-50 liters): Jerry cans made of PE

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions.)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 1.000 liters in product

Reference product/service or baseline scenario used
Jerry cans in standard design

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.0135

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Regarding the end of life stage and benefits and loads beyond the system boundaries, end of life burdens and credits were included by using the allocation factor 100 and also including the final lifecycle burdens. For the recycling/landfilling/incineration quotas of the different material types, a specific split was assumed equally for both, the low-carbon products and the reference products.

Some of the low carbon products and services exist in different product variants. For example, jerry cans made by using PCR material are produced in sizes from 1 to 50 liters.

For the review of the estimated avoided emissions, just one product size/variant was chosen as a proxy in these cases, typically the most relevant size/variant. Based on 20 liters design.

For bundled IBCs, the specific bundle combination can vary between single offers. To estimate the impact, one exemplary scenario/combination was chosen as a proxy, too.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
0.43

Level of aggregation
Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon
Other, please specify (A product or service is classified as low carbon, if its estimated climate change impact (cradle to grave) is minimum 5% lower than the estimated climate change impact of its reference product.)

Type of product(s) or service(s)

Shipping	Other, please specify (Jerry cans)

Description of product(s) or service(s)
JCR jerry cans rest of the world (1-30 liters): Jerry cans made of PE

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)
Yes

Methodology used to calculate avoided emissions
Other, please specify (Greif has conducted LCA studies on its products. The data from these LCA studies have been used to estimate the avoided emissions.)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)
Cradle-to-grave

Functional unit used
Transport of 1.000 liters in product

Reference product/service or baseline scenario used
Jerry cans in standard design

Life cycle stage(s) covered for the reference product/service or baseline scenario
Cradle-to-grave

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario
0.0135

Explain your calculation of avoided emissions, including any assumptions
The calculation was done by applying the IPCC GWP 100-years protocol.

Datasets used for the calculation come from different sources such as e.g. Ecoinvent, World Steel (for steel), PlasticsEurope and Franklin Associates (for PE), IEA (for energy) and internal process data.

Regarding the end of life stage and benefits and loads beyond the system boundaries, end of life burdens and credits were included by using the allocation factor 100 and also including the final lifecycle burdens. For the recycling/landfilling/incineration quotas of the different material types, a specific split was assumed equally for both, the low-carbon products and the reference products.

Some of the low carbon products and services exist in different product variants. For example, jerry cans made by using PCR material are produced in sizes from 1 to 50 liters.

For the review of the estimated avoided emissions, just one product size/variant was chosen as a proxy in these cases, typically the most relevant size/variant. Based on 20 liters design.

For bundled IBCs, the specific bundle combination can vary between single offers. To estimate the impact, one exemplary scenario/combination was chosen as a proxy, too.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
0.16

C5. Emissions methodology

C5.1

(C5.1) Is this your first year of reporting emissions data to CDP?
No

C5.1a

(C5.1a) Has your organization undergone any structural changes in the reporting year, or are any previous structural changes being accounted for in this disclosure of emissions data?

Row 1

Has there been a structural change?
No

Name of organization(s) acquired, divested from, or merged with
<Not Applicable>

Details of structural change(s), including completion dates
<Not Applicable>

C5.1b

(C5.1b) Has your emissions accounting methodology, boundary, and/or reporting year definition changed in the reporting year?

	Change(s) in methodology, boundary, and/or reporting year definition?	Details of methodology, boundary, and/or reporting year definition change(s)
Row 1	No	<Not Applicable>

C5.2

(C5.2) Provide your base year and base year emissions.

Scope 1

Base year start
November 1 2018

Base year end
October 31 2019

Base year emissions (metric tons CO2e)
676000

Comment

Scope 2 (location-based)

Base year start
November 1 2018

Base year end
October 31 2019

Base year emissions (metric tons CO2e)
614000

Comment

Scope 2 (market-based)

Base year start
November 1 2018

Base year end
October 31 2019

Base year emissions (metric tons CO2e)
636000

Comment

Scope 3 category 1: Purchased goods and services

Base year start
November 1 2018

Base year end
October 31 2019

Base year emissions (metric tons CO2e)
2578000

Comment

Scope 3 category 2: Capital goods

Base year start
November 1 2018

Base year end
October 31 2019

Base year emissions (metric tons CO2e)
101000

Comment

Scope 3 category 3: Fuel-and-energy-related activities (not included in Scope 1 or 2)

Base year start
November 1 2018

Base year end
October 31 2019

Base year emissions (metric tons CO2e)
292000

Comment

Scope 3 category 4: Upstream transportation and distribution

Base year start
November 1 2018

Base year end
October 31 2019

Base year emissions (metric tons CO2e)
185000

Comment

Scope 3 category 5: Waste generated in operations

Base year start
November 1 2018

Base year end
October 31 2019

Base year emissions (metric tons CO2e)
84000

Comment

Scope 3 category 6: Business travel

Base year start
November 1 2018

Base year end
October 31 2019

Base year emissions (metric tons CO2e)
10000

Comment

Scope 3 category 7: Employee commuting

Base year start
November 1 2018

Base year end
October 31 2019

Base year emissions (metric tons CO2e)
29000

Comment

Scope 3 category 8: Upstream leased assets

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3 category 9: Downstream transportation and distribution

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3 category 10: Processing of sold products

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3 category 11: Use of sold products

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3 category 12: End of life treatment of sold products

Base year start
November 1 2018

Base year end
October 31 2019

Base year emissions (metric tons CO2e)
1124000

Comment

Scope 3 category 13: Downstream leased assets

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3 category 14: Franchises

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3 category 15: Investments

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3: Other (upstream)

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

Scope 3: Other (downstream)

Base year start

Base year end

Base year emissions (metric tons CO2e)

Comment

C5.3

(C5.3) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate emissions.

IPCC Guidelines for National Greenhouse Gas Inventories, 2006
The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)
The Greenhouse Gas Protocol: Scope 2 Guidance
US EPA Mandatory Greenhouse Gas Reporting Rule
Other, please specify (National Council for Air and Stream Improvement, Inc. (NCASI))

C6. Emissions data

C6.1

(C6.1) What were your organization's gross global Scope 1 emissions in metric tons CO2e?

Reporting year

Gross global Scope 1 emissions (metric tons CO2e)
690000

Start date
<Not Applicable>

End date
<Not Applicable>

Comment

C6.2

(C6.2) Describe your organization's approach to reporting Scope 2 emissions.

Row 1

Scope 2, location-based
We are reporting a Scope 2, location-based figure

Scope 2, market-based
We are reporting a Scope 2, market-based figure

Comment

C6.3

(C6.3) What were your organization's gross global Scope 2 emissions in metric tons CO2e?

Reporting year

Scope 2, location-based
561200

Scope 2, market-based (if applicable)
571900

Start date
<Not Applicable>

End date
<Not Applicable>

Comment

C6.4

(C6.4) Are there any sources (e.g. facilities, specific GHGs, activities, geographies, etc.) of Scope 1 and Scope 2 emissions that are within your selected reporting boundary which are not included in your disclosure?

Yes

C6.4a

(C6.4a) Provide details of the sources of Scope 1 and Scope 2 emissions that are within your selected reporting boundary which are not included in your disclosure.

Source

Emissions associated with leased or owned vehicles, forklifts, tractors, or other mobile sources.

Relevance of Scope 1 emissions from this source

Emissions are relevant but not yet calculated

Relevance of location-based Scope 2 emissions from this source

No emissions from this source

Relevance of market-based Scope 2 emissions from this source (if applicable)

No emissions from this source

Explain why this source is excluded

The quantity of fuel used for these sources has been challenging to collect.

Estimated percentage of total Scope 1+2 emissions this excluded source represents

3

Explain how you estimated the percentage of emissions this excluded source represents

Fuel use data was reported in a data request from 23 facilities. Carbon emissions for each facility were calculated using the United States Environmental Protection Agencies mobile combustion emission factors. The calculated carbon emissions were used to derive an emission factor based on square footage that was applied to Greif's remaining facilities to estimate the total excluded emissions.

Source

Air conditioning refrigerant replacement

Relevance of Scope 1 emissions from this source

Emissions are not relevant

Relevance of location-based Scope 2 emissions from this source

No emissions from this source

Relevance of market-based Scope 2 emissions from this source (if applicable)

No emissions from this source

Explain why this source is excluded

Given the variety of regulations, the quantity of refrigerants has been challenging to collect.

Estimated percentage of total Scope 1+2 emissions this excluded source represents

0

Explain how you estimated the percentage of emissions this excluded source represents

Refrigerant data was estimated based on square footage using the United States Environmental Protection Agencies' HFC Emissions Accounting Tool. It was assumed that certain facility types including land, other, parking, storage, and warehouse spaces were not air conditioned. The estimated percentage of emissions is 0.1% of the overall.

Source

Process emissions

Relevance of Scope 1 emissions from this source

Emissions are not relevant

Relevance of location-based Scope 2 emissions from this source

No emissions excluded

Relevance of market-based Scope 2 emissions from this source (if applicable)

No emissions excluded

Explain why this source is excluded

Manufacturing generally involves painting exterior and coating interior surfaces. Process emissions from this paining have not been included in the inventory as the emissions have been difficult to calculate.

Estimated percentage of total Scope 1+2 emissions this excluded source represents

0

Explain how you estimated the percentage of emissions this excluded source represents

Process emissions are characterized as VOC emissions from paints, coatings, solvents, inks, resins, etc. The average VOC content for paints, coatings, solvents, and inks used by Greif were applied to data collected from 11 facilities. The VOC content for resins was calculated using an assumed 0.067 lb VOC/lb resin. An average GWP of between 0.1 and 12 was applied to the calculated VOC emissions to get the CO2 equivalent emissions. The calculated emissions were used to derive an emission factor based on square footage which was applied to Greif's remaining facilities to estimate the total excluded emissions.

Using this approach, VOCs could represent between 0.2% to 27.5% of Scope 1 and 2 emissions and warrants further review in the future to ensure that this is not a material source.

Source

Landfill emissions

Relevance of Scope 1 emissions from this source
Emissions are relevant and calculated, but not disclosed

Relevance of location-based Scope 2 emissions from this source
No emissions from this source

Relevance of market-based Scope 2 emissions from this source (if applicable)
No emissions from this source

Explain why this source is excluded
There is only one location in Riverville that has a closed landfill on their property and the emissions from this have not historically been included in the inventory.

Estimated percentage of total Scope 1+2 emissions this excluded source represents
3

Explain how you estimated the percentage of emissions this excluded source represents
Greif's Riverville facility has an operational landfill and reports their emissions to the United States Environmental Protection Agency annually.

C6.5

(C6.5) Account for your organization's gross global Scope 3 emissions, disclosing and explaining any exclusions.

Purchased goods and services

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
2492000

Emissions calculation methodology
Average data method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Please explain
Greif calculates emissions from purchased goods and services by tracking the total weight of the primary materials we purchase each year (steel, corrugated cardboard, plastic resins, etc.) and multiplying by corresponding emission factors, which are sourced from relevant trade associations.
Baseline methodology reference: Technical Guidance for Calculating Scope 3 Emissions Version 1.0, Calculation formula [1.5] Spend-based method, p 33

Capital goods

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
105000

Emissions calculation methodology
Average data method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Please explain
Greif calculates emissions from capital goods by determining capital goods spend and multiplying it by the appropriate emission factor.
Baseline methodology reference: Technical Guidance for Calculating Scope 3 Emissions Version 1.0, average spend method, p 37

Fuel-and-energy-related activities (not included in Scope 1 or 2)

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
286000

Emissions calculation methodology
Average data method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Please explain
Greif tracks the fuel use and purchased energy used in our operations annually as part of our Scope 1 and 2 GHG inventory. Based on this consumption, Greif multiples Scope 1 and 2 emissions by the relevant emission factor in % of Scope 1 and 2 emissions to determine upstream emissions associated with this consumption.
Baseline methodology reference: GHG Protocol Scope 3 Evaluator Background Document, p6, Scope 3, Category 3: Fuel- and energy-related activities

Upstream transportation and distribution

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
278000

Emissions calculation methodology
Fuel-based method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Please explain
Greif monitors the fuel used for transporting goods upstream of our operations and for the transport of our products that we pay for in dollars spend/year. Greif then converts this data to gallons/year and applies fuel-based emission factors to determine overall emissions.
Baseline methodology reference: Technical Guidance for Calculating Scope 3 Emissions Version 1.0, Calculation formula [4.6] Distance-based method, p 61

Waste generated in operations

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
131000

Emissions calculation methodology
Average data method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Please explain
Greif calculates emissions from our operational waste by tracking the total amount of waste broken down by hazardous versus non-hazardous and by each disposal method (landfill, reuse, reclamation, incineration, etc.) and multiplying by average emission factors to determine total emissions associated with this waste.
Baseline methodology reference: Technical Guidance for Calculating Scope 3 Emissions Version 1.0, Calculation formula [5.2] Waste-type-specific method, p 75

Business travel

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
1000

Emissions calculation methodology
Average data method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Please explain
Greif tracks the type and amount of business travel in the reporting year for our employees (air, rail, auto, etc.) and utilizes average emission factors to determine overall emissions.
Baseline methodology reference: Technical Guidance for Calculating Scope 3 Emissions Version 1.0, spend-based method, p 86

Employee commuting

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
27000

Emissions calculation methodology
Average data method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Please explain
Greif calculates emissions from employee commuting based on average data on commuting patterns and relevant emission factors.
Baseline methodology reference: GHG Protocol Documentation of the data and calculations to support the Greenhouse Gas Protocol Scope 3 Screening Tool, March 2017, Scope 3, Category 7: Employee Commuting, p8

Upstream leased assets

Evaluation status
Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Greif does not lease any upstream assets that are not already included in scope 1 and 2 emissions calculations based on our organizational boundary for calculating GHG emissions. Therefore, Scope 3 emissions from upstream leased assets are not relevant and emissions from this category are zero (0).

Downstream transportation and distribution

Evaluation status
Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
It is Greif's practice to deliver finished products to customers using transportation paid for by Greif. Therefore, downstream transportation and distribution emissions are not relevant to Greif and emissions associated with this category are zero (0). All transportation and distribution emissions are accounted for in category 4.

Processing of sold products

Evaluation status
Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Greif's products are finished packaging products and do not require further processing. Therefore, the processing of sold products is not relevant to Greif and GHG emissions from this source are zero (0).

Use of sold products

Evaluation status
Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Greif's sold product do not use or consume energy during the use phase, nor do they result in other sources of emissions while being used. Therefore, emissions from the use of sold products are not relevant to Greif and emissions associated with this category are zero (0).

End of life treatment of sold products

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
1124000

Emissions calculation methodology
Average data method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Please explain
Greif calculates emissions from the end-of-life treatment of sold products by tracking the total weight of the primary materials we purchase each year (steel, corrugated cardboard, plastic resins, etc.), assuming that all materials that are purchased in the reporting period are also sold in the same reporting period and multiplying by corresponding end-of-life treatment emission factors for each material type. Emission factors are sourced from the EPA WARM model.
Baseline methodology references:
US EPA WARM Model Verison 13, 2015.
Assuming 100% landfilling. Factor taken from Report Exhibit 17, p.22, "Mixed Metals" and "Mixed Plastics"
US EPA WARM Model Verison 13, 2015. Assuming 100% lan taken from Report Exhibit 17, p.21, "Corrugated Containers

Downstream leased assets

Evaluation status
Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Greif does not lease any assets to third parties and therefore this category is not relevant, and emissions associated with downstream leased assets are zero (0). Greif includes all our directly managed assets in scope 1 and 2 emissions calculations.

Franchises

Evaluation status
Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Greif does not have any franchises; therefore, this category is not relevant and GHG emissions from franchises are zero (0).

Investments

Evaluation status
Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
As a manufacturing company, Greif only has minor investments and does not make any investments with the objective of making a profit. Therefore, GHG emissions from this category are expected to not be relevant and be nearly zero (0).

Other (upstream)

Evaluation status
Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Greif does not have other (upstream) emissions which have not been accounted for in this inventory.

Other (downstream)

Evaluation status
Not relevant, explanation provided

Emissions in reporting year (metric tons CO2e)
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Please explain
Greif does not have other (downstream) emissions which have not been accounted for in this inventory.

C6.7

(C6.7) Are carbon dioxide emissions from biogenic carbon relevant to your organization?
Yes

C6.7a

(C6.7a) Provide the emissions from biogenic carbon relevant to your organization in metric tons CO2.

	CO2 emissions from biogenic carbon (metric tons CO2)	Comment
Row 1	199188	

C-AC6.9/C-FB6.9/C-PF6.9

(C-AC6.9/C-FB6.9/C-PF6.9) Do you collect or calculate greenhouse gas emissions for each commodity reported as significant to your business in C-AC0.7/FB0.7/PF0.7?

C6.10

(C6.10) Describe your gross global combined Scope 1 and 2 emissions for the reporting year in metric tons CO2e per unit currency total revenue and provide any additional intensity metrics that are appropriate to your business operations.

Intensity figure
0.0002257

Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)
1261900

Metric denominator
unit total revenue

Metric denominator: Unit total
5556100000

Scope 2 figure used
Market-based

% change from previous year
0.21

Direction of change
Decreased

Reason for change
Operational efficiencies and the increased use of electricity from renewable sources reduced emissions. In 2021, Greif conducted 21 energy efficiency projects that reduced annual energy consumption by 11 million kWh. The largest of which was around waste heat recovery and represented an investment of $135,000.

C7. Emissions breakdowns

C7.1

(C7.1) Does your organization break down its Scope 1 emissions by greenhouse gas type?
Yes

C7.1a

(C7.1a) Break down your total gross global Scope 1 emissions by greenhouse gas type and provide the source of each used greenhouse warming potential (GWP).

Greenhouse gas	Scope 1 emissions (metric tons of CO2e)	GWP Reference
CO2	633000	IPCC Fifth Assessment Report (AR5 – 100 year)
CH4	56000	IPCC Fifth Assessment Report (AR5 – 100 year)
N2O	900	IPCC Fifth Assessment Report (AR5 – 100 year)

C7.2

(C7.2) Break down your total gross global Scope 1 emissions by country/region.

Country/Region	Scope 1 emissions (metric tons CO2e)
United States of America	639226
China	8857
Netherlands	5025
Belgium	3709
France	3534
Singapore	2542
Russian Federation	4103
United Kingdom of Great Britain and Northern Ireland	2366
Brazil	1758
Canada	688
Spain	1808
Italy	1446
Germany	2061
Sweden	1116
Czechia	1291
South Africa	1071
Turkey	1031
Mexico	896
Argentina	871
Saudi Arabia	638
Malaysia	644
Hungary	638
Israel	494
Colombia	275
Greece	257
Poland	439
Viet Nam	290
Chile	451
Costa Rica	418
Portugal	1268
Egypt	169
Kenya	175
Romania	129
Algeria	152
Guatemala	36
Morocco	107

C7.3

(C7.3) Indicate which gross global Scope 1 emissions breakdowns you are able to provide.

By business division
By facility

C7.3a

(C7.3a) Break down your total gross global Scope 1 emissions by business division.

Business division	Scope 1 emissions (metric ton CO2e)
Paper Packaging and Services (PPS)	591000
Industrial Packaging and Services (IPS)	80300
Life Cycle Services (LCS)	8600
Corporate	8400
Global Packaging Accessories (GPA)	1000
Flexible Products and Services (FPS)	700

C7.3b

(C7.3b) Break down your total gross global Scope 1 emissions by business facility.

Facility	Scope 1 emissions (metric tons CO2e)	Latitude	Longitude
Riverville	172731	37.361933	-78.816822
Massillon	76793	40.751595	-81.516981
Austell	53664	33.817478	-84.645034
Sweetwater	41045	33.815504	-84.638781
Milwaukee	43112	43.061334	-87.886828
Fitchburg	29767	42.583689	-71.816767
Cincinnati (CCI)	27147	39.28495	-84.353126
Baltimore	22436	39.847557	-82.603428
Commerce	24468	33.982284	-118.162551
Taylors	21038	34.925427	-82.278466
Tama	20033	41.961022	-92.580327
Tacoma	14004	47.239218	-122.423163
Mobile	129	30.712698	-88.105392
Mason (MPM)	9731	42.56309	-84.431487
Houston	9423	29.702184	-95.060463
Harrisburg (SPC)	8288	35.333724	-80.60945
Alsip	7784	41.65628	-87.72619
Delaware	8437	40.227436	-83.048427
Louisville (MCC)	5894	38.167553	-85.892689
Arkadelphia	4152	34.518036	-93.120531
Warminster	3161	40.202395	-75.08425
Pioneer	2542	1.305161	103.661178
Ghent	3375	51.098069	3.709088
Europoort	2474	51.905708	4.218638
Taicang	2531	31.511078	121.29397
Santa Clara	2546	37.363492	-121.942317
Palmyra	4660	40.289563	-76.599223
Rouen	2066	49.429373	1.034016
Merced	2238	37.315464	-120.51356
Oshkosh	1632	43.99125	-88.602256
Oak Creek	2011	42.888193	-87.862387
Van Wert	2318	40.861239	-84.589764
Caojing	2149	30.814496	121.447488
Huizhou	1825	23.127033	114.56039
Ellesmere Port	1519	53.282018	-2.883468
Martorell	1601	41.485275	1.923039
Melzo	1090	45.498336	9.411187
Tianjin	1556	39.064877	117.692212
Moraine	1092	39.716747	-84.226226
Welcome	1207	35.92927	-80.238343
Santo Amaro	1051	-23.666907	-46.706618
Usti nad Labem	1291	50.663338	14.002691
Vreeland	984	52.232263	5.033013
Falkenburg	985	56.900564	12.47144
Laudun	1001	44.087714	4.65225
Kernersville	969	36.095375	-80.060383
Auburndale	919	28.049694	-81.78337
Tigre	871	-34.442832	-58.59765
Burton on Trent	847	52.815766	-1.640464
Loevenich	1121	50.945177	6.841812
Asterweg	869	52.390789	4.903499
Petaling Jaya	644	3.090845	101.639208
Cuernavaca	762	18.914236	-99.181661
Perm	766	57.959764	56.264045

Facility	Scope 1 emissions (metric tons CO2e)	Latitude	Longitude
Zhuhai	728	21.998573	113.193285
York	535	40.000638	-76.733953
Winfield	740	37.619931	-96.224676
Almasfuzito	638	47.72311	18.26891
Hamburg	709	53.522726	9.986966
Florence	1662	38.979366	-84.631086
Ein Hahoresh	494	32.385852	34.939996
Mobeni	707	-29.937243	30.95667
Omsk	619	54.995717	73.200768
Istanbul	541	40.859124	29.427204
Fontana	506	34.103782	-117.460408
Atlanta	573	33.106791	0
San Jose	418	9.872187	-84.070261
Jubail	384	27.043394	49.503123
Bay Minette	431	30.861078	-87.76787
Lille	467	50.528468	2.854623
Vologda	569	59.230386	39.861042
Vanderbijlpark	363	-26.656996	27.849403
Texarkana	377	33.42513	-94.04769
Baytown	555	29.811585	-94.845551
Doraville	359	33.913456	-84.270017
De Pere	799	44.423429	-88.095456
Rock Hill	486	34.960113	-81.021918
Lier	334	51.140352	4.556225
Volgograd	475	48.576516	44.446268
Aratu	309	-12.82368	-38.43188
St. Francis	2423	42.97294	-87.879646
Mandra	257	38.079017	23.521605
Meridian	232	31.500439	-91.418239
Rybnik	439	50.101336	18.566753
Vung Tau	290	10.637948	107.032545
Riyadh	255	24.524424	46.906984
Pudahuel	451	-33.379795	-70.772138
Charlotte	204	35.266669	-80.898581
Samandira	295	40.972582	29.220839
Naperville	239	41.781485	-88.2284
Lithonia	293	33.730249	-84.117424
Windsor Locks	245	41.938497	-72.663775
Esteio	239	-29.842211	-51.182939
Neenah	214	44.195056	-88.485267
Angarsk	249	52.5913	103.91195
Buffalo	217	42.869401	-78.752039
West Monroe	266	32.497408	-92.169552
Castenedolo	203	45.476687	10.282674
Winnipeg	233	49.886062	-96.958942
Bradley	194	41.147937	-87.858781
Don Benito	206	38.975221	-5.86988
Povoa	1268	38.862524	-9.06204
Woodbine	299	31.228448	-81.529902
Beloyarsk (Upakovka)	289	56.780625	61.35926
Lavonia	206	34.42708	-83.104552
Minerva	200	40.724537	-81.113751
Englishtown	192	40.344805	-74.267487
Bogota	275	4.735675	-74.134815
St. Gabriel (Evans)	492	30.248753	-91.077168
Kaluga	1100	55.215766	36.67255
Ede	699	52.035227	5.605774
Ontario	354	34.062472	-117.602184
Chicago	287	41.85861	-87.737341
Okemah	190	35.42794	-96.276894
Salt Lake City	187	40.716209	-111.955575
Lockport	187	41.586177	-88.062498
Arlington	184	32.68425	-97.080769
Sultanbeyli	181	40.974861	29.262411
Mombasa	175	-4.044386	39.649271
Scarborough	170	43.770557	-79.277391
Sadat City	169	30.363449	30.543326
Palatka	160	29.680563	-81.655638
Rio de Janeiro	159	-22.85935	-43.248031
Wright City	158	38.829	-91.027184

Facility	Scope 1 emissions (metric tons CO2e)	Latitude	Longitude
Saginaw	155	43.453409	-83.882253
Bottanuco	153	45.641089	9.512149
Algeria	152	35.753193	-0.564082
Salem	150	42.510018	-70.901076
Mendig	143	50.370317	7.300518
Nashville	143	35.835267	-87.447124
Dalton	135	34.713814	-84.962339
Monterrey	134	25.718797	-100.309129
Vaesterhaninge	131	59.115471	18.079067
Mobile	129	30.697822	-88.207648
Botosani	129	47.761479	26.620401
Belleville	128	44.196304	-77.373985
Crossett	119	33.130895	-91.97867
Denver	112	39.763963	-104.829123
Casablanca	107	33.605857	-7.531868
Toledo	99	41.661368	-83.451283
Silsbee	98	30.350659	-94.135686
Morgan Hill	97	37.123345	-121.643528
Longview	93	46.124121	-122.936644
Rheine	88	52.220769	7.488654
Franklin	85	36.761031	-86.569069
Mississauga	82	43.63916	-79.677305
Shanghai	68	30.821792	121.459715
Kingston	64	44.269498	-76.513113
Chicopee	62	42.205625	-72.553604
Phoenix	61	33.445944	-111.97121
Tallahassee	56	30.405751	-84.306413
Mt. Sterling	48	38.061192	-83.950564
Corinth	51	34.918752	-88.523501
Cedartown	48	34.01865	-85.229551
Columbus	40	40.009346	-83.134696
Beardstown	37	39.99749	-90.408876
Guatemala	36	14.460795	-90.640788
Kazan	35	55.848086	49.118889
Newark	35	40.738785	-74.133474
Grand Rapids	21	42.915588	-85.546882
Hadimkoy	13	41.15461	28.614758
Delta	11	49.129754	-123.022984
Hazleton	9	40.973266	-76.019165

C7.5

(C7.5) Break down your total gross global Scope 2 emissions by country/region.

Country/Region	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
United States of America	451622	449569
China	19256	19256
Turkey	17756	17756
Italy	10822	16416
Netherlands	8256	10999
Israel	5200	5200
Germany	4882	7432
Russian Federation	3996	3996
Romania	3739	3487
Belgium	1794	1689
Argentina	3701	3701
Singapore	3206	3206
Ukraine	2506	2506
Poland	2799	3213
Brazil	2840	2837
South Africa	2617	2617
Mexico	2147	2147
Morocco	1822	1822
Malaysia	1660	1660
United Kingdom of Great Britain and Northern Ireland	1541	2351
Saudi Arabia	1414	1414
Spain	1214	1610
Portugal	897	779
Canada	786	786
France	776	610
Greece	664	705
Czechia	835	1007
Viet Nam	579	579
Chile	413	413
Hungary	371	420
Egypt	343	343
Colombia	191	191
Sweden	188	703
Austria	144	144
Algeria	106	106
Kenya	46	46
Denmark	39	108
Guatemala	30	30
Costa Rica	5	5

C7.6

(C7.6) Indicate which gross global Scope 2 emissions breakdowns you are able to provide.

By business division
By facility

C7.6a

(C7.6a) Break down your total gross global Scope 2 emissions by business division.

Business division	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Paper Packaging and Services (PPS)	404900	404900
Industrial Packaging and Services (IPS)	115800	126400
Flexible Products and Services (FPS)	29500	29400
Tri-Sure also known as the Global Packaging Accessories (GPA) division	7000	8100
Life Cycle Services (LCS)	2400	2400
Corporate	1600	700

C7.6b

(C7.6b) Break down your total gross global Scope 2 emissions by business facility.

Facility	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Riverville	151698	151698
Austell	29681	29681
Sweetwater	25778	25778
Milwaukee	26809	26809
Massillon	28244	28244
Santa Clara	36113	36113
Baltimore	19916	19916
Cincinnati (CCI)	18251	18251
Tama	12678	12678
Fitchburg	13611	13611
Taylors	9263	9263
Houston	9134	9134
Hadimkoy	8656	8656
Alsip	6368	6368
Samandira	6734	6734
Tacoma	5667	5667
Lockport	5193	5193
Florence	1207	1207
St. Francis	908	908
Ein Hahoresh	5200	5200
Commerce	5878	5878
Castenedolo	4927	7474
Bottanuco	5100	7736
Lavonia	3957	3957
Caojing	4469	4469
Changzhou	4298	4298
Mason (MPM)	4004	4004
Negresti	3557	3317
Bradley	3098	3098
Taicang	2923	2923
Pioneer	3206	3206
Louisville (MCC)	2536	2536
Rybnik	2799	3213
Mendig	2916	4439
Zhitomir	2506	2506
Ede	3058	4074
Europoort	2460	3277
Zhenjiang	3197	3197
Mt. Sterling	2701	2701
Asterweg	2415	3218
Harrisburg (SPC)	2385	2385
Hazleton	2079	2079
Casablanca	1822	1822
Petaling Jaya	1660	1660
Delaware	1650	685
Tigre	1808	1808
Van Wert	1647	559
Huizhou	1582	1582
Arkadelphia	1122	1122
Warminster	1263	1263
Vanderbijlpark	1037	1037
Campana	1428	1428
Matehuala	1367	1367
Kazan	978	978
Lithonia	953	953
Zhuhai	1217	1217
Santo Amaro	1084	1083
Lier	1117	1051
Mobeni	1580	1580
Ellesmere Port	1112	1695
Kaluga	1157	1157
Tianjin	1144	1144
Melzo	795	1206
Povoa	897	897
Oshkosh	833	833
Sultanbeyli	1751	1751
Jubail	846	846
Palmyra	1524	1524
Wright City	671	671
Naperville	815	815
Mandra	664	705

Facility	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Usti nad Labem	835	1007
Ghent	598	563
Muhlhoff	722	1100
Cuernavaca	655	655
Baytown	508	508
Rouen	603	474
Istanbul	615	615
Riyadh	568	568
Merced	1102	1102
Welcome	521	521
Londrina	760	759
Auburndale	550	550
Hamburg	572	871
Araucaria	533	532
Martorell	532	705
San Juan	465	465
Loevenich	590	898
Perm	464	464
Belleville	533	533
Beardstown	461	461
San Roque (Cadiz)	548	728
Charlotte	405	405
Oak Creek	393	393
Pudahuel	413	413
Melzo	795	1206
Chicago	483	483
Atlanta	478	478
Shanghai	425	425
Winfield	399	399
Omsk	392	392
Almasfuzito	371	420
Vologda	363	363
Vung Tau	363	363
Arlington	348	348
Sadat City	343	353
Burton on Trent	336	513
Rock Hill	334	334
Texarkana	332	332
Vreeland	323	430
Volgograd	319	319
Dalton	311	311
Minerva	291	291
Manaus	284	283
Toledo	282	282
York	279	279
Franklin	272	272
St. Gabriel (Evans)	253	253
Phoenix	243	243
Saginaw	241	241
Beloyarsk (Upakovka)	237	237
Fontana	231	231
Okemah	224	224
Hochi Minh City	216	216
Mobile	214	214
Windsor Locks	212	212
Doraville	210	210
Grand Rapids	206	206
Bay Minette	201	201
Bogota	191	191
Morgan Hill	191	191
Botosani	182	170
Moraine	178	178
Woodbine	177	177
Falkenburg	176	656
Silsbee	162	162
Meridian	145	145
Vienna	144	144
Englishtown	143	143
Corinth	139	139
Neenah	138	138

Facility	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Nardeeville	136	136
Don Benito	134	177
Monterrey	125	125
Palatka	121	121
Chicopee	120	120
Cedartown	118	118
De Pere	118	118
Riviera Beach	118	118
Denver	112	112
Chattanooga	106	106
Algeria	106	106
Longview	105	105
Kingston	104	104
Newark	99	99
Ontario	96	96
Laudun	95	74
Thirsk	93	143
Nashville	92	92
Columbus	90	90
Weyers Cave	86	86
Angarsk	85	85
Rheine	82	124
Izegem	79	74
Augusta	78	78
Rio de Janeiro	75	75
Lille	71	56
Stockton	71	71
Crossett	70	70
West Monroe	70	70
Scarborough	68	68
Aratu	66	66
Cleveland	63	63
Salt Lake City	59	59
Salem	56	56
Mombasa	46	46
Waynesville	45	45
Buffalo	44	44
Shreveport	41	41
Mississauga	40	40
Hedehusne (Roskilde)	39	108
Winnipeg	39	39
Esteio	39	39
Tallahassee	36	36
Guatemala	30	30
San Jose	28	28
Johnsonville	27	27
Vaesterhaninge	12	46
Montceau	7	6
Delta	2	2
Cartagena	0	0
Kernersville	532	532

C7.9

(C7.9) How do your gross global emissions (Scope 1 and 2 combined) for the reporting year compare to those of the previous reporting year?

Decreased

C7.9a

(C7.9a) Identify the reasons for any change in your gross global emissions (Scope 1 and 2 combined), and for each of them specify how your emissions compare to the previous year.

	Change in emissions (metric tons CO2e)	Direction of change	Emissions value (percentage)	Please explain calculation
Change in renewable energy consumption	5000	Decreased	0.4	Greif's renewable energy consumption (purchases and generation) in FY21 increased by approximately 7500 MWh compared to FY20. The result was a decrease in emissions of 5,000 tonnes of CO2e or less than 1% of FY20 scope 1 and 2 emissions. (5,000/1,262,000)*100 =0.40%.
Other emissions reduction activities	4390	Decreased	0.34	In FY21 Greif's emission reduction projects reduced total s1 and s2 emissions by approximately 4,390 tonnes CO2e. This reduction is less than 1% of FY20 s1 and s2 emissions. (4,390/1,262,000)*100= 0.34%.
Divestment	0	No change	0	There were no divestitures in FY21.
Acquisitions	3000	Increased	0.23	During FY21 Greif acquired businesses that contributed emissions totalling less than 1% of FY20 s1 and s2 emissions. (3,000/1,262,000)*100=0.23%.
Mergers	0	No change	0	There were no mergers in FY21
Change in output	44000	Decreased	3.48	Greif's Paper Packaging and Services business unit (PPS) contributes over 70% of the company's greenhouse gas emissions. In FY21 production at PPS increased, however emissions decreased by 44,000 tonnes CO2e. (44,000/1,262,000)*100=3.48%.
Change in methodology	0	No change	0	There was no change in methodology in FY21
Change in boundary	0	No change	0	There was no change in the emissions inventory boundary during FY21
Change in physical operating conditions	0	No change	0	There were no known changes in physical operating conditions during FY21 that would impact company emissions.
Unidentified	39627	Increased	3.14	There were unidentified increases in emissions that are unable to be attributed to a specific category. (39,627/1,262,000)*100=3.14%
Other	0	No change	0	

C7.9b

(C7.9b) Are your emissions performance calculations in C7.9 and C7.9a based on a location-based Scope 2 emissions figure or a market-based Scope 2 emissions figure?

Market-based

C8. Energy

C8.1

(C8.1) What percentage of your total operational spend in the reporting year was on energy?

More than 0% but less than or equal to 5%

C8.2

(C8.2) Select which energy-related activities your organization has undertaken.

	Indicate whether your organization undertook this energy-related activity in the reporting year
Consumption of fuel (excluding feedstocks)	Yes
Consumption of purchased or acquired electricity	Yes
Consumption of purchased or acquired heat	No
Consumption of purchased or acquired steam	Yes
Consumption of purchased or acquired cooling	No
Generation of electricity, heat, steam, or cooling	Yes

C8.2a

(C8.2a) Report your organization's energy consumption totals (excluding feedstocks) in MWh.

	Heating value	MWh from renewable sources	MWh from non-renewable sources	Total (renewable and non-renewable) MWh
Consumption of fuel (excluding feedstock)	HHV (higher heating value)	617300	3435200	4052500
Consumption of purchased or acquired electricity	<Not Applicable>	34300	1457900	1492200
Consumption of purchased or acquired heat	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired steam	<Not Applicable>	0	117100	117100
Consumption of purchased or acquired cooling	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of self-generated non-fuel renewable energy	<Not Applicable>	0	<Not Applicable>	0
Total energy consumption	<Not Applicable>	656000	5010200	5666200

C8.2b

(C8.2b) Select the applications of your organization's consumption of fuel.

	Indicate whether your organization undertakes this fuel application
Consumption of fuel for the generation of electricity	Yes
Consumption of fuel for the generation of heat	Yes
Consumption of fuel for the generation of steam	Yes
Consumption of fuel for the generation of cooling	No
Consumption of fuel for co-generation or tri-generation	Yes

C8.2c

(C8.2c) State how much fuel in MWh your organization has consumed (excluding feedstocks) by fuel type.

Sustainable biomass

Heating value
HHV

Total fuel MWh consumed by the organization
617320

MWh fuel consumed for self-generation of electricity
0

MWh fuel consumed for self-generation of heat
0

MWh fuel consumed for self-generation of steam
617320

MWh fuel consumed for self-generation of cooling
<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration
0

Comment

Other biomass

Heating value
HHV

Total fuel MWh consumed by the organization
0

MWh fuel consumed for self-generation of electricity
0

MWh fuel consumed for self-generation of heat
0

MWh fuel consumed for self-generation of steam
0

MWh fuel consumed for self-generation of cooling
<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration
0

Comment

Other renewable fuels (e.g. renewable hydrogen)

Heating value
HHV

Total fuel MWh consumed by the organization
0

MWh fuel consumed for self-generation of electricity
0

MWh fuel consumed for self-generation of heat
0

MWh fuel consumed for self-generation of steam
0

MWh fuel consumed for self-generation of cooling
<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration
0

Comment

Coal

Heating value
HHV

Total fuel MWh consumed by the organization
1340

MWh fuel consumed for self-generation of electricity
0

MWh fuel consumed for self-generation of heat
0

MWh fuel consumed for self-generation of steam
1340

MWh fuel consumed for self-generation of cooling
<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration
0

Comment

Oil

Heating value
HHV

Total fuel MWh consumed by the organization
185570

MWh fuel consumed for self-generation of electricity
0

MWh fuel consumed for self-generation of heat
52040

MWh fuel consumed for self-generation of steam
0

MWh fuel consumed for self-generation of cooling
<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration
0

Comment
Certain oil-based fuels are used for mobile equipment.

Gas

Heating value
HHV

Total fuel MWh consumed by the organization
3248310

MWh fuel consumed for self-generation of electricity
0

MWh fuel consumed for self-generation of heat
708010

MWh fuel consumed for self-generation of steam
2360140

MWh fuel consumed for self-generation of cooling
<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration
180160

Comment

Other non-renewable fuels (e.g. non-renewable hydrogen)

Heating value
HHV

Total fuel MWh consumed by the organization
0

MWh fuel consumed for self-generation of electricity
0

MWh fuel consumed for self-generation of heat
0

MWh fuel consumed for self-generation of steam
0

MWh fuel consumed for self-generation of cooling
<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration
0

Comment

Total fuel

Heating value
HHV

Total fuel MWh consumed by the organization
4052540

MWh fuel consumed for self-generation of electricity
0

MWh fuel consumed for self-generation of heat
760050

MWh fuel consumed for self-generation of steam
2978800

MWh fuel consumed for self-generation of cooling
<Not Applicable>

MWh fuel consumed for self- cogeneration or self-trigeneration
180160

Comment

C8.2d

(C8.2d) Provide details on the electricity, heat, steam, and cooling your organization has generated and consumed in the reporting year.

	Total Gross generation (MWh)	Generation that is consumed by the organization (MWh)	Gross generation from renewable sources (MWh)	Generation from renewable sources that is consumed by the organization (MWh)
Electricity	51900	51900	4400	4400
Heat	477500	477500	0	0
Steam	2607300	2607300	552100	552100
Cooling	0	0	0	0

(C8.2e) Provide details on the electricity, heat, steam, and/or cooling amounts that were accounted for at a zero or near-zero emission factor in the market-based Scope 2 figure reported in C6.3.

Sourcing method
Default delivered electricity from the grid (e.g. standard product offering by an energy supplier), supported by energy attribute certificates

Energy carrier
Electricity

Low-carbon technology type
Other biomass

Country/area of low-carbon energy consumption
Chile

Tracking instrument used
Contract

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)
1028826

Country/area of origin (generation) of the low-carbon energy or energy attribute
Chile

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)
2019

Comment

Sourcing method
Default delivered electricity from the grid (e.g. standard product offering by an energy supplier), supported by energy attribute certificates

Energy carrier
Electricity

Low-carbon technology type
Renewable energy mix, please specify (Unknown)

Country/area of low-carbon energy consumption
China

Tracking instrument used
Contract

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)
883238

Country/area of origin (generation) of the low-carbon energy or energy attribute
China

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)
2020

Comment

Sourcing method
Default delivered electricity from the grid (e.g. standard product offering by an energy supplier), supported by energy attribute certificates

Energy carrier
Electricity

Low-carbon technology type
Renewable energy mix, please specify (Unknown)

Country/area of low-carbon energy consumption
Colombia

Tracking instrument used
Contract

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)
1189775

Country/area of origin (generation) of the low-carbon energy or energy attribute
Colombia

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)
2019

Comment

Sourcing method
Default delivered electricity from the grid (e.g. standard product offering by an energy supplier), supported by energy attribute certificates

Energy carrier
Electricity

Low-carbon technology type

Renewable energy mix, please specify (Unknown)

Country/area of low-carbon energy consumption
United States of America

Tracking instrument used
I-REC

Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)
4568000

Country/area of origin (generation) of the low-carbon energy or energy attribute
United States of America

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)
2020

Comment

C8.2g

(C8.2g) Provide a breakdown of your non-fuel energy consumption by country.

Country/area
Brazil

Consumption of electricity (MWh)
26624300

Consumption of heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]
26624300

Is this consumption excluded from your RE100 commitment?
<Not Applicable>

Country/area
Chile

Consumption of electricity (MWh)
1028800

Consumption of heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]
1028800

Is this consumption excluded from your RE100 commitment?
<Not Applicable>

Country/area
China

Consumption of electricity (MWh)
883200

Consumption of heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]
883200

Is this consumption excluded from your RE100 commitment?
<Not Applicable>

Country/area
Colombia

Consumption of electricity (MWh)
1189800

Consumption of heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]
1189800

Is this consumption excluded from your RE100 commitment?
<Not Applicable>

Country/area
United States of America

Consumption of electricity (MWh)
4568000

Consumption of heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]
4568000

Is this consumption excluded from your RE100 commitment?
<Not Applicable>

C9. Additional metrics

C9.1

(C9.1) Provide any additional climate-related metrics relevant to your business.

C10. Verification

C10.1

(C10.1) Indicate the verification/assurance status that applies to your reported emissions.

	Verification/assurance status
Scope 1	Third-party verification or assurance process in place
Scope 2 (location-based or market-based)	Third-party verification or assurance process in place
Scope 3	Third-party verification or assurance process in place

C10.1a

(C10.1a) Provide further details of the verification/assurance undertaken for your Scope 1 emissions, and attach the relevant statements.

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement
Greif 2021 GHG Verification.pdf

Page/ section reference
Pages 1 to 3

Relevant standard
ISO14064-3

Proportion of reported emissions verified (%)
100

C10.1b

(C10.1b) Provide further details of the verification/assurance undertaken for your Scope 2 emissions and attach the relevant statements.

Scope 2 approach
Scope 2 location-based

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement
Greif 2021 GHG Verification.pdf

Page/ section reference
Pages 1 to 3

Relevant standard
ISO14064-3

Proportion of reported emissions verified (%)
100

Scope 2 approach
Scope 2 market-based

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement
Greif 2021 GHG Verification.pdf

Page/ section reference
Pages 1 to 3

Relevant standard
ISO14064-3

Proportion of reported emissions verified (%)
100

C10.1c

(C10.1c) Provide further details of the verification/assurance undertaken for your Scope 3 emissions and attach the relevant statements.

Scope 3 category
Scope 3: Purchased goods and services
Scope 3: Capital goods
Scope 3: Fuel and energy-related activities (not included in Scopes 1 or 2)
Scope 3: Upstream transportation and distribution
Scope 3: Waste generated in operations
Scope 3: Business travel
Scope 3: Employee commuting
Scope 3: End-of-life treatment of sold products

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement
Greif 2021 GHG Verification.pdf

Page/section reference
Pages 1 to 3

Relevant standard
ISO14064-3

Proportion of reported emissions verified (%)
100

C10.2

(C10.2) Do you verify any climate-related information reported in your CDP disclosure other than the emissions figures reported in C6.1, C6.3, and C6.5?
No, but we are actively considering verifying within the next two years

C11. Carbon pricing

C11.1

(C11.1) Are any of your operations or activities regulated by a carbon pricing system (i.e. ETS, Cap & Trade or Carbon Tax)?
Yes

C11.1a

(C11.1a) Select the carbon pricing regulation(s) which impacts your operations.
California CaT - ETS
Sweden carbon tax

C11.1b

(C11.1b) Complete the following table for each of the emissions trading schemes you are regulated by.

California CaT - ETS

% of Scope 1 emissions covered by the ETS
3.54

% of Scope 2 emissions covered by the ETS
0

Period start date
January 1 2020

Period end date
December 31 2020

Allowances allocated
38809

Allowances purchased
0

Verified Scope 1 emissions in metric tons CO2e
24494

Verified Scope 2 emissions in metric tons CO2e
0

Details of ownership
Facilities we own and operate

Comment
Our two papermills in CA, Santa Clara and LA (Commerce) are covered under the California Cap-and-Trade. The California mills operate more energy efficiently than benchmark, therefore they generate an excess of credits. 85% of this excess is due to the mill in Santa Clara purchasing steam that is generated from waste heat at a neighboring electrical generator. Santa Clara has very low Scope 1 emissions, among the lowest in the country. The two mills are currently generating about 30,000 tons of carbon credits per year, declining at a 2% per year slope. The LA mill and Santa Clara mill are in industry sectors that allowed them to voluntarily opt-in to the Cap-and-Trade.

C11.1c

(C11.1c) Complete the following table for each of the tax systems you are regulated by.

Sweden carbon tax

Period start date
November 1 2020

Period end date
October 31 2021

% of total Scope 1 emissions covered by tax
0.16

Total cost of tax paid
249984

Comment

C11.1d

(C11.1d) What is your strategy for complying with the systems you are regulated by or anticipate being regulated by?

Greif's primary strategy for complying with the carbon pricing systems it is currently regulated under and those that it may be regulated under in the future is to reduce its GHG emissions companywide through product and process innovation, and efficiency enhancement projects, among other things. In 2021, Greif announced a goal to reduce its scope 1 and 2 emissions by 28% by 2030 relative to a 2019 base year. By achieving this target, Greif will reduce its exposure to carbon pricing mechanisms and thereby maintain compliance with GHG regulations.

In keeping with its GHG reduction strategy, Greif has reinforced its focus on site-level efficiency enhancement programs. Greif has systematically undertaken efficiency enhancement programs for several years and expects to conduct them on an ongoing basis for the foreseeable future. In 2020 and 2021, Greif completed 55 and 21 energy efficiency projects, saving 14 million kWh and 11 million kWh, respectively. Some of these projects were informed by or benefited from regulatory factors. For example, in 2020 Greif replaced equipment at its paperboard mills in Los Angeles, California and Fitchburg, Massachusetts with more energy efficient technology in 2020. These improvements led to a reduction of both greenhouse gasses and air pollutants. The updates allowed Greif to take advantage of Cap-and-Trade programs in California that provide Emission Reduction Credits (ERCs).

C11.2

(C11.2) Has your organization originated or purchased any project-based carbon credits within the reporting period?
No

C11.3

(C11.3) Does your organization use an internal price on carbon?
No, and we do not currently anticipate doing so in the next two years

C12. Engagement

C12.1

(C12.1) Do you engage with your value chain on climate-related issues?
Yes, our suppliers
Yes, our customers/clients
Yes, other partners in the value chain

C12.1a

(C12.1a) Provide details of your climate-related supplier engagement strategy.

Type of engagement
Information collection (understanding supplier behavior)

Details of engagement
Collect climate change and carbon information at least annually from suppliers

% of suppliers by number
0.2

% total procurement spend (direct and indirect)
20

% of supplier-related Scope 3 emissions as reported in C6.5
15

Rationale for the coverage of your engagement
(How Greif engages) Greif engages with its key suppliers through the EcoVadis platform to analyze and incentivize performance on climate change targets. (Why Greif selected certain suppliers) Greif began requesting that its 40 largest suppliers complete EcoVadis assessments in 2020, and continued to do so in 2021, as these suppliers make up a large proportion of Greif's overall upstream scope 3 emissions. As part of this program, Greif trained its buyers on the EcoVadis platform to understand the assessment, recognize the factors EcoVadis is rating and best utilize information from the assessments.

Impact of engagement, including measures of success
(Measure of success) Greif's 2021 target was to assess 25% of its suppliers by total spend through the EcoVadis platform. (Description of impact) Falling just short of this target, Greif was able to assess 20% of its suppliers by total spend by the end of the fiscal year. Greif is now using this data to help better understand its upstream scope 3 emissions profile to drive reductions in the lifecycle emissions associated with the company's products. Additionally, Greif has continued to build on the data gathered from EcoVadis by directly surveying key steel, plastic, and OCC suppliers in 2022. The steel suppliers that were surveyed represent 32% of Greif's total spend on steel, while the plastics suppliers represent 77% of spend on plastics, and the OCC suppliers represent about 50% of Greif's spend on OCC.

Comment

C12.1b

(C12.1b) Give details of your climate-related engagement strategy with your customers.

Type of engagement & Details of engagement

Collaboration & innovation	Run a campaign to encourage innovation to reduce climate change impacts

% of customers by number
15

% of customer - related Scope 3 emissions as reported in C6.5
15

Please explain the rationale for selecting this group of customers and scope of engagement
(How Greif engages) Greif works with customers to allay greenhouse gases in their supply chain. We prioritize customers that desire to impact their sustainability goals, including energy and emissions, and reduce costs. We collaborate with these customers frequently in an effort to develop products that meet their needs and those of others in the industry. We regularly meet with customers to identify collaborative projects to reduce each other's carbon emissions. One program that Greif has implemented is the use of a proprietary Green Tool, which assists customers in selecting the most efficient container with the lowest emissions for their needs. The tool enables companies to evaluate the GHG emissions associated with different shipping scenarios and assists customers in calculating their scope 3 GHG emissions. (Why Greif selected certain customers) Greif engages its top Global Industrial Packaging (GIP) customers with its Green Tool as they account for a disproportionately large percentage of the company's overall GIP sales.

Impact of engagement, including measures of success
(Measure of success) In 2021, Greif had a goal of helping more than 21 customers, accounting for at least 8% of total revenue (i.e., last year's engagement performance), engage with the Green Tool while making purchasing decisions. (Description of impact) Greif met its target for 2021 by having 31 customers (11 of which were GIP global key customers), accounting for 15% of revenue, use the Green Tool to optimize their purchasing behaviour. Engaging customers with the Green Tool has led to an increase in the sales of sustainably tagged products within Greif's GIP business.

C12.1d

(C12.1d) Give details of your climate-related engagement strategy with other partners in the value chain.

(Explanation of who "other partners in the value chain" constitutes) In addition to suppliers and customers, Greif formally engages with its transportation and distribution partners, investors, the World Business Council for Sustainable Development (WBCSD), and the Alliance To End Plastic Waste (AEPW), among other external stakeholders, on climate topics. These stakeholders were chosen for engagement because of a 2020 materiality assessment in which Greif's reliance on timely and cost-effective downstream distribution, public markets, and the policy effects of sustainable development organizations were identified as important factors in Greif's business.

(How Greif engages) Greif engages with its transportation and distribution partners daily to incorporate climate-related factors into its logistics decision-making processes. Since 2014 Greif has formally partnered with the EPA's SmartWay program to manage logistics in an environmentally responsible manner. Greif uses carriers that are approved through the EPA's SmartWay initiative whenever possible. Greif includes SmartWay certification during the new carrier certification process. Additionally, Greif's SmartWay-approved carrier base accounts for 77 percent of miles travelled in North America. From 2014 to 2018, Greif has saved over 231,535 tons of CO2 mass emissions through the use of SmartWay carriers.

Greif engages investors in its climate-related strategy through formal earnings calls, sustainability reporting, and active responses to sustainability assessments, including CDP and EcoVadis. Greif engages with sustainability assessment firms to ensure accuracy and improve Greif's scores for the benefit of the investor community. Greif also attends meetings with current and potential investors to discuss its climate strategy, circular economy strategy, and other aspects of its sustainability program. Greif engages the communities in which it operates through public reporting, including its sustainability report, social media, conference attendance, and public meetings. Greif published its 2021 annual sustainability report for the benefit of the investor and broader stakeholder community, in which Greif's climate governance structure and general climate strategy are outlined.

Greif engages also with the World Business Council for Sustainable Development (WBCSD) and the UN Global Compact (UNGC). Greif began engaging with WBCSD in 2009 to demonstrate its commitment to providing business leadership as a catalyst for change toward sustainable development. Greif is proud to have hosted the first Midwest WBCSD conference in 2011, and again in 2012 and 2013, to discuss and share ideas and strategies about how to respond to some of the key environmental and business sustainability questions we face today and to share best practices. Through its partnership with WBCSD, Greif published "From Cradle to Grave: Greif's Life Cycle Analysis, a case study on how we implement Life Cycle Analysis in our business." In 2020, Greif was an active member of WBCSD's circular economy, REscale, and New Energy Solutions working groups. In 2021, we also served as Co-Chairs of the WBCSD Plastics and Packaging working group focused on developing a transition roadmap to circularity for the industrial packaging sector. Greif's CEO delivered the keynote address at WBCSD's 2019 Annual Council Meeting dinner and director of sustainability presented at the sessions on Plastics and the integration of ESG risks into the risk management process, and provided input on two WBCSD papers /pieces that were published and communicated on their website and shared with all of their members. Greif also piloted a risk management program in collaboration with WBCSD to better integrate ESG issues into Greif's enterprise risk management process. In addition to these activities, Greif continues to engage with WBCSD quarterly and is participating in a program to better ingrain climate-related risk into Greif's enterprise risk management approach.

C12.2

(C12.2) Do your suppliers have to meet climate-related requirements as part of your organization's purchasing process?

No, but we plan to introduce climate-related requirements within the next two years

C12.3

(C12.3) Does your organization engage in activities that could either directly or indirectly influence policy, law, or regulation that may impact the climate?

Row 1

Direct or indirect engagement that could influence policy, law, or regulation that may impact the climate

Yes, we engage indirectly through trade associations

Does your organization have a public commitment or position statement to conduct your engagement activities in line with the goals of the Paris Agreement?

No, but we plan to have one in the next two years

Attach commitment or position statement(s)

<Not Applicable>

Describe the process(es) your organization has in place to ensure that your engagement activities are consistent with your overall climate change strategy

Greif's Sustainability Steering Committee (SSC) is informed by and oversees engagement on climate-related matters, which led partially by the Executive Leadership Team (ELT), Vice President of Sustainability, product managers, legal department, and the EHS department. Since the SSC is also responsible for compliance with climate targets and climate risk assessment, it is well positioned to understand and guide interactions on climate issues.

Primary reason for not engaging in activities that could directly or indirectly influence policy, law, or regulation that may impact the climate

<Not Applicable>

Explain why your organization does not engage in activities that could directly or indirectly influence policy, law, or regulation that may impact the climate

<Not Applicable>

C12.3b

(C12.3b) Provide details of the trade associations your organization engages with which are likely to take a position on any policy, law or regulation that may impact the climate.

Trade association
Other, please specify (World Business Council for Sustainable Development (WBCSD))

Is your organization's position on climate change consistent with theirs?
Consistent

Has your organization influenced, or is your organization attempting to influence their position?
We publicly promote their current position

State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)
(Trade association's position on climate change) WBCSD promotes ambitious action on climate change that is aligned with the Paris Agreement.
(How it differs with Greif's position) Greif position does not differ from that of WBCSD on the broad topic of climate action.

Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)

Describe the aim of your organization's funding
<Not Applicable>

Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?
Yes, we have evaluated, and it is aligned

C12.4

(C12.4) Have you published information about your organization's response to climate change and GHG emissions performance for this reporting year in places other than in your CDP response? If so, please attach the publication(s).

Publication
In mainstream reports

Status
Complete

Attach the document
2021 Annual Report.pdf

Page/Section reference
CEO's Letter, Risks Related to Industry Conditions (page 9-10), Risks Related to Regulatory and Legal Costs (page 15-17)

Content elements
Strategy
Risks & opportunities
Emission targets

Comment

C15. Biodiversity

C15.1

(C15.1) Is there board-level oversight and/or executive management-level responsibility for biodiversity-related issues within your organization?

	Board-level oversight and/or executive management-level responsibility for biodiversity-related issues	Description of oversight and objectives relating to biodiversity	Scope of board-level oversight
Row 1	Yes, board-level oversight	Greif's Board is made aware of and needs to approve land management activities conducted by the company's Soterra business unit, including sustainability and climate change projects (e.g., carbon capture, solar farm development, carbon credit sales).	<Not Applicable>

C15.2

(C15.2) Has your organization made a public commitment and/or endorsed any initiatives related to biodiversity?

	Indicate whether your organization made a public commitment or endorsed any initiatives related to biodiversity	Biodiversity-related public commitments	Initiatives endorsed
Row 1	Yes, we have made public commitments and publicly endorsed initiatives related to biodiversity	Other, please specify (Committed to monitoring any impacts on the biodiversity of the lands we manage, including protecting corridors and stream zones, as needed.)	SDG Other, please specify (Sustainable Forestry Initiative, SDG6: Clean Water and Sanitation)

C15.3

(C15.3) Does your organization assess the impact of its value chain on biodiversity?

	Does your organization assess the impact of its value chain on biodiversity?	Portfolio
Row 1	No, and we do not plan to assess biodiversity-related impacts within the next two years	<Not Applicable>

C15.4

(C15.4) What actions has your organization taken in the reporting year to progress your biodiversity-related commitments?

	Have you taken any actions in the reporting period to progress your biodiversity-related commitments?	Type of action taken to progress biodiversity- related commitments
Row 1	Yes, we are taking actions to progress our biodiversity-related commitments	Land/water management Species management Education & awareness

C15.5

(C15.5) Does your organization use biodiversity indicators to monitor performance across its activities?

	Does your organization use indicators to monitor biodiversity performance?	Indicators used to monitor biodiversity performance
Row 1	No	Please select

C15.6

(C15.6) Have you published information about your organization's response to biodiversity-related issues for this reporting year in places other than in your CDP response? If so, please attach the publication(s).

Report type	Content elements	Attach the document and indicate where in the document the relevant biodiversity information is located
In voluntary sustainability report or other voluntary communications	Content of biodiversity-related policies or commitments	p. 32-33 Greif_2021SustainabilityReport.pdf

C16. Signoff

C-FI

(C-FI) Use this field to provide any additional information or context that you feel is relevant to your organization's response. Please note that this field is optional and is not scored.

C16.1

(C16.1) Provide details for the person that has signed off (approved) your CDP climate change response.

	Job title	Corresponding job category
Row 1	President and Chief Executive Officer	Chief Executive Officer (CEO)

SC. Supply chain module

SC0.0

(SC0.0) If you would like to do so, please provide a separate introduction to this module.

SC0.1

(SC0.1) What is your company's annual revenue for the stated reporting period?

	Annual Revenue
Row 1	5556100000

SC1.1

(SC1.1) Allocate your emissions to your customers listed below according to the goods or services you have sold them in this reporting period.

Requesting member
The Dow Chemical Company

Scope of emissions
Scope 1

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
11735

Uncertainty (±%)

Major sources of emissions
Emissions from production.

Verified
Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
94000000

Unit for market value or quantity of goods/services supplied
Currency

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

Requesting member
Bayer AG

Scope of emissions
Scope 1

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
1530

Uncertainty (±%)

Major sources of emissions
Emissions from production.

Verified
Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
12200000

Unit for market value or quantity of goods/services supplied
Currency

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

Requesting member
FIRMENICH SA

Scope of emissions
Scope 1

Allocation level

Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
1549

Uncertainty (±%)

Major sources of emissions
Emissions from production.

Verified
Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
12350000

Unit for market value or quantity of goods/services supplied
Currency

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

Requesting member
Givaudan SA

Scope of emissions
Scope 1

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
1158

Uncertainty (±%)

Major sources of emissions
Emissions from production.

Verified
Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
9200000

Unit for market value or quantity of goods/services supplied
Currency

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

Requesting member
The Dow Chemical Company

Scope of emissions
Scope 2

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
9378

Uncertainty (±%)

Major sources of emissions
Emissions from production.

Verified
Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
93600000

Unit for market value or quantity of goods/services supplied
Currency

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

Requesting member
Bayer AG

Scope of emissions
Scope 2

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
1223

Uncertainty (±%)

Major sources of emissions
Emissions from production

Verified
Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
121200000

Unit for market value or quantity of goods/services supplied
Currency

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

Requesting member
FIRMENICH SA

Scope of emissions
Scope 2

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
1237

Uncertainty (±%)

Major sources of emissions
Emissions from production.

Verified
Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
12340000

Unit for market value or quantity of goods/services supplied
Currency

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

Requesting member
Givaudan SA

Scope of emissions
Scope 2

Allocation level
Company wide

Allocation level detail
<Not Applicable>

Emissions in metric tonnes of CO2e
925

Uncertainty (±%)

Major sources of emissions
Emissions from production.

Verified
Yes

Allocation method
Allocation based on the market value of products purchased

Market value or quantity of goods/services supplied to the requesting member
9200000

Unit for market value or quantity of goods/services supplied
Currency

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
Emissions were apportioned downstream based on the total percentage of revenue that is attributable to each customer.

SC1.2

(SC1.2) Where published information has been used in completing SC1.1, please provide a reference(s).

Greif's verified 2021 scope 1 and 2 emissions were used in the calculations above (https://www.greif.com/wp-content/uploads/2022/04/Greif-2021-GHG-Verification.pdf) as well as revenue figures from its 10-k (https://www.sec.gov/Archives/edgar/data/0000043920/000004392021000076/gef-20211031.htm).

SC1.3

(SC1.3) What are the challenges in allocating emissions to different customers, and what would help you to overcome these challenges?

Allocation challenges	Please explain what would help you overcome these challenges
Diversity of product lines makes accurately accounting for each product/product line cost ineffective	Greif produces a variety of different products. As such, accurately tracking emissions for each product line is difficult. Greif hopes that its ability to track emissions accurately will increase as its GHG inventory continues to advance in sophistication.

SC1.4

(SC1.4) Do you plan to develop your capabilities to allocate emissions to your customers in the future?
Yes

SC1.4a

(SC1.4a) Describe how you plan to develop your capabilities.

Greif is currently in the process of reviewing and enhancing its GHG inventory approach. By enhancing its inventory, Greif hopes to become better able to isolate emissions associated with specific products and services that it provides to clients and therefore more accurately apportion them downstream.

SC2.1

(SC2.1) Please propose any mutually beneficial climate-related projects you could collaborate on with specific CDP Supply Chain members.

Requesting member
Bayer AG

Group type of project
Relationship sustainability assessment

Type of project
Assessing products or services life cycle footprint to identify efficiencies

Emissions targeted
Actions that would reduce both our own and our customers' emissions

Estimated timeframe for carbon reductions to be realized
0-1 year

Estimated lifetime CO2e savings

Estimated payback
Cost/saving neutral

Details of proposal
Greif's "Green Tool" allows customers to compare the greenhouse gas impact of Greif's products and services against one another, and therefore make informed decisions about which to procure for their operations. Greif offers a myriad of products with reduced lifecycle emissions (either through increased energy, input, or transportation efficiency), and comparable or better performance when compared to legacy alternatives . Using the Green Tool to make data-driven procurement decisions can help customers reduce scope 1, 2, and 3 emissions.

SC2.2

(SC2.2) Have requests or initiatives by CDP Supply Chain members prompted your organization to take organizational-level emissions reduction initiatives?
No

SC4.1

(SC4.1) Are you providing product level data for your organization's goods or services?
No, I am not providing data

Submit your response

In which language are you submitting your response?
English

Please confirm how your response should be handled by CDP

	I understand that my response will be shared with all requesting stakeholders	Response permission
Please select your submission options	Yes	Public

Please confirm below
I have read and accept the applicable Terms