

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 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 244,000 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 2018, 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 2018	October 31 2019	No	<Not Applicable>

C0.3

(C0.3) Select the countries/areas for which you will be supplying data.

- 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
- Nigeria
- Philippines
- 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.

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	Since 2016 Greif's entire board, and ultimately our Board Chair, has held responsibility for climate-related issues & sustainability. Greif's Senior Vice President, Rigid Industrial Packaging & Services and Global Sustainability, reports to the board at each meeting. Annually, 1 board meeting is dedicated to sustainability, including climate change. In 2016, Senior Vice President, Rigid Industrial Packaging & Services and Global Sustainability assumed responsibility for leading sustainability. This role leads 45% of our business (by 2019 operating profit), strategically positioning this role to embed sustainability in our business. The individual in this role also leads our Sustainability Steering Committee (SSC), which is comprised of members of the Executive Leadership Team and Greif's Director of Sustainability. The board holds the SSC accountable for reaching annual goals, impacting Senior Vice President, Rigid Industrial Packaging & Services and Global Sustainability and Director of Sustainability's remuneration and funding for sustainability programs.

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	<ul style="list-style-type: none"> Reviewing and guiding strategy Reviewing and guiding major plans of action Reviewing and guiding risk management policies Reviewing and guiding business plans Monitoring implementation and performance of objectives Overseeing major capital expenditures, acquisitions and divestitures 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 our ESG scores from our Senior Vice President, Rigid Industrial Packaging & Services and Global Sustainability at each quarterly board meeting. It is up to the board if they want to discuss sustainability further. Annually, one board meeting is dedicated to a discussion of sustainability issues, including climate change. The board receives an update on progress against formal goals, key initiatives, and establishment of new priorities. Additionally, we bring in outside resources to talk to the board during our quarterly board meetings. These outside resources inform board members on various ESG topics. Feedback and guidance received from the board is communicated to the Sustainability Steering Committee for implementation in the organization.

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 (Senior Vice President & Group President)	<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 our Senior Vice President, Rigid Industrial Packaging & Services (RIPS) and Global Sustainability. This role assumed responsibility for leading sustainability across Greif in 2016. This role leads 45 percent of our business (by operating profit), holds operational control of more than 120 production facilities and approximately 7,000 employees and is instrumental in leading RIPS's increased growth and profitability. Greif's aim is to further embed sustainability into our thinking and operations and believes that the individual in this role is strategically positioned to do so. The role also leads Greif's 11-member Sustainability Steering Committee, which was formed in 2016 to establish a formal governance structure and provide broad organizational oversight of our sustainability program. In addition to this individual, the Sustainability Steering Committee includes Greif's President and Chief Executive Officer; Executive Vice President, Chief Financial Officer; Senior Vice President, Chief Human Resources Officer; Executive Vice President, General Counsel and Secretary; Vice President and Chief Administrative Officer; Vice President, Investor Relations & Corporate Communications; Vice President and Division President, Flexible Products & Services; Senior Vice President and Group President, Paper Packaging & Services and Soterra LLC; Senior Vice President Enterprise Strategy, Global Sourcing and Supply Chain and Greif Packaging Accessories; and Director of Sustainability. The Committee is tasked with further integrating sustainability into our strategy and operations, reviewing our sustainability progress and priorities biannually and ensuring accountability at all levels of our organization. The Committee, which is subject to Board oversight, was deliberately formed including Senior leadership to signal to the organization and our stakeholders the importance of sustainability, ensure an enterprise view of sustainability, accelerate our progress of initiatives and ensure the Committee has the authority to implement change in the organization. The Board of Directors holds the Sustainability Committee accountable for reaching annual goals, which directly impacts the remuneration of our Senior Vice President, Rigid Industrial Packaging & Services and Global Sustainability, and determines the level of funding for Greif's sustainability programs. The Steering Committee guides the activities of our six-member Sustainability Management Team, which works with topic teams, including the Global Energy Team, consisting of representatives from each region and business unit to drive operational projects and priorities. The Sustainability Management Team meets quarterly 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 our Senior Vice President, Rigid Industrial Packaging & Services and Global Sustainability and Director of Sustainability. Our Director of Sustainability meets quarterly with our CEO, CFO and other members of the ELT to discuss progress of sustainability initiatives and funding required for upcoming initiatives, including energy and emissions reduction projects. In 2019, our Director of Sustainability attended and presented on sustainability at Greif, with a focus on climate-related topics, at our annual Leadership Council meeting. The Leadership Council meeting brings together leaders from each Greif business unit and the Executive Leadership Team. The sustainability presentation served to increase awareness and further integrate sustainability into the operations and procurement of each business unit. Since 2010 Greif has maintained a Global Energy Team, currently consisting of 25 members, that is responsible for coordinating energy and emissions reduction projects throughout the company and identifying specific operational risks and opportunities that can contribute to meeting Greif's energy and emission goals. In 2019, we restructured the team to place an increased emphasis on including regional leadership to better engage and identify energy opportunities within each business unit and include legacy Carastar facilities. This change in structure has allowed us to streamline our energy roadmap process to focus on and invest in the business units and facilities that have the most impactful energy opportunities. Whereas previously each facility was responsible for developing their own roadmap, regional leadership is now responsible for collaborating with each business unit to identify energy reduction and efficiency opportunities. Greif's sustainability governance structure was established to ensure climate-related issues are a focus at all levels of the organization and are tied to our business initiatives.

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
All employees	Monetary reward	Energy reduction target	Energy savings are integrated into Greif's incentive structure. Our Flexible Products and Services (FPS) Hadimköy facility in Turkey developed a sustainability program that focuses on employee engagement. They have identified various success criteria for the plant, including energy reduction, as a result of scrap reduction. All employees engaged in monthly meetings to generate improvement ideas. The plant evaluated the ideas, selected projects to implement, set success criteria, and tracked progress monthly. By decreasing the scrap ratio from 12.1% to 10.2%, they saved 328.9 kWh energy usage reduction, an 18,500 Euro savings. Production employees' premiums (bonuses) are tied to the achievement of the success criteria identified and paid monthly, based on performance. For example, if semi-finished departments of Hadimköy had greater than 12% scrap, there are no bonuses paid. However, if they reduce the monthly scrap rate to 10.5% or less, then they are paid their full bonus.
Other, please specify (Energy and Emissions Team)	Non-monetary reward	Emissions reduction target	Greif's Global Energy and Emissions Team and business unit-level management create annual energy roadmaps; energy and emissions-reduction goals are integrated into the performance reviews of some members of the Energy and Emissions Team.
Facilities manager	Monetary reward	Energy reduction target	Plant managers track energy spend at their facility and actively work to achieve energy savings delineated in business unit energy roadmaps. Our plant managers' performance incentives are linked to overall cost savings, including savings from energy reductions.
All employees	Non-monetary reward	Emissions reduction target	To reinforce our belief that good business is environmentally responsible, we introduced the Michael J. Gasser Global Sustainability Award Program in 2010. This program is available to all employees and recognizes superior effort and achievement in the improvement of the environment. The award recognizes teams that create innovative, sustainable products or processes that reduce or mitigate the direct and indirect impact of climate change. Awards are given for Energy Excellence, Ecosystem Improvement, and Sustainable Innovation. Greif's Board and CEO recognize award winners. In 2019, Greif's Carol Stream facility collaborated with our Rigid packaging business (RIPS), purchasing, RIPS Italy and 4 RIPS plants to source 800,000 pounds of recycled plastic resins to use in the production of Intermediate Bulk Containers feet and corner protectors. The team also reused empty corrugated bulk boxes to ship the recycled products they manufacture, reducing corrugated bulk box purchases by 84%. The project created company value and established environmental and financial benefits, while contributing to both our circular economy initiatives and our emissions reduction target, reducing the demand for virgin raw materials in addition to diverting waste from landfills and finding a new purpose for them. Due to the outstanding sustainability impact of the project and its ability to be scaled to other molding and injection molding facilities, the project and Carol Stream team was awarded the 2019 Michael J. Gasser Sustainability Award. In 2014, Greif introduced the Plant Olympics 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, in 2017, it expanded globally to include all Greif regions and business units. Ratings are based on safety, people, productivity, customer satisfaction, 5S and sustainability, including climate change. 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.
Environment/Sustainability manager	Non-monetary reward	Energy reduction target	Our Director of Sustainability's entire performance review consists of progress on sustainability goals and initiatives.
Procurement manager	Monetary reward	Environmental criteria included in purchases	Part of our Senior Director, North American Sourcing & Supply Chain's performance is based on their ability to lead Greif's Procurement Sustainability project to ensure / hold to account we are meeting our 2025 goals. Many of our buyers are working on specific sustainability projects, for example sourcing more recycled materials. These buyers have sustainability criteria integrated into their performance reviews.

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	6	10	

C2.1b

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

Greif defines substantive financial or strategic impact as any strategic risk with the potential to have aggregated impact of approximately 5% of pre-tax income or greater, which is in alignment with guidance set forth by the U.S. Securities and Exchange Commission. Risks that fall below this threshold but are significant due to customer, operational or regulatory demands are also considered in this process and prioritized based on risk velocity, financial impact and likelihood of occurrence.

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

Climate-related risks and opportunities are integrated into Greif's Enterprise Risk Management (ERM) Process, which considers all Greif Business Units and geographies. Risk information is identified and analyzed through Greif's Risk and Content Monitoring processes by assurance providers across the organization, including Internal Audit, Legal/Compliance, Greif Business System, and the Sustainability Steering Committee (SSC). Information from these groups is provided to Greif's Risk Leader Committee (RLC) led by Greif's Chief Audit Executive, and comprised of members of Greif's Executive, Business Unit, and Strategic Business Unit Leadership Teams, including representatives from Sustainability, Legal, Finance, Risk Management and each of Greif's business units. The RLC identifies, ranks, reviews, and prioritizes risks in conjunction with Greif's Audit Committee to determine the most critical risks and identify areas of opportunity within them, which are then discussed with the Board of Directors. Once aligned to, risks are evaluated by Greif's Strategy Team (ST) to develop plans for risk mitigation and opportunity capture, which are approved by Greif's Executive Leadership Team prior to implementation. Risks identified through this process are evaluated and prioritized based on potential financial impact, production impact, importance to key stakeholders, and timeline to implementation. Greif prioritizes risks with the potential to have substantive financial impact (as defined in C2.1b). Risks that fall below this threshold but are significant due to customer, operational or regulatory demands are also considered and prioritized based on risk velocity, financial impact and likelihood of occurrence. The SSC, comprised of Greif's ELT and our Director of Sustainability, meets biannually to look at economic, environmental and social trends, risks and opportunities and ensure they are considered in our corporate strategy and ERM. The SSC monitors industry reports (i.e. WBCSD ESG Enterprise Risk Management Framework, WRI's Assessing the Post-2020 Clean Energy Landscape, and CSSR's Fourth National Climate Assessment), ESG ratings and ranking (i.e. CDP, EcoVadis), energy pricing, evolving government regulations/programs, and holds formal relationships with ESG-specific associations and NGOs, including World Business Council for Sustainable Development (WBCSD) and the United Nations Global Compact, to identify emerging risks that may impact our business. Greif's Sustainability Management Team (consisting of global leaders of our sustainability teams; Sr. Vice President of Rigid Industrial Packaging & Services (RIPS) and Global Sustainability; and Director of Sustainability) meets quarterly to discuss sustainability risks and opportunities. This team develops Greif's sustainability goals and roadmaps and reports to Greif's SSC. In 2019, Greif began incorporating results from our internal Global Trends Report into our ERM process. Based on interviews with internal leaders and secondary research, the report identifies global trends with particular relevance to our business: Companies Becoming More Environmentally Friendly; Digitization & Automation of Manufacturing Supply Chain & Logistics, and Enterprise Purchasing & B2B Selling; Workforce Shortages, Surpluses & Skill Gaps; and Growth Opportunities Increasing in Emerging Markets. In conjunction with other internal and external sources that are considered in our ERM process, the trend report improves our ability to forecast and plan for long-term trends that may impact our business in the future. Through our ERM, Greif identified extreme weather events as an acute physical risk with potential to cause substantive financial impact to Greif, particularly where Greif's operations and suppliers are exposed to hurricane risk (e.g. RIPS facilities and suppliers in Texas, Florida, and Louisiana). Based on planning by Greif's ST, insurance coverage, redundancies in supply chain and manufacturing capabilities were established, and the We Got Chu Natural Disaster Recovery Protocol was launched. Administered by representatives from sales, marketing, customer service, operations and logistics in conjunction with business unit leadership, We Got Chu manages risk and business continuity through inventory and production redundancy capabilities, facility risk assessments and proactive labor relations. The program outlines a 25 step process to identify customer orders that may be impacted if a disaster impacts one of our facilities, identify alternative products that meet customer specifications and facilities that are able to produce the products our customers have ordered. Each facility conducts monthly random mock disasters to ensure protocols are in place, understood, and quickly implementable. Our risk planning was implemented when our facilities were impacted by hurricane's Harvey and Irma in 2017. Despite operational stoppages in these facilities, our supply and manufacturing redundancies and disaster response plans allowed us to fulfill all customer obligations without declaring force majeure. No Greif facilities were directly impacted by acute physical events in 2018 or 2019. Our ERM process and SSC has also identified that Greif is exposed to transitional market risk in the form of raw material price and supply volatility, particularly in our core raw materials of steel, resin, and paint, as a result of climate related impacts. This risk was also identified as a material topic during our 2017 formal materiality assessment and reported in our 2018 and 2019 Sustainability reports. Our global procurement team mitigates this risk by securing long-term price-locked contracts, opportunistically increasing stock if prices fall, and establishing multiple supply relationships for like materials. This is also an opportunity for product innovation in reducing the raw materials required to manufacture our products. Our procurement, product development, and innovation teams collaborate with suppliers and customers to lightweight and reduce the gauge of materials used in our products, including NexDRUM® which is produced using 15% less material and 12% less CO2 emissions than standard drums, thus creating opportunity from this risk. In 2019, lightweighting and down gauging efforts resulted in \$1 million in savings, an example of how our ERM process is used to identify and manage climate related opportunities. In 2018, we conducted an onsite review of our Riverville plant (our largest source of Scope 1 and Scope 2 emissions) in partnership with a 3rd party to identify energy/emissions reduction opportunities. In 2019, the results of this assessment, as well as regional and facility level roadmaps, were used to implement 84 energy efficiency projects resulting in 66 million kWh annual savings.

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	As an organization with operations across the globe, current regulations 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 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 RLC. Current regulatory risks are discussed at Sustainability Steering Committee 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 ELT, and annually by Greif's Board of Directors. Greif's most recent risk reviews have identified current compliance and regulatory risk as a moderate risk factor with potential impact evident within six to 12 months. For example, our Chinese Rigid Industrial Packaging & Services (RIPS) operations are subject to strict air quality regulations set by the Ministry of Ecology and Environment. If air quality falls below yellow alert levels, the government will request that manufacturers shut down operations until air quality returns to a safe level. Due to these regulations, Greif's Taicang, Shanghai and Tianjin facilities were shut down in 2019 resulting in 10, 12 and 27 days of lost production time, respectively. Similar mandated shut-downs could reoccur at any time, representing risk of lost revenues as a result of climate-related regulations. As such, this, and similar climate-related regulations, are relevant and always included in our Enterprise Risk Management process, as described in C2.2. Further, per our 2019 10K, we are subject to transportation safety regulations set by the U.S. Department of Transportation and similar agencies in other jurisdictions. These regulations and standards set forth requirements related to the transportation of both hazardous and nonhazardous materials in some of our packaging products and subject Greif to random inspections and testing to ensure compliance. As transportation, and reducing emissions related to the transportation of our products, is a critical component of our climate strategy, the implications of these regulations are relevant to, and thus always included in our climate-related risk assessments.

	Relevance & inclusion	Please explain
Emerging regulation	Relevant, always included	Emerging regulations 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 Sustainability Steering Committee (SSC) is notified when regulatory changes with potential climate-related impacts are identified by regional VPs and the Director of Sustainability. Emerging 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 ELT, and annually by Greif's Board of Directors. The risk of changing climate, climate change regulations and greenhouse gases affecting our operations and financial performance is disclosed as a risk on our 2019 10K. We believe it is likely that the scientific and political attention to issues concerning the extent and causes of climate change will continue, with the potential for further legislation and regulations that could affect our results of operations and financial condition. Recently, Canada implemented a number of rules and regulations around paint, impacting our operations in the country. To address the new regulations, Greif leverages Dakota Software to track the relevant regulations across our Rigid Industrial Packaging & Services (RIPS) and Paper Packaging & Services (PPS) North American operations. By creating unique profiles for each of our sites, we can better understand the relevant laws and regulations that each facility is subject to. The system sends out monthly updates, informing each facility of any changes to relevant regulations. In 2016, the Brazilian Federal Government, through the Ministry of Mines and Energy, initiated MERCADO LIVRE DE ENERGIA ELETRICA ou AMBIENTE DE CONTRATAÇÃO LIVRE - ACL* (FREE ELECTRICITY MARKET), an energy rationing program intended to make the energy market more competitive for consumers and energy traders. The emerging regulation was identified as a potential risk through our ERM process. After implementing the program, Greif reduced energy costs 30%, savings more than \$1.4 million USD, and reduced CO2 emission 70 percent. In 2019, we implemented similar programs in Chile and Colombia shifting 64% and 100% of energy use, respectively, to renewable sources and leading to \$40,000 annual savings and 955 tons of CO2 total.
Technology	Relevant, always included	Greif surfaces technology opportunities/risks through customer conversations and RFPs, our Life Cycle Analysis showing where our most significant emissions occur, facility energy audits and product cost analyses. We address these opportunities/risks through product quality, innovation and operational energy and emission roadmaps. Our Global Innovation Committee, comprised of representatives from each of Greif's business units, manages innovation and is responsible for driving collaboration and idea sharing across and within business units. The committee updates Greif's Executive Leadership Team quarterly on innovation priorities and industry megatrends that may influence investment and company strategy. Innovation is managed by a process that evaluates and prioritizes projects based on potential financial return, sustainability impacts and overall value to Greif and our customers. Since efforts identified by this team have potential for significant capital investment, and indicate changing customer behavior, the activities are a Risk Process and Content Monitoring input considered in our ERM process (see C2.2), as is Greif's Global Trends report created by this team (see C2.2). Our technology-related innovation efforts focus on transforming our product portfolio by developing sustainable packaging solutions based on a set of eight environmental, social, and financial sustainability criteria. Through internally initiated solutions and customer collaboration, our innovation efforts focus on dematerialization and green material substitution while maintaining performance requirements. In 2019 Greif began producing multi-layer GCUBE IBCs made with up to 60% PCR using plastic extruded at on-site recycling centers. The inner layer of the bottle remains 100% virgin high density polyethylene, while the 2 external layers are made from a blend of PCR. In addition to reducing the need for virgin resin, the product reduces the carbon footprint of the bottle by up to 38% and up to 11% for the entire product. Each year, Greif's Sustainability Steering Committee (SSC) oversees the development of operational energy and emissions roadmaps to identify projects, including technology replacements that will contribute to climate-related goals. This information is incorporated into Greif's ERM process. Progress against the goals is discussed at each biannual SSC Meeting. In 2019, we completed 84 projects, reducing energy consumption by over 66 million kWh, annually.
Legal	Relevant, always included	Greif considers climate-related legal risk in conjunction with emerging regulatory risk. As discussed in our 2019 10k, Greif's legal risks are evaluated collaboratively by Greif's Environmental Health and Safety, Legal and Compliance teams. As direct assurance providers to Greif's Risk Process and Content Monitoring inputs, risks identified by these teams are directly factored into Greif's ERM process, and evaluated by the Risk Leader Committee, as described in C2.2. When legal risk with potential climate-related implications is identified, the Sustainability Steering Committee is notified. If the matter is urgent, the Committee will convene to discuss and address the risk, with subsequent updates occurring at each biannual meeting. In 2017, the Wisconsin reconditioning facilities of Container Life Cycle Management LLC (CLCM), a joint venture partially owned by Greif, became subject to environmental and safety regulatory violation allegations, many of which CLCM disputes, and to odor complaints. CLCM immediately began working with the regulators to identify and address these issues and is continuing to make tangible changes to those operations. For example, CLCM raised the height of a smoke stack to immediately address odor concerns. In 2018, CLCM installed a regenerative thermal oxidizer (RTO) at the St. Francis facility intended to reduce odors emanating from the site's operations. Thermal oxidation is recognized as the most effective way to destroy odor-causing compounds and is commonly used throughout the United States for a wide variety of processes. CLCM initiated the use of the RTO in 2019 and continues to identify areas for improvement. More information on this situation is available at clcmwi.com. Greif's risk management process enabled us to quickly identify, respond to, and continue to manage any potential legal ramifications of this event.
Market	Relevant, always included	Industrial packaging customers are increasingly looking to manufacturers such as Greif to help them optimize their costs and reduce waste and emissions in their supply chain. Greif's sales and marketing teams engage with our customers daily to ensure we remain abreast of their concerns and are able to respond to them. We track Customer Satisfaction Index and Net Promoter Scores quarterly to ensure we are properly addressing customer needs and use their feedback to monitor emerging concerns. Greif formally collaborates with our customers on product development and innovation efforts to help them meet their sustainability goals. These efforts have led to the launch of a variety of products, including NexDrum and EcoBalance products lines – which increase the use of recycled materials, reduce weight and emissions compared to conventional products. Starting in 2019, we conducted one-on-one interviews with customers and will report our results in 2020. All customers have access to the Greif Green Tool, which allows them to estimate the emission impact of various Greif solutions. Our supply chain management efforts proactively reduce material use and seek to identify materials that are more environmentally friendly, including low-VOC and energy-efficient alternatives. In response to these risks, and to ensure market related risks associated with them are being actively managed, Greif set 2025 goals: (1) Using a fiscal year 2017 baseline, reduce raw materials/logistical costs used to produce current product offering by one percent; (2) Move from non-green to green material sourcing if it is economically feasible and doing so provides high quality products to our customers. The Sustainability Steering Committee (SSC) receives updates on these risks and associated programs at biannual meetings. Through the activities and teams described above, Greif identifies market-related risks related to raw materials, procurement activities, supplier relations, and competition. These risks are identified by Greif's Global Sales and Marketing, Global Sourcing and Procurement teams and Global Innovation Committee. Recommendations from these teams are Risk Process and Content Monitoring inputs and considered in our ERM process by the Risk Leader Committee, as described in C2.2. As discussed in our 2019 10k, the risk of raw material and energy price fluctuations and shortages in part due to climate related events, is a material financial risk to the business.
Reputation	Relevant, always included	Acknowledgment and management of climate risk is increasingly becoming an expectation for our current and potential customers that poses a risk of reduced demand for our products. Our Sustainability Director, who reports to the Senior Vice President, Rigid Industrial Packaging & Services and Global Sustainability and sits on both the Sustainability Steering Committee and Sustainability Management Team, is responsible for assessing and managing climate-related reputational risk through regular engagement with our stakeholders and developing communications and reporting on sustainability topics. In 2017, the SSC conducted a third-party ESG materiality assessment, identifying climate strategy, energy, and emissions among the important topics to our stakeholders. Based on the results of the assessment, Greif assigned owners to high priority ESG topics and set goals and KPIs related to high priority topics. Potential reputational risks that we identified as part of this assessment, as well as the SSC's ongoing stakeholder engagement and responsibilities, are Risk Process and Content Monitoring inputs and considered in our ERM process by the Risk Leader Committee (see C2.2). Greif has published sustainability reports since 2009 and reported in accordance with GRI Standards Core requirements since 2017. Greif has been a member of the World Business Council for Sustainable Development (WBCSD) since 2009. We engage with WBCSD quarterly, have partnered to host conferences, signed on to the organization's Manifesto for Energy Efficiency in Buildings, partnered to publish from Cradle to Grave: Greif's Life Cycle Analysis (LCA), a case study on how we implement LCA in our business, and are an active member of WBCSD's Factor 10 circular economy working group. In 2019, we collaborated with WBCSD to participate in a pilot program to further integrate climate and sustainability risks into our ERM process and joined their ReScale and Energy Solutions working groups, focused on renewable energy and climate and energy, respectively. Customer collaboration has led to the launch of a variety of products, including NexDrum and EcoBalance products lines – both of which increase the use of recycled materials, reduce weight and emissions compared to conventional products. All customers have access to the Greif Green Tool, which allows them to estimate the emission impact of various Greif solutions. In 2019, we collaborated with 10 customers using the Green Tool.
Acute physical	Relevant, always included	Risk Management and Business Continuity is a material risk for Greif that is evaluated on an ongoing basis via our ERM process (see C2.2). To ensure this risk is regularly and proactively managed, in 2017 Greif established the We Got Chu program, administered by representatives from sales, marketing, customer service, operations and logistics in conjunction with business unit leadership. The program manages risk and business continuity through inventory and production redundancy capabilities, facility risk assessments and proactive labor relations. We Got Chu outlines a Natural Disaster Recovery Protocol for each Greif production facility in NA to follow. The program outlines a 25-step process to identify customer orders that may be impacted if a disaster impacts one of our facilities, identify alternative products that meet customer specifications and facilities that are able to produce the products our customers have ordered. Through the program, each facility conducts monthly random mock disasters to ensure protocols are in place, understood, and quickly implementable. Greif's facilities undergo periodic loss control engineering inspections by our property insurance company and every 2 years Greif's highest risk facilities are third-party audited to assess natural disaster and safety risks. Inspections are conducted by engineers to identify acute physical risks to the facility and ways to reduce and control those risks. We make capital investments in our facilities to mitigate identified risks. For example, Greif recently opened a new facility in Palmyra, Pennsylvania. During the site selection process, we evaluated the risk of flooding to ensure the new facility was not located in a flood zone. We also installed a custom designed sprinkler system to best protect the facility in the unfortunate event of a fire. In 2017, Greif's North American operations were hit by hurricanes Harvey and Irma, resulting in \$5.3 million of impact to our business. Despite the impact, our risk management and business continuity practices allowed us to meet our customer commitments during recovery without declaring force majeure. No Greif facilities were directly impacted by acute physical events in 2018 or 2019, however we did complete upgrades to continue to improve our resilience should we be impacted in the future including an upgrade to the roof for one of our Houston, Texas facilities to better protect against hurricane-related wind and water damage.
Chronic physical	Relevant, always included	Chronic physical risks are evaluated as part of our long-term risk management and business continuity efforts, which is led by our Risk Leader Committee according to our ERM process, described in C2.2. Each of our business units works with the Global Strategy Team to set short- and long-term strategy around locations of operation, facility placement, and markets we serve. Climate risk is integrated into business decisions, including siting of facilities and areas of operation. Greif's facilities undergo loss control engineering inspections by our property insurance company periodically and every two years Greif's highest risk facilities are third-party audited to assess natural disaster and safety risks. Inspections are conducted by engineers and focus on identifying acute physical risks to the facility and ways to reduce and control those risks. We make capital investments in our facilities to mitigate the risks identified in these inspections and audits. For example, Greif recently opened a new facility in Pennsylvania. During the site selection process, we evaluated the risk of flooding to ensure the new facility was not located in a flood zone. We also installed a custom designed sprinkler system to best protect the facility in the unfortunate event of a fire. In 2019 we completed an upgrade to the roof for one of our Houston, Texas facilities to better protect against hurricane-related wind and water damage.

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

Chronic physical	Rising sea levels
------------------	-------------------

Primary potential financial impact

Decreased revenues due to reduced production capacity

Climate risk type mapped to traditional financial services industry risk classification

<Not Applicable>

Company-specific description

Climate change, to the extent it produces rising temperatures inducing sea level rise, may adversely impact our ability to manufacture and transport our products. Our operations include facilities in low-lying coastal areas such as Europoort, Vreeland, and Asterweg, in the Netherlands, Malaysia, and Singapore, which may be significantly impacted by sea level rise. These facilities produce many steel and plastic drums and intermediate bulk containers (IBC) products that are core to our Rigid Industrial Packaging & Services (RIPS) business, including some of Greif's sustainability tagged products (please see 4.5a) such as lightweight steel drums, NexDrum® and GCUBE IBs. Our facilities are strategically located in close proximity to our customers and seaports to minimize logistics and transportation costs, which can be significant due to the weight of raw materials that are transported in Greif packaging. Adaptations due to sea level rise may lead to increased logistics costs, production interruptions, or potentially facility relocation, each of which could disrupt Greif's strategic locations.

Time horizon

Long-term

Likelihood

Likely

Magnitude of impact

High

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

1014296000

Potential financial impact figure – minimum (currency)

<Not Applicable>

Potential financial impact figure – maximum (currency)

<Not Applicable>

Explanation of financial impact figure

18 Greif facilities, and a few of our offices, 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 the consequences of sea-level rise. A study from the European Commission's FP7 notes that "expected annual damage from flooding [in Europe] is projected to grow to around €5 bil. by the 2020s [and] €11 bil. by the 2050s." A 2008 study by the Dutch Deltacommissie estimated costs of adaptation to sea level rise increasing up to €1.6 bil./year by 2020, and €1.5 bil. through 2100. With operations and customers in these lands, Greif may bear some of these adaptation costs. Potential financial impact assumes that all Greif facilities at risk of sea level rise will need to be relocated at the full value of the facility and revenues generated from those facilities will be lost for a period of one year.

Cost of response to risk

372000

Description of response and explanation of cost calculation

Each of our business units works with the Global Strategy Team to set short- and long-term strategy around locations of operation, facility placement, and markets we serve. Climate risk is integrated into business decisions, including location of facilities and areas of operation. Greif purchases property insurance to protect assets from losses associated with fire, flood, wind storm, and earthquake. Such coverage would cover the total loss of a facility and machinery and equipment replacement costs. In addition to asset protection, Greif purchases business interruption coverage, which protects the company from loss of profits due to a loss from covered natural disasters. Business interruption coverage includes contingent coverage, protecting Greif from loss of supply of raw materials and loss of customer business provided that such losses are due to the supplier or customer sustaining a loss due to a covered natural disaster. In 2017, Greif's North American operations in Texas and Florida were hit by hurricanes Harvey and Irma, resulting in \$5.3 million of impact to our business. Despite the impact, our risk management and business continuity practices, as described above, allowed us to meet our customer commitments during recovery without declaring force majeure. In 2018 and 2019, no Greif facilities were directly impacted by acute physical events, however we did complete facility upgrades to continue to improve our resilience should we be impacted in the future. For example, Greif upgraded the roof at our Asterweg/Amsterdam facility to better protect against rainfall and install improved water outlets to better divert increasingly heavy rainfall and flooding impacts in the area. Cost of response includes spending on this, and similar, resilience-related upgrades made to the 18 Greif facilities subject to this risk. As this cost is variable from year to year, cost is provided for 2019 only.

Comment

Referenced sources include: OECD Environment Working Paper: Ranking Port Cities with High Exposure and Vulnerability to Climate Extremes; Environmental

Identifier

Risk 2

Where in the value chain does the risk driver occur?

Direct operations

Risk type & Primary climate-related risk driver

Acute physical	Increased severity and frequency of extreme weather events such as cyclones and floods
----------------	--

Primary potential financial impact

Decreased revenues due to reduced production capacity

Climate risk type mapped to traditional financial services industry risk classification

<Not Applicable>

Company-specific description

Climate change, to the extent it impacts the frequency and severity of precipitation extremes and related natural disasters— including wildfires and flooding—may impact our ability to manufacture and transport our products. Such climate-related extremes may impact our footprint in any geography at any time. Greif's Mexico and United States operations in Florida, Texas, and Louisiana are at specific risk of hurricanes and California locations are at specific risk of drought and wildfires. In 2017, Greif's North American operations were hit by hurricanes Harvey and Irma, resulting in \$5.3 million of impact to our business. Despite the impact, our risk management and business continuity practices allowed us to meet our customer commitments during recovery without declaring force majeure. In 2018 and 2019, no Greif facilities were directly impacted by acute physical events, however we did complete facility upgrades to continue to improve our resilience should we be impacted in the future. For example, in 2019 we completed an upgrade to the roof for one of our Houston, Texas facilities to better protect against hurricane-related wind and water damage.

Time horizon

Medium-term

Likelihood

Virtually certain

Magnitude of impact

High

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

3000000

Potential financial impact figure – minimum (currency)

<Not Applicable>

Potential financial impact figure – maximum (currency)

<Not Applicable>

Explanation of financial impact figure

Several of Greif's operations are subject to temporary disruptions or increased costs due to extreme weather events, including flooding and drought. A significant number of our manufacturing facilities are situated nearby our customers to minimize the impact of freight and enhance customer service. This strategy also facilitates our business contingency plans, which focus on moving production to other facilities during any business interruptions. Supplying our customer base from an alternate location may increase freight costs and/or production costs, however we are confident in our abilities to efficiently and effectively support the supply chain during any period of the interruption. A recent review of several loss events enables an estimated exposure range of \$1 million to \$3 million due to production downtime and lost revenues associated with facility closure events with a duration of less than a year. The provided financial impact is the impact of one such event at one facility.

Cost of response to risk

9550000

Description of response and explanation of cost calculation

Each of our businesses works with the Global Strategy Team to set short- and long-term strategy around locations of operation, facility placement, and markets we serve. We also assess business continuity risk and implement redundancy plans to mitigate risks related to changing physical conditions. Our operations are strategically placed to allow for redundancies throughout our operations. Greif has a proven record of quickly and efficiently shifting production to other production facilities to meet our customers' needs, which is formalized in our We Got Chu Disaster Response Program, which was put into place in 2017 during Hurricanes Harvey and Irma, which impacted our Texas and Florida operations. Greif purchases total loss property insurance to protect assets from losses associated with fire, flood, wind, storm, and earthquake. Such coverage would cover the total loss of a facility and machinery and equipment replacement costs. In addition to asset protection, Greif purchases business interruption coverage, which protects the company from loss of profits due to a loss from covered natural disasters. Business interruption coverage includes contingent coverage, protecting Greif from loss of supply of raw materials and loss of customer business provided that such losses are due to the supplier or customer sustaining a loss due to a covered natural disaster. Greif insurance covers additional costs of shipping if production is temporarily shifted due to climate related natural disasters. The provided cost of response is the amount Greif spends on total loss property insurance, which, as noted above, is made to mitigate the impact of this risk.

Comment

Identifier

Risk 3

Where in the value chain does the risk driver occur?

Upstream

Risk type & Primary climate-related risk driver

Market	Increased cost of raw materials
--------	---------------------------------

Primary potential financial impact

Increased indirect (operating) costs

Climate risk type mapped to traditional financial services industry risk classification

<Not Applicable>

Company-specific description

Greif Rigid Industrial Packaging & Services (RIPS) business, with operations in over 40 countries, accounted for 54% of our global revenue in 2019. RIPS produces multiple lines of steel drums, including our Large, Conical, and Composite steel drums product lines, placing steel among our leading raw material inputs. Accordingly, the price of steel has a significant impact on the profitability of our business. If we are unable to manage steel pricing, our margins suffer and we may not be able to offer our customers competitive prices for our products. In 2018, the price of steel fluctuated quite dramatically with the introduction of steel tariffs imported to the United States. Prices rose throughout the year, before falling in November of 2018. As trade tensions grow between the United States and China, the future cost of steel remains unclear. General Steel anticipates costs to gradually rise in 2019 and into the future, though currency instability and a slowing global economy could pose a risk (Source: 2019 Gensteel 2019 Pricing Forecast). We know that active management in the form of lightweighting and downgauging our products to reduce the use of raw materials is needed to mitigate this risk, and have taken steps to do so. Down gauging resulted in \$1 million USD in raw material savings in 2019. Our production costs are at risk of rising due to an increase of fuel, transportation, and natural gas costs. Driver shortages and increasing fuel costs increase our transportation costs. Our PPS operations, located in Riverville, VA and Massillon, OH, are heavily reliant on natural gas, which is forecasted to decrease in price as supply increases over the coming years. This impacts both our production costs, and raw material supply costs.

Time horizon

Medium-term

Likelihood

Virtually certain

Magnitude of impact

High

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

5000000

Potential financial impact figure – minimum (currency)

<Not Applicable>

Potential financial impact figure – maximum (currency)

<Not Applicable>

Explanation of financial impact figure

The financial impact is based on the aggregated results of the Greif Enterprise Risk Management committee, who have identified the potential financial impact of raw material price volatility to be approximately \$5 million. Quarterly, the risk committee evaluates the likelihood and financial impact of each risk, as described in C2.2. As part of rating the risks from (high, medium, low); respondents are asked to provide a quantitative measure of the impact. The quantitative measure is compared to the risk factors (or factors contributing to the risk rating). Financial impact is determined based on the outcome of this process, which is informed by the information detailed in the company-specific description of this risk, as well as the volume of raw materials used in Greif's operations.

Cost of response to risk

20133177

Description of response and explanation of cost calculation

Price volatility is managed by our Global Procurement and Supply Chain team as well as our innovation efforts focused on transforming our product portfolio by developing sustainable packaging solutions based on a set of 8 environmental, social, and financial sustainability criteria. Through internally-initiated solutions and collaboration with customers, our innovation efforts focus on dematerialization—producing products that are lighter weight, utilize less virgin raw materials and more recycled content and identifying safer materials including bio-based materials while continuing to meet performance requirements. In 2019, our dematerialization efforts like reductions in steel, lead to \$1 mil. in savings. Greif's line of Composite Steel Drums is produced using steel that is up to 1.5mm thinner than conventional drums. Innovation is managed by our Global Innovation Committee, comprised of representatives from each of Greif's business units (BUs). This structure facilitates idea sharing and collaboration across the enterprise, which allows ideas to serve and influence multiple BUs. The committee updates Greif's Executive Leadership Team quarterly providing progress on innovation priorities and industry megatrends that may influence investment and overall company strategy in the future. Innovation is managed by a process that evaluates and prioritizes projects based on potential financial return, sustainability impacts and overall value to Greif and our customers. Beginning in 2019, Greif began incorporating results from our internal Global Trends Report into our ERM process. Based on interviews with internal leaders and secondary research, the report identifies global trends with particular relevance to our business such as Companies are Becoming More Environmentally Friendly; Digitization & Automation of Manufacturing and supply chain and logistics. In conjunction with other internal and external sources that are considered in our ERM process, the trend report improves our ability to forecast and plan for long-term trends that may impact our business in the future. Cost of response includes \$20,033,177 mil. in R&D investments made in 2019 on sustainability tagged products that, in addition to reducing emissions and energy use, reduce Greif's reliance on virgin raw materials and \$100,000 as an estimate for the salary of Greif's procurement team that is attributable to time spent on actively managing this risk.

Comment

Cost of management includes: \$3.4 million in R&D investments made in 2018 on sustainability tagged products that, in addition to reducing emissions and energy use, reduce Greif's reliance on virgin raw materials. \$156,250 as an estimate of the salary of the Sustainability Procurement Team that is attributable to time spent on actively managing this risk.

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

In 2011, Greif conducted a screening of almost 150 customers and competitors, which found that customers are increasingly cognizant of sustainability internally and in their supply chains. 89% of customers interviewed agreed that sustainable supply chain practices will become increasingly important over the next ten years. Additionally, approximately 50% of customers interviewed agreed that sustainable packaging will become increasingly important to their customers and the importance of shipping sustainably will likely increase even more with introduction of greater fuel/energy taxes and regulation. While we regularly collaborate with our customers (see C12.1b), we reinforced this finding in our 2017 ESG materiality assessment, which identified a variety of climate and product related topics as high priority to our customers, and our 2019 Global Trends Report, which highlighted similar concerns and opportunities along our supply chain (see C2.2). As a manufacturer of industrial packaging, Greif can play a unique role in helping our customers address these changes. In many cases, empty Greif packaging must be transported to a customer to be filled, and then transported to our customer's customers for use. As such, the manufacture and transportation of Greif packaging can be areas of opportunity for companies to reduce both upstream and downstream costs and emissions. Greif works with our raw material suppliers, transportation partners, and internal teams to develop lighter weight and more energy efficient products and provide transportation and ancillary services to help our customers reduce emissions associated with our packaging (e.g. EcoBalance, NexDRUM®), as described in the estimated financial impact and strategy to realize columns. To manage logistics in an environmentally responsible manner, Greif uses carriers that are approved through the EPA's SmartWay initiative whenever possible. We include SmartWay certification during our new carrier certification process. Greif's SmartWay-approved carrier base accounts for 89 percent of ton miles traveled in NA. From 2014 to 2018, we saved 231,535 tons of CO2 mass emissions through the use of SmartWay carriers. We have begun transitioning GPS devices in our trucks to run on solar as opposed to battery power. By the end of 2019, this transition was 56 percent complete and will be completed in 2020.

Time horizon

Medium-term

Likelihood

Virtually certain

Magnitude of impact

High

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

430000000

Potential financial impact figure – minimum (currency)

<Not Applicable>

Potential financial impact figure – maximum (currency)

<Not Applicable>

Explanation of financial impact figure

In 2019, Greif realized \$430 million from sustainability-tagged products (please see C4.5a for additional information). The estimated financial impact provided is based on a conservative five percent growth rate across Greif's entire sustainability-tagged product portfolio for one year of sales.

Cost to realize opportunity

20033177

Strategy to realize opportunity and explanation of cost calculation

Greif addresses this opportunity by providing tools and collaboration opportunities that allow our customers better access and visibility to how our products impact their value chain. Greif's sustainability-driven products better enable our customers to achieve their goals and will play an increasing role in differentiating Greif from competitors. For example, our NexDRUM® plastic drum is produced with 15% less material and results in a 12% CO2 emissions reduction compared with conventional drums. Similarly, our EcoBalance product line is produced using 75% recycled plastic and reduce CO2 emissions 30-53% compared to conventional drums. GCUBE IBC reduces the carbon footprint of the bottle up to 38% and up to 11% for the entire IBC. Some products (e.g. some Jerry Cans) can be produced using 100% PCR. Our Green Tool allows customers to evaluate the environmental impact of our products and select optimal packaging solutions to mitigate emissions. We are working directly with 20 of our customers to take their current Greif product(s) and decrease the raw material input, weight, and increase the use of recycled content to create closed loops and minimize waste. In 2017, Greif established a goal to reduce raw materials/logistical costs used to produce current product offering by 1% and established formal innovation processes/teams. These teams collaborate with customers to increase the number of sustainable products in our portfolio by developing products that are lighter weight, utilize less virgin raw materials in favor of recycled materials and reduce emissions associated with our products. Cost to realize opportunity represents Greif's 2019 R&D investments in sustainability-tagged products, which can include spending on new production lines, manufacturing tooling, and/or machine or facility upgrades that are needed to more efficiently produce sustainability-tagged products, introduce or expand production capability/capacity for sustainability-tagged products, or enable production of sustainability-tagged products in new facilities, or begin producing new sustainability-tagged products. For example, Greif invested \$5.4 million to expand production capabilities for mono- and multilayer PCR drums at our Bradley and Lavonia facilities, allowing for increased production of products that both use less virgin resin and have a lower carbon footprint than similar products (please see C4.5a for all products, descriptions, and investment information).

Comment

Cost to realize opportunity represents Greif's 2019 R&D investments in sustainability-tagged products. The efforts of the teams mentioned will build on work that Greif has already done to develop products that support more sustainable supply chain practices and sustainability-driven products.

Identifier

Opp2

Where in the value chain does the opportunity occur?

Downstream

Opportunity type

Products and services

Primary climate-related opportunity driver

Shift in consumer preferences

Primary potential financial impact

Increased revenues resulting from increased demand for products and services

Company-specific description

As corporations, investors, and the general public are becoming increasingly attuned to climate change issues, industrial manufacturing clients are at risk of changing public perceptions around a company's operations and product lines. Greif, as an industrial manufacturer of products that may be perceived as energy, emissions, and waste intensive, may be adversely impacted by perceived brand and reputational risk. By developing products and services that can decrease customers' GHG emissions and waste in their value chain, and publicly communicating our sustainability commitments, Greif can set itself apart from competitors and ensure the success of its reputation. In 2017, Greif conducted our first formal materiality assessment to better inform our sustainability reporting and improve our sustainability strategy. During the process we engaged Greif's leaders and Board of Directors, customers, investors, community members, community partners, suppliers and sustainability experts to determine the impacts, risks, and opportunities that are most relevant to Greif and its stakeholders. The assessment confirmed that performance in climate strategy, waste, and water are potential areas of opportunity and differentiation. Climate strategy in particular is an area of importance to customers, who use energy and emissions as an input during supplier selection, further confirming climate-related reputation as an area of opportunity for Greif. Using data from third-party life cycle assessments, the Greif Green Tool contains energy and emissions data for all of our Rigid and Flexible Packaging products and services and allows us to collaborate with our customers to help them select packaging solutions that lower emissions and their overall carbon footprint as much as possible. In 2019, Greif used the tool to collaborate with a chemical specialty customer in Italy to identify more sustainable products for them. The analysis helped identify four projects to present to the customer – transitioning to lighter-weight jerry cans, increasing use of products with high percentages of postconsumer resin (PCR), create and coordinate closed loop packaging in Europe, and test Greif's GCUBE Track technology to optimize logistics and supply chain. The customer will be implementing one of these projects in 2020 and will continue to evaluate the remaining for implementation in 2020 or 2021. In 2019, Greif generated \$430 million in revenue from sustainability tagged products.

Time horizon

Long-term

Likelihood

Likely

Magnitude of impact

High

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

11292205

Potential financial impact figure – minimum (currency)

<Not Applicable>

Potential financial impact figure – maximum (currency)

<Not Applicable>

Explanation of financial impact figure

Positive perceptions surrounding Greif's sustainability-driven product lines could trigger an increase in stock price resulting in higher market capitalization for Greif. For example, as of December 13, 2019, Greif (GEF) had 26,260,943 outstanding shares of Class A stock trading at a value of \$43.82 per share. A 1% increase in value due to positive perception would result in an increase of \$0.43 per share, or a new stock value of \$44.25, and an increased market capitalization of \$11,292,205.

Cost to realize opportunity

300000

Strategy to realize opportunity and explanation of cost calculation

In 2016 we established board oversight of sustainability to enhance and continue developing our sustainability program and climate change initiatives. Members of our Sustainability Steering Committee maintain relationships with sustainable development organizations, including WBCSD and UNGC (of which we are a signatory) and leads our reporting efforts, including our annual CDP response and GRI-aligned sustainability report. In 2019, we collaborated with WBCSD to participate in a pilot program to further integrate climate and sustainability risks into our ERM process and joined their ReScale and Energy Solutions working groups, focused on renewable energy and climate and energy, respectively. Many of Greif's customers are also members of WBCSD and these working groups. We participate in third-party assessments (e.g. Sedex, Together for Sustainability, EcoVadis) and share our results to build trust with our stakeholders and further our reputation as a company that is committed to transparency and continuous improvement. We foster a culture of innovation that encourages sustainable product development and considers the end-of-life of our products. After conducting LCAs on our entire rigid and flexible products and services lines, we created Earthminded LCS, which recollects, reconditions and enables reuse of used industrial containers, and developed the Greif Green Tool, which allows customers to identify and choose Greif products that mitigate the emissions impact of their industrial packaging. Product innovation, including incorporating sustainability factors into our products, is managed by our Global Innovation Committee, comprised of representatives from each Greif business unit and is responsible for driving collaboration and idea sharing across and within business units. The committee updates Greif's Executive Leadership Team (ELT) quarterly on progress on innovation priorities and industry megatrends that may influence investment and company strategy in the future. Greif manages innovation through a process that evaluates and prioritizes projects based on potential financial return, sustainability impacts and overall value to Greif and our customers. Cost to realize opportunity includes updates to the Green Tool, membership dues to sustainable development organizations (e.g. WBCSD), costs for completing sustainability assessments (e.g. EcoVadis), and costs related to sustainability reporting (e.g. Greif's annual GRI report and data verification).

Comment**Identifier**

Opp3

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Resource efficiency

Primary climate-related opportunity driver

Use of more efficient production and distribution processes

Primary potential financial impact

Reduced indirect (operating) costs

Company-specific description

The cost of producing and transporting our products is sensitive to the price of energy. Energy prices, in particular oil and natural gas, have fluctuated in recent years, with a corresponding effect on our production costs. Potential legislation, regulatory action and international treaties related to climate change may result in increases to energy costs. To date, at least 40 countries and 24 subnational regions (states, provinces, etc.) have already or are scheduled to soon make polluters pay with a national or regional price on carbon, including 12 where Greif currently operates: Poland, Sweden, Denmark, Ukraine, France, Spain, Portugal, South Africa, Singapore, Colombia, Chile and Argentina. Since 1997, there has been a 20-fold increase in the number of global climate change laws, according to the most comprehensive database of relevant policy and legislation (Source: Mapped: Climate change laws around the world). We believe it is likely that the scientific and political attention to issues concerning the extent and causes of climate change will continue, with the potential for further regulations that could affect our operations and financial condition. Foreign, federal, state and local regulatory bodies have proposed various measures relating to climate change, regulating GHG emissions and energy policies (for example, California expanded its cap-and-trade program to cover 85% of GHG emissions, impacting 11 Greif facilities in California. In China, at least 9 regulatory changes are impacting our operations (China accounts for 2.0% of Greif's Scope 1 emissions), including reductions in hazardous fine particulate matter, capping of particulate matter, and increased air pollution inspections. Examples of these regulations include the Integrated Emission Standards for Air Pollutants and Volatile Organic Compound Emission Standards. Due to these changes in legislation/regulation, we could incur increased energy, environmental and other costs and capital expenditures to comply with the limitations. Failure to comply with these regulations could result in fines to our company and could negatively affect our business, however also afford us the opportunity to proactively improve our energy efficiency, thereby reducing our costs and exposure to these risks. We have entered into short-term contracts to hedge certain of our energy costs, but are also taking more permanent measures that positively impact our business like investing in renewable energy.

Time horizon

Medium-term

Likelihood

Virtually certain

Magnitude of impact

High

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

10000000

Potential financial impact figure – minimum (currency)

<Not Applicable>

Potential financial impact figure – maximum (currency)

<Not Applicable>

Explanation of financial impact figure

We are increasing the use of renewables across our business, both through investments in our direct operations and sourcing renewables via energy contracts. The total impact of these programs is estimated annually as we develop facility-level energy roadmaps identifying energy efficiency projects to be completed in the following year. In North America alone we have installed more than 2,000 solar panels, delivering 2.7 mil. kilowatt hours (kWh) of energy and saving more than \$100,000 annually. Throughout our China operations, we source renewable energy through 4,800 solar panels via energy purchase contracts. We are also investing in more energy efficient equipment in our operations. In 2019, we completed 84 projects resulting in \$2.7 million in savings, including installation of a new boiler in our Fitchburg, Massachusetts mill saving \$324,000 and 15 million kWh annually. In working to achieve our 2020 energy and emissions goal, we estimate a \$10 mil. savings opportunity annually.

Cost to realize opportunity

8238581

Strategy to realize opportunity and explanation of cost calculation

Greif set a 2020 goal to achieve 10 percent reduction in energy and GHG emissions per unit of production, from a fiscal 2014 baseline. Greif's Sustainability Steering Committee (SSC) is responsible for developing strategies and overseeing tactics to drive progress against this goal. The SSC guides the activities of our Sustainability Management Team and Global Energy Team. Since 2010 Greif has maintained a Global Energy Team, currently consisting of 25 members, that is responsible for coordinating energy and emissions reduction projects throughout the company and identifying specific operational risks and opportunities that can contribute to meeting Greif's energy and emission goals. In 2019, we restructured the team to place an increased emphasis on including regional leadership to better engage and identify energy opportunities within each business unit and include legacy Carastar facilities. This change in structure has allowed us to streamline our energy roadmap process to focus on and invest in the business units and facilities that have the most impactful energy opportunities. For example, in 2019, Greif's Tri-Sure facility in Carol Stream collaborated with Rigid Industrial Packaging & Services (RIPS) North America purchasing, RIPS Italy and four RIPS NA plants to source 800,000 pounds of recycled plastic resins to use in the production of IBC rear/corner feet and corner protectors. This internal sourcing strategy reduced costs by \$100,000. The team also reused empty corrugated bulk boxes to ship the recycled products they manufacture, reducing corrugated bulk box purchases by 84 percent. The project created company value and established environmental and financial benefits, while closing two internal loop systems and contributing to our circular economy and emissions reduction initiatives by reducing virgin raw materials used, diverting waste from landfills and finding a new purpose for them. Due to the outstanding sustainability impact of the project and its ability to be scaled to other molding and injection molding facilities, the project and Tri-Sure Carol Stream team was awarded the 2019 Michael J. Gasser Sustainability Award. Cost to realize opportunity is presented for FY2019 only, representing the cost of implementing energy projects for the fiscal year. We estimate a \$10 million savings opportunity annually through our efforts to increase our resource efficiency through renewables and energy savings projects.

Comment

Cost to realize opportunity is presented for FY2019 only. We estimate a \$10 million savings opportunity annually through our efforts to increase our resource efficiency through renewables and energy savings projects.

C3. Business Strategy

C3.1

(C3.1) Have climate-related risks and opportunities influenced your organization's strategy and/or financial planning?

Yes

C3.1a

(C3.1a) Does your organization use climate-related scenario analysis to inform its strategy?

No, but we anticipate using qualitative and/or quantitative analysis in the next two years

C3.1c

(C3.1c) Why does your organization not use climate-related scenario analysis to inform its strategy?

Climate-related weather impacts are consistently included in Greif's Enterprise Risk Management process and are factored into our Sales and Operations Planning process (S&OP), including selecting sites for our new facilities and planning maintenance and upgrades to our existing facilities. Every two years Greif's highest risk facilities are third-party audited to assess natural disaster and safety risks. In addition, Greif's facilities undergo loss control engineering inspections by our property insurance company periodically. Inspections are conducted by engineers and focus on identifying acute physical risks to the facility and ways to reduce and control those risks. We make capital investments in our facilities to mitigate the risks identified in these inspections and audits. For example, Greif recently opened a new facility in Pennsylvania. During the site selection process, we evaluated the risk of flooding to ensure the new facility was not located in a flood zone. We also installed a custom designed sprinkler system to best protect the facility in the unfortunate event of a fire. Our global procurement team has worked to establish supplier and supply chain redundancies to ensure consistency of supply. We also have a formalized natural disaster response plan, We Got Chu, which is tested in each facility monthly. Our natural disaster response plan was put into place in 2017 during Hurricanes Harvey and Irma, which impacted our Texas and Florida operations. Despite these facilities experiencing manufacturing shut-downs, our business continuity and risk planning efforts allowed us to meet all customer commitments through the events. While we are proud of the protocols we've put in place, we understand and realize that a formal scenario analysis can only serve to improve our climate-related risk and opportunity assessments and mitigation and adaptation plans. To-date, performing a comprehensive scenario analysis has been cost prohibitive and competing demands for resources within our organization have prevented us from conducting one. In 2018, we started vetting scenario analysis frameworks. In 2019 we developed plans to conduct phase 1 and phase 2 assessments and intend on conducting that work within the next two years.

C3.1d

(C3.1d) 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	<p>Greif's products and services are impacted by each risk and opportunity identified. Mitigating raw material price volatility is one of the primary goals of our efforts to lightweight and downgauge our product lines. The core of this effort is reducing the amount of virgin raw materials used in our products, which directly impacts our exposure to this risk. Down gauging resulted in \$1 mil. in raw material savings in 2019. Our products are impacted by the risk of sea level rise and change in precipitation extremes. 18 of Greif's production facilities are located in areas at risk for flooding due to sea level rise. In 2019, these facilities accounted for over \$455 mil. in revenue. Greif's business continuity and disaster response program, We Got Chu, mandates that all products must be able to be co-produced at multiple facilities so that we can service customer orders in the event of a shut-down. Greif's production and transportation services must account for the potential that products may be produced and shipped from back-up production facilities. Each Greif product benefits from our energy efficiency programs as a result of lowered operating expenses impacting our 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 2019, we completed 84 projects, and commenced two more, leading to an 86,000 metric ton reduction in CO2e, and saving \$2.76 mil. 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 2019, Greif realized \$430 mil. in revenues from 17 product and service lines as sustainable. Our products and services are impacted by our reputation to the extent that we can effectively communicate and prove the benefits to the market/customers. The Greif Green Tool allows our 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. Since being developed, over 80 customers have used the tool.</p>
Supply chain and/or value chain	Yes	<p>Greif's upstream and downstream value chain is impacted by sea level rise and changes in precipitation extremes and drought risk. These risks could result in temporary shut-downs, or long-term relocations, particularly in the case of sea level rise. Our sourcing and procurement strategy is highly dependent on sourcing raw materials in close proximity to our production facilities. Operational changes could lead to changes in spending patterns with suppliers, including short-term reductions in spend and long-term elimination of suppliers. Price volatility may impact suppliers in the event Greif identifies favorable pricing for like materials with alternate suppliers. Conversely, Greif's inability to control pricing could lead to reduced margins, or increased prices to our customers. Supplier performance against our supply chain goals; to reduce 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 our customers by the end of fiscal year 2025, account for 5% of our supplier scorecard. Greif's innovation efforts offer positive impact to our customers, who may experience lowered prices (for Greif products and transportation), increased performance, and/or reduced environmental impact for product changes, but can cause negative impact to suppliers, particularly through our light weighting and downgauging programs. For example, in FY 2019, Greif reduced raw material use by 0.001%, resulting in \$1 million less in spending with our suppliers. That is due to gauge reduction, inventory reductions (less demand), switching to water-based paints, etc. Greif's energy efficiency improvements positively impact our customers in the form of reduced Scope 3 emissions as well as improving their reputation of working with sustainable suppliers. In 2019, our Los Angeles and Fitchburg mills engaged in one time sales of emissions reduction credits valued at over \$1 million. Our NexDrum product offers 12% reduction in emissions, which can benefit emissions reporting for our downstream stakeholders. Our focus on energy efficiency and emissions reductions extends to our suppliers whom we request respond to the extensive ESG EcoVadis supplier questionnaire and comply with our Supplier Code of Conduct which sets climate-related expectations.</p>
Investment in R&D	Yes	<p>Greif makes investments in R&D to develop products that protect against raw material price volatility, reduce our Scope 3 greenhouse gas emissions and waste to landfill and allow us to address opportunities related to changing customer preferences and reputation. Greif's product development and innovation efforts are supported by R&D investments to develop products that reduce our 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 2019, Greif invested approximately 20 million in R&D for our sustainability-tagged products, which represent approximately 9% (\$430 million) of Greif's revenues. Down gauging and increasing the use of PCR in our products directly reduces the raw materials required to produce our products, such as the DoubleGreen product line Jerrycan, which is produced using 28.5% less polyethylene resin than comparable cans and uses bioplastics, and EcoBalance™ product line made using 75% PCR, including some Jerrycans that can be made with 100% PCR. We also invest in R&D to develop new production methods, in part to support producing such products. For example, to produce our NexDRUM plastic drum, we 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 our standard blow molded plastic drum. Since these types of R&D investments directly lead to a reduction in raw materials needed to produce our products, our exposure to raw material price volatility is reduced. In 2019, we realized \$1 million in savings from our downgauging program. These types of investments directly address changes in customer preferences and our reputation. The products developed through our R&D investments, such as those described above, address our customers' increasing demand for more sustainable, reduced emissions and lighter weight products. Promoting and discussing these products through our Products and Services page and Innovation and Supply Chain Management pages of our sustainability report enhance our reputation as an aware and responsible steward of the climate.</p>
Operations	Yes	<p>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, and North Carolina in the United States. Greif's disaster response program, We Got Chu, 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. As an asset-heavy industrial manufacturer, we have significant energy efficiency opportunities in our direct operations. Our Sustainability Steering Committee and Sustainability Management Team work with our Global Energy Team to develop annual project roadmaps identifying energy efficiency opportunities at each Greif facility. In 2019, 84 energy efficiency projects with a combined impact of 66 mil. kWh and \$2.76 million in savings were identified across Greif's operations. For example, Greif's Fitchburg, Massachusetts mill installed a new boiler resulting in savings of \$324,000 and 15 million kWh annually. Our commitment to transparency to support our reputation impacts our operations through third party audits and management of our Environmental Management System (EMS). Greif participates in third-party audits at the request of our customers to establish, protect, maintain, and publicly communicate our practices. Through the end of 2019, Greif participated in 13 third-party audits conducted by Sedex and Together for Sustainability, including evaluation of our energy and emission use and environmental compliance systems. Realizing our opportunity in changing customer expectations requires our operations to develop new production capabilities, invest in new production equipment and add new products to their production lines. For example, in 2018 we introduced a UN-certified PCR drum. This could only be initially produced in one Illinois facility. In 2019, we expanded production to our Hazelton, Houston and Lavonia facilities in North America.</p>

C3.1e

(C3.1e) 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 Capital expenditures Capital allocation Acquisitions and divestments Access to capital Assets Liabilities	<p>Climate related risks and opportunities influence all elements of Greif's financial planning. Greif's opportunity in changing customer behavior has factored into our revenues forecast through a predicted shift in product mix from conventional to sustainable and/or low emission products (e.g. NexDRUM, see 2.4a). Revenue can also be impacted by raw material price volatility. In the event raw material prices lead to increased prices to our customers, we are at risk of losing their business. We reduce our exposure to this risk and address the customer behavior opportunity, in part, through our efforts to lightweight and downgauge our product lines. In doing so, we offset potential revenue losses from conventional packaging and addressing market demand, providing revenue growth. Revenue from Greif's sustainability-tagged products totaled over \$430M, 9% of total revenue in 2019. We have forecasted 2 to 24% annual growth for select sustainability-tagged products. 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. We have accounted for this in our financial planning process by establishing a natural disaster response protocol, We Got Chu (WGC), mandating that all of our 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, WGC outlines our processes for fulfilling customer orders at back-up production facilities. Changes in production and shipping locations have meaningful impacts on our transportation costs, both incoming for raw materials and outgoing to our customer locations. Climate-related weather impacts are included in Greif's Enterprise Risk Management process and factored into our Sales and Operations Planning process (S&OP), including planning maintenance and upgrades to our existing facilities. Every two years Greif's highest risk facilities are third-party audited for natural disaster and safety risks. Based on audit findings, Greif makes capital investments to address those risks, such as upgrading the roof in one of our Houston, Texas facilities to better protect against wind and water damage that was caused by hurricanes. Capital expenditure decisions such as these, including supply chain and infrastructure projects that support business continuity and address climate related risks, are formally part of our financial planning process. Our global procurement team has worked to establish supplier/supply chain redundancies to ensure consistency of supply. Greif was most recently impacted by natural disasters in 2017, when our North American operations were impacted by changes in precipitation/extreme weather events and WGC was implemented in response. Our production facilities in Texas and Florida were hit by hurricanes Harvey and Irma, resulting in \$5.3 million of impact to our business, including damages to our fixed manufacturing assets. In recovering from these events, facility upgrades were considered, per our S&OP. Executing on our energy efficiency opportunity requires the investment of financial capital, impacts our manufactured capital and directly impacts our operating costs. Since capturing energy efficiency opportunities involves replacing manufacturing equipment in our production facilities and changes the amount and cost of energy used in our manufacturing processes, realizing our energy efficiency opportunities impacts our manufactured capital. In 2019, Greif invested \$8,238,581 in capital expenditures to complete 84 energy efficiency projects, saving 88,000 metric tons of CO2e and \$2.76 million annually. Innovation efforts undertaken to capture changing customer preferences have led to intellectual property assets. For example, to produce our NexDRUM plastic drum, we developed a proprietary injection and welding production 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 our standard blow molded plastic drum. Liabilities associated with environmental, health and safety claims that may arise from damages resulting from sea level rise or extreme weather events are covered by Greif's comprehensive insurance policies, which attempt to mitigate Greif's financial exposure in the event of these risks were to occur. We have made approximately \$9.55 million in expenditures on insurance policies to protect against the financial impacts of these risks. Greif purchases total loss property insurance to protect assets (facilities, machinery and equipment) from losses associated with fire, flood, windstorm and earthquakes. Greif purchases business interruption coverage, which protects from loss of profits due to a loss from covered natural disasters, including contingent coverage, protecting Greif from loss of supply of raw materials and customer business provided that such losses are due to the supplier or customer sustaining a loss due to a covered natural disaster, and covers additional costs of shipping if production is temporarily shifted due to climate related natural disasters. Greif has allocated human and financial capital to address changing customer expectations and our reputational opportunity. Our Sustainability Steering Committee (described in 1.2a) has access to financial capital to make investments in enhancing our sustainability reputation, including partnerships with organizations such as the World Business Council for Sustainable Development, building climate-related social and human capital in the organization, which is used to communicate with our stakeholders on a day-to-day basis, thereby helping us capture our reputational opportunity. For example, in 2017, the SSC conducted a third-party ESG materiality assessment, identifying climate strategy, energy, and emissions among the important topics to our stakeholders. Based on the results of the assessment, Greif assigned owners to high priority ESG topics and set goals and KPIs related to them, which informed the development of our 2017 Sustainability report, published in accordance with GRI Standards Core reporting requirements. Our Sustainability Report has been published in accordance with these requirements each year since. Financial planning, including all elements discussed above, is conducted annually and forecasted ahead 3-5 years.</p>

C3.1f

(C3.1f) Provide any additional information on how climate-related risks and opportunities have influenced your strategy and financial planning (optional).

C4. Targets and performance

C4.1

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

Intensity target

C4.1b

(C4.1b) Provide details of your emissions intensity target(s) and progress made against those target(s).

Target reference number

Int 1

Year target was set

2015

Target coverage

Company-wide

Scope(s) (or Scope 3 category)

Scope 1+2 (location-based)

Intensity metric

Metric tons CO2e per unit of production

Base year

2014

Intensity figure in base year (metric tons CO2e per unit of activity)

100

% of total base year emissions in selected Scope(s) (or Scope 3 category) covered by this intensity figure

100

Target year

2020

Targeted reduction from base year (%)

10

Intensity figure in target year (metric tons CO2e per unit of activity) [auto-calculated]

90

% change anticipated in absolute Scope 1+2 emissions

-24.6

% change anticipated in absolute Scope 3 emissions

5.7

Intensity figure in reporting year (metric tons CO2e per unit of activity)

89

% of target achieved [auto-calculated]

110

Target status in reporting year

Achieved

Is this a science-based target?

No, but we anticipate setting one in the next 2 years

Please explain (including target coverage)

Greif has tailored its greenhouse gas reduction program and targets to meet its unique business needs. Our 10% emissions intensity reduction target is calculated based on performance at each facility and each of our business units. Final corporate emissions intensity figures are based on a consolidated emissions performance from each facility and business unit. Emissions intensity figures reported here represent normalized progress against our actual emissions intensity in our base year. Greif has achieved 110% of our target and therefore exceeded the FY2020 target in FY2019.

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	1	149
To be implemented*	6	116
Implementation commenced*	1	0
Implemented*	84	14842
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 production processes	Machine/equipment replacement
---	-------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

2865

Scope(s)

Scope 1

Voluntary/Mandatory

Voluntary

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

324000

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

2278190

Payback period

4-10 years

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization
---	----------------------

Estimated annual CO2e savings (metric tonnes CO2e)

2137

Scope(s)

Scope 1

Voluntary/Mandatory

Voluntary

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

22815

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

0

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement
---	-------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

1884

Scope(s)

Scope 1

Voluntary/Mandatory

Voluntary

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

124250

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

3413302

Payback period

>25 years

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in buildings	Lighting
--------------------------------	----------

Estimated annual CO2e savings (metric tonnes CO2e)

1723

Scope(s)

Scope 1

Voluntary/Mandatory

Voluntary

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

5750

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

15000

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization
---	----------------------

Estimated annual CO2e savings (metric tonnes CO2e)

862

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

204000

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

0

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in buildings	Motors and drives
--------------------------------	-------------------

Estimated annual CO2e savings (metric tonnes CO2e)

617

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

67000

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

7000

Payback period

<1 year

Estimated lifetime of the initiative

6-10 years

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization
---	----------------------

Estimated annual CO2e savings (metric tonnes CO2e)

322

Scope(s)

Scope 1

Voluntary/Mandatory

Voluntary

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

14460

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

0

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in buildings	Lighting
--------------------------------	----------

Estimated annual CO2e savings (metric tonnes CO2e)

310

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

41343

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

90000

Payback period

1-3 years

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization
---	----------------------

Estimated annual CO2e savings (metric tonnes CO2e)

273

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

137602

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

0

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment**Initiative category & Initiative type**

Energy efficiency in buildings	Lighting
--------------------------------	----------

Estimated annual CO2e savings (metric tonnes CO2e)

269

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

35000

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

30000

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment**Initiative category & Initiative type**

Energy efficiency in buildings	Lighting
--------------------------------	----------

Estimated annual CO2e savings (metric tonnes CO2e)

235

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

43000

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

180000

Payback period

4-10 years

Estimated lifetime of the initiative

6-10 years

Comment**Initiative category & Initiative type**

Energy efficiency in production processes	Process optimization
---	----------------------

Estimated annual CO2e savings (metric tonnes CO2e)

220

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

18087

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

0

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement
---	-------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

215

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

33000

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

260000

Payback period

4-10 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)

170

Scope(s)

Scope 1

Voluntary/Mandatory

Voluntary

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

63240

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

6000

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement
---	-------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

126

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

14288

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

17146

Payback period

4-10 years

Estimated lifetime of the initiative

6-10 years

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Reuse of steam
---	----------------

Estimated annual CO2e savings (metric tonnes CO2e)

126

Scope(s)

Scope 1

Voluntary/Mandatory

Voluntary

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

75000

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

35000

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization
---	----------------------

Estimated annual CO2e savings (metric tonnes CO2e)

119

Scope(s)

Scope 1

Voluntary/Mandatory

Voluntary

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

79004

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

42000

Payback period

1-3 years

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement
---	-------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

115

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

12929

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

6300

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in buildings	Heating, Ventilation and Air Conditioning (HVAC)
--------------------------------	--

Estimated annual CO2e savings (metric tonnes CO2e)

109

Scope(s)

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

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

86868

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

20000

Payback period

<1 year

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)

108

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

12396

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

21622

Payback period

1-3 years

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement
---	-------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

106

Scope(s)

Scope 1

Voluntary/Mandatory

Voluntary

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

6972

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

120000

Payback period

16-20 years

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement
---	-------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

101

Scope(s)

Scope 1

Voluntary/Mandatory

Voluntary

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

9187

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

22000

Payback period

1-3 years

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization
---	----------------------

Estimated annual CO2e savings (metric tonnes CO2e)

88

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

34240

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

0

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization
---	----------------------

Estimated annual CO2e savings (metric tonnes CO2e)

88

Scope(s)

Scope 1

Voluntary/Mandatory

Voluntary

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

13500

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)

86

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Mandatory

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

28192

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)

85

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

10000

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

8000

Payback period

1-3 years

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement
---	-------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

84

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

10700

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

56000

Payback period

4-10 years

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in buildings	Lighting
--------------------------------	----------

Estimated annual CO2e savings (metric tonnes CO2e)

80

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

11748

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

29500

Payback period

1-3 years

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement
---	-------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

77

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

11009

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

114900

Payback period

11-15 years

Estimated lifetime of the initiative

11-15 years

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Waste heat recovery
---	---------------------

Estimated annual CO2e savings (metric tonnes CO2e)

76

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

7320

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

7000

Payback period

<1 year

Estimated lifetime of the initiative

6-10 years

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization
---	----------------------

Estimated annual CO2e savings (metric tonnes CO2e)

74

Scope(s)

Scope 1

Voluntary/Mandatory

Voluntary

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

9380

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

0

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment**Initiative category & Initiative type**

Energy efficiency in production processes	Process optimization
---	----------------------

Estimated annual CO2e savings (metric tonnes CO2e)

70

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

27000

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

0

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment**Initiative category & Initiative type**

Energy efficiency in production processes	Machine/equipment replacement
---	-------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

59

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

31104

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

21000

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment**Initiative category & Initiative type**

Energy efficiency in production processes	Machine/equipment replacement
---	-------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

58

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

8764

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

5500

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in buildings	Lighting
--------------------------------	----------

Estimated annual CO2e savings (metric tonnes CO2e)

58

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

10284

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

52826

Payback period

4-10 years

Estimated lifetime of the initiative

6-10 years

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization
---	----------------------

Estimated annual CO2e savings (metric tonnes CO2e)

54

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Mandatory

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

3062

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	Product or service design
---	---------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

53

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Mandatory

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

19000

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

400000

Payback period

>25 years

Estimated lifetime of the initiative

21-30 years

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Compressed air
---	----------------

Estimated annual CO2e savings (metric tonnes CO2e)

51

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Mandatory

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

8910

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)

51

Scope(s)

Scope 1

Voluntary/Mandatory

Voluntary

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

4374

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

0

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization
---	----------------------

Estimated annual CO2e savings (metric tonnes CO2e)

49

Scope(s)

Scope 2 (market-based)

Voluntary/Mandatory

Mandatory

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

10739

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

0

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in buildings	Heating, Ventilation and Air Conditioning (HVAC)
--------------------------------	--

Estimated annual CO2e savings (metric tonnes CO2e)

46

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

11500

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

23000

Payback period

1-3 years

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement
---	-------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

45

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

119603

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

15000

Payback period

1-3 years

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization
---	----------------------

Estimated annual CO2e savings (metric tonnes CO2e)

44

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

24161

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

20000

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization
---	----------------------

Estimated annual CO2e savings (metric tonnes CO2e)

43

Scope(s)

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

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

12000

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	Motors and drives
---	-------------------

Estimated annual CO2e savings (metric tonnes CO2e)

42

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

6470

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

19500

Payback period

1-3 years

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)

41

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

7260

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

35286

Payback period

4-10 years

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)

39

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

6878

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

20000

Payback period

1-3 years

Estimated lifetime of the initiative

6-10 years

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization
---	----------------------

Estimated annual CO2e savings (metric tonnes CO2e)

35

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Mandatory

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

7325

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	Cooling technology
---	--------------------

Estimated annual CO2e savings (metric tonnes CO2e)

33

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

7144

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

0

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement
---	-------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

29

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

4381

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

26073

Payback period

4-10 years

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Reuse of steam
---	----------------

Estimated annual CO2e savings (metric tonnes CO2e)

23

Scope(s)

Scope 1

Voluntary/Mandatory

Voluntary

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

35000

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

30000

Payback period

1-3 years

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement
---	-------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

21

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

7731

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

5000

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in buildings	Heating, Ventilation and Air Conditioning (HVAC)
--------------------------------	--

Estimated annual CO2e savings (metric tonnes CO2e)

18

Scope(s)

Scope 1

Voluntary/Mandatory

Voluntary

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

5500

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

550

Payback period

<1 year

Estimated lifetime of the initiative

21-30 years

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Motors and drives
---	-------------------

Estimated annual CO2e savings (metric tonnes CO2e)

18

Scope(s)

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

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

44072

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

34292

Payback period

1-3 years

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement
---	-------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

16

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Mandatory

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

6500

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)

13

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Mandatory

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

0

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)

12

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

11185

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

5000

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in buildings	Lighting
--------------------------------	----------

Estimated annual CO2e savings (metric tonnes CO2e)

11

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

2295

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

1000

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in buildings	Lighting
--------------------------------	----------

Estimated annual CO2e savings (metric tonnes CO2e)

9

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

800

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

11500

Payback period

11-15 years

Estimated lifetime of the initiative

21-30 years

Comment

Initiative category & Initiative type

Energy efficiency in buildings	Motors and drives
--------------------------------	-------------------

Estimated annual CO2e savings (metric tonnes CO2e)

8

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

3500

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

4000

Payback period

1-3 years

Estimated lifetime of the initiative

21-30 years

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement
---	-------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

6

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

754

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

23604

Payback period

>25 years

Estimated lifetime of the initiative

11-15 years

Comment

Initiative category & Initiative type

Energy efficiency in buildings	Heating, Ventilation and Air Conditioning (HVAC)
--------------------------------	--

Estimated annual CO2e savings (metric tonnes CO2e)

4

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

701

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

41698

Payback period

>25 years

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Machine/equipment replacement
---	-------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

4

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

550

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

2200

Payback period

4-10 years

Estimated lifetime of the initiative

21-30 years

Comment

Initiative category & Initiative type

Energy efficiency in buildings	Lighting
--------------------------------	----------

Estimated annual CO2e savings (metric tonnes CO2e)

4

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

1900

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

2530

Payback period

1-3 years

Estimated lifetime of the initiative

1-2 years

Comment

Initiative category & Initiative type

Energy efficiency in buildings	Lighting
--------------------------------	----------

Estimated annual CO2e savings (metric tonnes CO2e)

4

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

670

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

1100

Payback period

1-3 years

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in buildings	Heating, Ventilation and Air Conditioning (HVAC)
--------------------------------	--

Estimated annual CO2e savings (metric tonnes CO2e)

4

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

45000

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

297233

Payback period

4-10 years

Estimated lifetime of the initiative

11-15 years

Comment

Initiative category & Initiative type

Energy efficiency in buildings	Heating, Ventilation and Air Conditioning (HVAC)
--------------------------------	--

Estimated annual CO2e savings (metric tonnes CO2e)

4

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

5000

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

35681

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)

Scope 2 (location-based)

Voluntary/Mandatory

Mandatory

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

0

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)

2

Scope(s)

Scope 1

Voluntary/Mandatory

Mandatory

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

2303

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)

1

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

1680

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

19269

Payback period

16-20 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)

1

Scope(s)

Scope 1

Voluntary/Mandatory

Voluntary

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

1404

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

0

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in buildings	Lighting
--------------------------------	----------

Estimated annual CO2e savings (metric tonnes CO2e)

1

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

178

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

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment**Initiative category & Initiative type**

Energy efficiency in production processes	Machine/equipment replacement
---	-------------------------------

Estimated annual CO2e savings (metric tonnes CO2e)

0.16

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

22328

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

15945

Payback period

<1 year

Estimated lifetime of the initiative

11-15 years

Comment**Initiative category & Initiative type**

Energy efficiency in buildings	Heating, Ventilation and Air Conditioning (HVAC)
--------------------------------	--

Estimated annual CO2e savings (metric tonnes CO2e)

0.16

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

350

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

350

Payback period

1-3 years

Estimated lifetime of the initiative

Ongoing

Comment**Initiative category & Initiative type**

Energy efficiency in buildings	Heating, Ventilation and Air Conditioning (HVAC)
--------------------------------	--

Estimated annual CO2e savings (metric tonnes CO2e)

0.09

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

1764

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

200

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in buildings	Lighting
--------------------------------	----------

Estimated annual CO2e savings (metric tonnes CO2e)

0.02

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

11

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

14724

Payback period

4-10 years

Estimated lifetime of the initiative

3-5 years

Comment

Initiative category & Initiative type

Energy efficiency in buildings	Lighting
--------------------------------	----------

Estimated annual CO2e savings (metric tonnes CO2e)

0

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

1

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

650

Payback period

4-10 years

Estimated lifetime of the initiative

3-5 years

Comment

Initiative category & Initiative type

Energy efficiency in buildings	Heating, Ventilation and Air Conditioning (HVAC)
--------------------------------	--

Estimated annual CO2e savings (metric tonnes CO2e)

0

Scope(s)

Scope 1

Voluntary/Mandatory

Voluntary

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

76000

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

152700

Payback period

1-3 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)

0

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

109697

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

60125

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

Initiative category & Initiative type

Energy efficiency in production processes	Process optimization
---	----------------------

Estimated annual CO2e savings (metric tonnes CO2e)

0

Scope(s)

Scope 1

Voluntary/Mandatory

Mandatory

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

702

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)

0

Scope(s)

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

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

0

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

0

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)

0

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

0

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	Process optimization
---	----------------------

Estimated annual CO2e savings (metric tonnes CO2e)

0

Scope(s)

Scope 1

Voluntary/Mandatory

Voluntary

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

0

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)

0

Scope(s)

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

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

0

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

0

Payback period

1-3 years

Estimated lifetime of the initiative

6-10 years

Comment

C4.3c

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

Method	Comment
Internal finance mechanisms	We integrate environmental aspects of our business into our overall business strategy, including mergers and acquisitions, 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 our SBUs provide financial incentives to facilities that reduce energy consumption.
Internal incentives/recognition programs	In 2014, Greif introduced the Plant Olympics 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, 5S 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.
Employee engagement	Sustainability is a pillar of The Greif Way and plays a key role in driving our business strategy, management and operations. Energy reduction goals are embedded into employee performance reviews throughout the organization, from executive leadership and SVPs to facility managers. Employees are encouraged to incorporate best practices in energy efficiency into their day-to-day operations both at work and at home. Every year, we provide challenges and contests for our employees to reduce energy in our facilities and elsewhere. In our EMEA operations, we offer financially subsidized bicycles to employees to lower emissions and improve the health of our commuters. Our Flexible Products and Services (FPS) Hadımköy facility in Turkey developed a sustainability program that focuses on employee engagement. They've identified various success criteria for the plant, including energy and scrap reduction. All employees engaged in monthly meetings to generate improvement ideas. The plant evaluated the ideas, selected projects to implement, set success criteria, and tracked progress monthly. Employees' premiums were tied to the achievement of the identified success criteria. Through the program, the plant reduced their scrap ratio from 12.1 to 10.2 percent, resulting in a 328,000 kWh reduction in energy use, for example, if the plant scrap rate rose above 10.5%, premiums decreased. In 2019, the collective efforts from our five-week "Greif Going Green" initiative resulted in nearly 600 trees planted and 42,000 pounds of trash collected. During the five weeks leading up to Earth Day colleagues were challenged to get out in the community to make a positive difference for the environment. A total of 1,320 Greif colleagues from 16 countries participated, with the efforts totaling 103 hours of volunteering. In 2019 we launched our Serious About Sustainability colleague engagement program in North America aimed at sharing more detailed energy information with our colleagues for the facilities where they work and identifying both projects and everyday opportunities to impact our energy use. Facilities that signed up to the program participated in a three-month competition to reduce energy usage. The three winning facilities received a certificate and catered lunch in recognition of their efforts. We are excited to continue offering and expanding this program in 2020.

C4.5

(C4.5) Do you classify any of your existing goods and/or services as low-carbon products or do they enable a third party to avoid GHG emissions?

Yes

C4.5a

(C4.5a) Provide details of your products and/or services that you classify as low-carbon products or that enable a third party to avoid GHG emissions.

Level of aggregation

Product

Description of product/Group of products

Injected IBC plastic pallet (GCube) The injected Intermediate Bulk Container (IBC) plastic pallet is a (new) plastic pallet design for the GCube-IBC product range at Greif. It supersedes the old plastic pallet design. Compared to the old pallet design, the new pallet is now made of 100% recycled HDPE. At the same time, the new pallet design is also recyclable, as it can be easily disassembled.

Are these low-carbon product(s) or do they enable avoided emissions?

Low-carbon product

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify (Third-party lifecycle assessments.)

% revenue from low carbon product(s) in the reporting year

0.57

% of total portfolio value

<Not Applicable>

Asset classes/ product types

<Not Applicable>

Comment

Carbon footprint comparison of the new with the old plastic pallet designs (screening level / estimate), using data from LCA studies on industrial packaging done at Greif.

Level of aggregation

Product

Description of product/Group of products

Lightweight steel drums (Spiraltainer) The Spiraltainer is a light weighted steel drum design. Compared to conventional standard bead steel drums, the Spiraltainer still reaches a comparable vacuum strength using less steel, which reduces the raw materials used.

Are these low-carbon product(s) or do they enable avoided emissions?

Low-carbon product

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify (Third-party lifecycle assessments.)

% revenue from low carbon product(s) in the reporting year

3.85

% of total portfolio value

<Not Applicable>

Asset classes/ product types

<Not Applicable>

Comment

Carbon footprint comparison of Spiraltainer with conventional standard bead steel drums (screening level / estimate), using data from LCA studies on industrial packaging done at Greif.

Level of aggregation

Product

Description of product/Group of products

New GCube valves The New GCube Valve is a plastic valve for IBCs. Traditional IBC valves (which are superseded by the new GCube valve at Greif) are made of HDPE and PP, but also contain small metal parts that cannot be removed easily, so traditional IBC valves cannot be recycled. The new GCube valve is made of HDPE and PP only, which allows them to be easily recycled.

Are these low-carbon product(s) or do they enable avoided emissions?

Avoided emissions

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify (Reduced virgin material use.)

% revenue from low carbon product(s) in the reporting year

0.02

% of total portfolio value

<Not Applicable>

Asset classes/ product types

<Not Applicable>

Comment

GCube valves avoid emission by reducing the amount of virgin materials in Greif's, and our customers' value chain.

Level of aggregation

Product

Description of product/Group of products

NexDrum Nexdrum is a light weighted plastic drum design. Compared to conventional blow molded HDPE plastic drums, Nexdrum is produced with 15% less HDPE, which reduces the raw materials used.

Are these low-carbon product(s) or do they enable avoided emissions?

Low-carbon product

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify (Third-party lifecycle assessments.)

% revenue from low carbon product(s) in the reporting year

0.28

% of total portfolio value

<Not Applicable>

Asset classes/ product types

<Not Applicable>

Comment

Carbon footprint comparison of Nexdrum with conventional blow molded HDPE plastic drums (screening level / estimate), using data from LCA studies on industrial packaging done at Greif.

Level of aggregation

Product

Description of product/Group of products

Valerex Plastic Drums Valerex is a lightweighted plastic drum design. Compared to conventional blowmolded HDPE plastic drums, Valerex is produced with less HDPE, so it allows to save HDPE / reduce raw materials.

Are these low-carbon product(s) or do they enable avoided emissions?

Low-carbon product

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify (Third-party lifecycle assessments.)

% revenue from low carbon product(s) in the reporting year

0.24

% of total portfolio value

<Not Applicable>

Asset classes/ product types

<Not Applicable>

Comment

Carbon footprint comparison of Valerex with conventional blow molded HDPE plastic drums (screening level / estimate), using data from LCA studies on industrial packaging done at Greif.

Level of aggregation

Group of products

Description of product/Group of products

LATAM Jerrycan Coex - 5, 10, 20 L The COEX jerrycans in LATAM have a layer made of bio-based HDPE resin (supplied by BRASKEM, derived from sugarcane) instead of standard HDPE. Using Bio-based PE instead of standard oil-based PE reduces the climate change impact of the packaging.

Are these low-carbon product(s) or do they enable avoided emissions?

Low-carbon product

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify (Third-party lifecycle assessments.)

% revenue from low carbon product(s) in the reporting year

0.31

% of total portfolio value

<Not Applicable>

Asset classes/ product types

<Not Applicable>

Comment

Carbon footprint comparison based on a LCA study done at Greif.

Level of aggregation

Group of products

Description of product/Group of products

LATAM Jerrycan Mono - 5, 10, 20 L The monolayer jerrycans in LATAM contain a significant amount of bio-based HDPE (supplied by BRASKEM, derived from sugarcane) instead of standard HDPE. Using Bio-based PE instead of standard oil-based PE reduces the climate change impact of the packaging.

Are these low-carbon product(s) or do they enable avoided emissions?

Low-carbon product

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify (Third-party lifecycle assessments.)

% revenue from low carbon product(s) in the reporting year

0.43

% of total portfolio value

<Not Applicable>

Asset classes/ product types

<Not Applicable>

Comment

Greif uses lifecycle assessment studies of our products to determine the carbon footprint of our industrial packaging products. Through our LCA, we determined this product has a lower carbon footprint than our conventional jerrycans.

Level of aggregation

Group of products

Description of product/Group of products

Clean steel drums Clean steel drums (for highly sensitive filling goods) are specially cleaned drums using compressed air treatment technology. This process of cleaning the steel drums replaces the manual cleaning process of drums using solvents. Compared to the manual cleaning process using solvents (notable amount of solvents per drum is needed), the clean steel drums just require the usage of compressed air (low energy input).

Are these low-carbon product(s) or do they enable avoided emissions?

Low-carbon product

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify (Third-party lifecycle assessments.)

% revenue from low carbon product(s) in the reporting year

0

% of total portfolio value

<Not Applicable>

Asset classes/ product types

<Not Applicable>

Comment

Greif uses lifecycle assessment studies of our products to determine the carbon footprint of our industrial packaging products. Through our LCA, we determined this product has a lower carbon footprint than our conventional cleaning process. Carbon footprint comparison of cleaning by compressed air vs. manual cleaning with solvents, using environmental data from LCAs for solvents and electricity figures for applying compressed air.

Level of aggregation

Group of products

Description of product/Group of products

PCR Drums - Monolayer Monolayer PCR (post-consumer resin) drums are made of recycled (PCR) HDPE. The usage of recycled HDPE instead of virgin HDPE increases the recollection and recycling of HDPE packaging products. The environmental impact of using recycled HDPE resin to produce drums is typically significantly lower than the impact of using virgin HDPE.

Are these low-carbon product(s) or do they enable avoided emissions?

Low-carbon product

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify (Third-party lifecycle assessments.)

% revenue from low carbon product(s) in the reporting year

0.08

% of total portfolio value

<Not Applicable>

Asset classes/ product types

<Not Applicable>

Comment

Greif uses lifecycle assessment studies of our products to determine the carbon footprint of our industrial packaging products. Through our LCA, we determined this product has a lower carbon footprint than our drums produced using virgin HDPE. Carbon footprint comparison of monolayer PCR drums with conventional plastic drums made of virgin HDPE, using data from LCA studies on industrial packaging done at Greif.

Level of aggregation

Group of products

Description of product/Group of products

PCR Drums - Coex (multilayer) Multilayer PCR drums are HDPE drums which are made of two layers of virgin HDPE and a middle layer of recycled (PCR) HDPE. The usage of recycled HDPE for the middle layer instead of virgin HDPE increases the recollection and recycling of HDPE packaging products. The environmental impact of using recycled HDPE resin to produce drums is typically significantly lower than the impact of using virgin HDPE.

Are these low-carbon product(s) or do they enable avoided emissions?

Low-carbon product

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify (Third-party lifecycle assessments.)

% revenue from low carbon product(s) in the reporting year

0.08

% of total portfolio value

<Not Applicable>

Asset classes/ product types

<Not Applicable>

Comment

Greif uses lifecycle assessment studies of our products to determine the carbon footprint of our industrial packaging products. Through our LCA, we determined this product has a lower carbon footprint than our drums produced using virgin HDPE. Carbon footprint comparison of multilayer PCR drums with conventional plastic drums made of pure virgin HDPE, using data from LCA studies on industrial packaging done at Greif.

Level of aggregation

Group of products

Description of product/Group of products

Greif CLCM/EarthMinded network is a recollection and reconditioning service for used drums and IBCs which enables the re-usage of the reconditioned packaging. In the case that a recollected drum or IBC cannot be properly reconditioned anymore, the material of the packaging (steel and plastics) is sent to recycling to enable the re-usage of the materials (e.g. to produce other products made from the recycled materials such as PCR plastic drums).

Are these low-carbon product(s) or do they enable avoided emissions?

Avoided emissions

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify (Reduced virgin material use.)

% revenue from low carbon product(s) in the reporting year

1.67

% of total portfolio value

<Not Applicable>

Asset classes/ product types

<Not Applicable>

Comment

Carbon footprint comparison of new drums and IBCs with reconditioned drums and IBCs (screening level / estimate), using data from LCA studies on industrial packaging done at Greif.

Level of aggregation

Product

Description of product/Group of products

Conical Steel Drums Conical steel drums are open head steel drums with a conical form. Compared to classic cylindrical (non-conical) steel drums, the conical form allows a stacking of empty drums. This leads to better space utilization in trucks when transporting empty drums (typically 2.000 conical drums with lids vs. only 288 palletized classic cylindrical drums).

Are these low-carbon product(s) or do they enable avoided emissions?

Avoided emissions

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify (Third-party lifecycle assessments.)

% revenue from low carbon product(s) in the reporting year

1.54

% of total portfolio value

<Not Applicable>

Asset classes/ product types

<Not Applicable>

Comment

Greif uses lifecycle assessment studies of our products to determine the carbon footprint of our industrial packaging products. Through our LCA, we determined this product has a lower carbon footprint than our conventional plastic drum design. Carbon footprint comparison of using and transporting empty conical drums with using and transporting empty classic cylindrical drums (screening level / estimate), using data from LCA studies on industrial packaging done at Greif.

Level of aggregation

Company-wide

Description of product/Group of products

Greif Green Tool Greif Green Tool allows customers to identify and evaluate the total environmental impact of industrial packaging given their individual situation. The tool, a calculator based on the Greif LCA models, highlights interdependent sustainability improvements to reveal unmet potential in GHG footprint reductions. Through inputs such as geographic scope, weight and volume of shipments, distance of transportation and trippage rate, the Green Tool provides our customers with the optimal packaging solution to mitigate emissions and maximize value.

Are these low-carbon product(s) or do they enable avoided emissions?

Avoided emissions

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify (Third-party lifecycle assessments.)

% revenue from low carbon product(s) in the reporting year

0

% of total portfolio value

<Not Applicable>

Asset classes/ product types

<Not Applicable>

Comment

The Greif Green tool incorporates findings from our LCA's into a tool that allows our customers to evaluate the carbon footprint of their packing selection and transportation methods. This information allows our customers to better understand the emission associated with their packaging choices, and select lower emission options that meet their requirements.

Level of aggregation

Product

Description of product/Group of products

LATAM plastic bottle -1L The PE plastic bottle in LATAM has a new enhanced design with rings. The enhanced design with rings reduces the weight of the bottle by up to 25% compared to the old bottle design with fewer rings. Less HDPE input is needed which reduces the climate change impact of the product.

Are these low-carbon product(s) or do they enable avoided emissions?

Low-carbon product

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify (Third-party lifecycle assessments.)

% revenue from low carbon product(s) in the reporting year

0.1

% of total portfolio value

<Not Applicable>

Asset classes/ product types

<Not Applicable>

Comment

Greif uses lifecycle assessment studies of our products to determine the carbon footprint of our industrial packaging products. Through our LCA, we determined this product has a lower carbon footprint than bottles produced in the old design. Carbon footprint comparison of bottles produced in the new enhanced design with bottles produced in the old design, using data from LCA studies on industrial packaging done at Greif.

Level of aggregation

Product

Description of product/Group of products

JCR jerry cans (Europe) - 16, 18, 20 & 25 liter The PE jerry cans in Europe have a new enhanced design. The enhanced design reduces the weight of the jerry cans by up to 15% compared to the old standard design. Less HDPE input is needed which reduces the climate change impact of the product.

Are these low-carbon product(s) or do they enable avoided emissions?

Low-carbon product

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify (Third-party lifecycle assessments.)

% revenue from low carbon product(s) in the reporting year

0.1

% of total portfolio value

<Not Applicable>

Asset classes/ product types

<Not Applicable>

Comment

Greif uses lifecycle assessment studies of our products to determine the carbon footprint of our industrial packaging products. Through our LCA, we determined this product has a lower carbon footprint than jerry cans produced in the old standard design. Carbon footprint comparison of jerry cans produced in the new enhanced design with jerry cans produced in the old design, using data from LCA studies on industrial packaging done at Greif.

Level of aggregation

Product

Description of product/Group of products

GCUBE Intermediate Bulk Container (IBC) with PCR Introduced in 2019, the GCUBE IBC is made with up to 60% PCR. The inner layer of this sustainable bottle is 100% virgin high density polyethylene (HDPE), while the two external layers are made from a blend of PCR. In addition to reducing the need for virgin resin, the new product reduces the carbon footprint of the IBC bottle by up to 38% and up to 11% for the entire IBC.

Are these low-carbon product(s) or do they enable avoided emissions?

Low-carbon product

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify (Third-party lifecycle assessments.)

% revenue from low carbon product(s) in the reporting year

0

% of total portfolio value

<Not Applicable>

Asset classes/ product types

<Not Applicable>

Comment

Carbon footprint comparison based on a LCA study done at Greif.

Level of aggregation

Group of products

Description of product/Group of products

Transparent PCR Jerry Cans In 2019 Greif introduced a transparent jerry can made with 100% PCR providing our customers the ability to see the level of liquid inside the jerry can while reducing their carbon footprint and reliance of virgin materials.

Are these low-carbon product(s) or do they enable avoided emissions?

Low-carbon product

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify (Third-party lifecycle assessments.)

% revenue from low carbon product(s) in the reporting year

0

% of total portfolio value

<Not Applicable>

Asset classes/ product types

<Not Applicable>

Comment

Carbon footprint comparison of jerry cans produced in the new enhanced design with jerry cans produced in the old design. A formal LCA has not been conducted on this product, but emissions savings are anticipated based on known savings from similar product transitions.

C5. Emissions methodology

C5.1

(C5.1) Provide your base year and base year emissions (Scopes 1 and 2).

Scope 1

Base year start

November 1 2013

Base year end

October 31 2014

Base year emissions (metric tons CO2e)

368700

Comment

Scope 2 (location-based)

Base year start

November 1 2013

Base year end

October 31 2014

Base year emissions (metric tons CO2e)

498400

Comment

Scope 2 (market-based)

Base year start

November 1 2013

Base year end

October 31 2014

Base year emissions (metric tons CO2e)

498400

Comment

C5.2

(C5.2) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate emissions.

The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)

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)

675900

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

614200

Scope 2, market-based (if applicable)

628100

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 minor sources at facilities outside of North America. Minor sources could include leased or owned vehicles, fork lifts, yard tractors, landscaping equipment 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)

Emissions are not relevant

Explain why this source is excluded

The quantity of fuel used for these sources is not available

Source

Air conditioning refrigerant replacement.

Relevance of Scope 1 emissions from this source

Emissions are not evaluated

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)

Emissions are not relevant

Explain why this source is excluded

No records of air conditioning maintenance are available.

Source

Electricity and fuel use at Land Management offices.

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

Emissions are relevant but not yet calculated

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

Emissions are not relevant

Explain why this source is excluded

Greif does not own the headquarters office for its land management business. Two out of the five remaining offices are on sale and Greif does not collect data from the other three facilities since the energy usage very small.

Source

Process emissions

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 excluded

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

Emissions are not relevant

Explain why this source is excluded

Steel drum manufacturing generally involves painting exterior and coating interior surfaces. Emissions of solvents or combustion products of solvents have not been included in the inventory.

Source

Closed landfill emissions

Relevance of Scope 1 emissions from this source

Emissions are not evaluated

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)

Emissions are not relevant

Explain why this source is excluded

Several Caraustar mills have closed landfills on their property. Because of the short period of time between acquiring Caraustar and this report, there was insufficient time to evaluate possible landfill emissions.

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

Metric tonnes CO2e

2578000

Emissions calculation methodology

Technical Guidance average-data method

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

0

Please explain

Capital goods

Evaluation status

Relevant, calculated

Metric tonnes CO2e

101000

Emissions calculation methodology

Technical Guidance average-data method

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

0

Please explain

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

Evaluation status

Relevant, calculated

Metric tonnes CO2e

292000

Emissions calculation methodology

Technical Guidance average-data method

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

0

Please explain

Upstream transportation and distribution

Evaluation status

Relevant, calculated

Metric tonnes CO2e

185000

Emissions calculation methodology

Technical Guidance fuel-based method

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

0

Please explain

Waste generated in operations

Evaluation status

Relevant, calculated

Metric tonnes CO2e

84000

Emissions calculation methodology

Technical Guidance average-data method

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

0

Please explain

Business travel**Evaluation status**

Relevant, calculated

Metric tonnes CO2e

10000

Emissions calculation methodology

Technical Guidance spend-data method

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

0

Please explain**Employee commuting****Evaluation status**

Relevant, calculated

Metric tonnes CO2e

29000

Emissions calculation methodology

Technical Guidance average-data method

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

0

Please explain**Upstream leased assets****Evaluation status**

Not relevant, explanation provided

Metric tonnes 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 included in scope 1 and 2 emissions calculations.

Downstream transportation and distribution**Evaluation status**

Not relevant, explanation provided

Metric tonnes 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.

Processing of sold products**Evaluation status**

Not relevant, explanation provided

Metric tonnes 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 typically finished packaging products and no further processing by the customer is required.

Use of sold products

Evaluation status

Not relevant, explanation provided

Metric tonnes 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 do not directly consume any energy during use nor do they release any direct GHG emissions.

End of life treatment of sold products

Evaluation status

Relevant, calculated

Metric tonnes CO₂e

1124000

Emissions calculation methodology

Technical Guidance average-data method

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

0

Please explain

Downstream leased assets

Evaluation status

Not relevant, explanation provided

Metric tonnes 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 that are not already included in scope 1 and 2 emissions calculations.

Franchises

Evaluation status

Not relevant, explanation provided

Metric tonnes 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 franchise operations.

Investments

Evaluation status

Not relevant, explanation provided

Metric tonnes 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 does not make investments with the objective of making a profit.

Other (upstream)

Evaluation status

Metric tonnes 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

Not applicable

Other (downstream)

Evaluation status

Metric tonnes 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

Not applicable

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	209900	

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

0.000283787

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

1304000

Metric denominator

unit total revenue

Metric denominator: Unit total

4595000000

Scope 2 figure used

Market-based

% change from previous year

38

Direction of change

Increased

Reason for change

In FY19 Greif acquired a large company with a higher emissions per unit total revenue profile than Greif in FY18.

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	611000	IPCC Fifth Assessment Report (AR5 – 100 year)
CH4	64100	IPCC Fifth Assessment Report (AR5 – 100 year)
N2O	700	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	629161
China	7447
Netherlands	4986
France	3441
Russian Federation	3070
Belgium	2914
United Kingdom of Great Britain and Northern Ireland	2872
Singapore	2158
Brazil	1913
Spain	1791
Italy	1693
Portugal	1316
Germany	1286
Canada	1238
South Africa	1185
Czechia	1021
Sweden	1021
Malaysia	866
Turkey	844
Argentina	781
Saudi Arabia	724
Mexico	687
Hungary	644
Israel	467
Poland	421
Chile	403
Viet Nam	299
Greece	275
Egypt	188
Kenya	185
Colombia	159
Algeria	132
Romania	104
Morocco	97
Guatemala	42
Costa Rica	40
Nigeria	6

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)	586011
Rigid Industrial Packaging and Services (RIPS)	77775
Life Cycle Services (LCS)	9389
Tri-Sure also known as Global Packaging Accessories (GPA) division	1335
Corporate	950
Flexible Products and Services (FPS)	420

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	158414	0	0

Facility	Scope 1 emissions (metric tons CO2e)	Latitude	Longitude
Massillon	79549	0	0
Sweetwater	45095	0	0
Austell	44726	0	0
Milwaukee	43854	0	0
Fitchburg	28977	0	0
Mobile	28434	0	0
Tama	24980	0	0
Baltimore	23680	0	0
Taylors	20465	0	0
Cincinnati (CCI)	19678	0	0
Commerce	19567	0	0
Tacoma	13035	0	0
Houston	9287	0	0
Mason (MPM)	9261	0	0
Harrisburg (SPC)	7593	0	0
Alsip	7004	0	0
Louisville (MCC)	4805	0	0
Arkadelphia	4666	0	0
Warminster	3232	0	0
Europoort	2685	0	0
Ghent	2535	0	0
Florence	2449	0	0
Taicang	2280	0	0
Oak Creek	2217	0	0
Pioneer	2158	0	0
Rouen	2134	0	0
Ellesmere Port	1910	0	0
Van Wert	1831	0	0
St. Francis	1775	0	0
Merced	1760	0	0
Huizhou	1734	0	0
Martorell	1569	0	0
Caojing	1444	0	0
Tianjin	1401	0	0
Melzo	1345	0	0
Povoa	1316	0	0
Santa Clara	1305	0	0
Welcome	1299	0	0
Oshkosh	1261	0	0
Santo Amaro	1168	0	0
Moraine	1087	0	0
Usti nad Labem	1021	0	0
Burton on Trent	962	0	0
Vreeland	950	0	0
Delaware	950	0	0
Auburndale	907	0	0
Laudun	879	0	0
Petaling Jaya	866	0	0
Falkenburg	828	0	0
Grand Rapids	805	0	0
Perm	784	0	0
Tigre	781	0	0
Chicago	778	0	0
Asterweg	778	0	0
Atlanta	741	0	0
Baytown	731	0	0
Tonawanda	716	0	0
Winfield	703	0	0
Fontana	697	0	0
Volgograd	697	0	0
Stoney Creek	684	0	0
Mobeni	646	0	0
Almasfuzito	644	0	0
Hamburg	602	0	0
Newark	583	0	0
Omsk	581	0	0
Ede	573	0	0
Cuernavaca	566	0	0
Texarkana	560	0	0
Belleville	553	0	0
York	546	0	0

Facility	Scope 1 emissions (metric tons CO2e)	Latitude	Longitude
Zhuhai	540	0	0
Vanderbijlpark	539	0	0
Istanbul	528	0	0
Loevenich	516	0	0
Ein Hahoresch	467	0	0
Bay Minette	461	0	0
Jubail	458	0	0
Vologda	445	0	0
Kernersville	440	0	0
Lille	428	0	0
Rybnik	421	0	0
Carrol Stream	404	0	0
Pudahuel	403	0	0
Naperville	381	0	0
Lier	379	0	0
Pineville	353	0	0
Doraville	344	0	0
Lithonia	321	0	0
St. Gabriel (Evans)	315	0	0
Aratu	306	0	0
Vung Tau	299	0	0
Palatka	296	0	0
Cornell	295	0	0
Windsor Locks	277	0	0
Mandra	275	0	0
Bradley	275	0	0
Wright City	266	0	0
Lavonia	266	0	0
Riyadh	265	0	0
Charlotte	257	0	0
Angarsk	251	0	0
Esteio	249	0	0
Meridian	238	0	0
Rock Hill	237	0	0
Beloyarsk (Upakovka)	236	0	0
Memphis	234	0	0
Don Benito	222	0	0
Castenedolo	203	0	0
Arlington	202	0	0
West Monroe	201	0	0
Indianapolis	201	0	0
Samandira	195	0	0
Englishtown	195	0	0
Vaesterhaninge	193	0	0
Rio de Janeiro	190	0	0
Sadat City	188	0	0
Mombasa	185	0	0
Hardeeville	175	0	0
Randleman	172	0	0
Salem	164	0	0
Lockport	156	0	0
Mendig	155	0	0
Woodbine	152	0	0
Bottanuco	146	0	0
Morgan Hill	144	0	0
Algeria	132	0	0
Monterrey	121	0	0
Silsbee	114	0	0
Crossett	107	0	0
Buffalo	106	0	0
Botosani	104	0	0
Mt. Sterling	103	0	0
Sultanbeyli	103	0	0
Cartagena	102	0	0
Casablanca	97	0	0
Tallahassee	94	0	0
Okemah	83	0	0
Stockton	77	0	0
Minerva	77	0	0

Facility	Scope 1 emissions (metric tons CO2e)	Latitude	Longitude
Kazan	77	0	0
San Jose	74	0	0
Salt Lake City	70	0	0
Green Bay	69	0	0
Hazleton	68	0	0
Phoenix	65	0	0
Saginaw	58	0	0
Bogota	57	0	0
Fort Worth	56	0	0
Los Angeles	53	0	0
Dalton	52	0	0
Shanghai	47	0	0
Burlington	44	0	0
Cleveland	44	0	0
Guatemala	42	0	0
Nashville	40	0	0
Beardstown	39	0	0
Kingston Springs	33	0	0
Franklin	31	0	0
Augusta	27	0	0
Chicopee	26	0	0
Columbus	23	0	0
Chattanooga	21	0	0
Corinth	21	0	0
Ontario	20	0	0
De Pere	20	0	0
Hadimkoy	18	0	0
Longview	18	0	0
Muhlhoff	14	0	0
Neenah	13	0	0
La Palma	12	0	0
Cedartown	10	0	0
Apapa	6	0	0
Weyers Cave	6	0	0
Riviera Beach	1	0	0

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)	Purchased and consumed electricity, heat, steam or cooling (MWh)	Purchased and consumed low-carbon electricity, heat, steam or cooling accounted for in Scope 2 market-based approach (MWh)
United States of America	503628	503628	1104752769	4568
Turkey	16487	16487	35342740	0
China	13616	13616	21544100	0
Italy	11113	16219	33435487	0
Netherlands	8042	9183	17264222	0
Germany	7105	11497	15825141	0
Israel	6310	6310	11065536	0
Romania	3996	4990	12332164	0
Brazil	3675	2902	30534227	6311
Russian Federation	3632	3632	10088756	0
Ukraine	3515	3515	8257526	0
Malaysia	3447	3447	5251593	0
Argentina	3396	3396	9021074	0
Singapore	3216	3216	8106796	0
Poland	3016	3756	4165959	0
South Africa	2617	2617	2755446	0
Morocco	2162	2162	3155384	0
Mexico	2025	2025	4350668	0
Saudi Arabia	1888	1888	2638480	0
United Kingdom of Great Britain and Northern Ireland	1677	2290	5992185	0
Belgium	1657	1723	9597823	0
Spain	1024	1862	4134695	0
Canada	959	959	6371904	0
Portugal	897	960	3104975	0
Czechia	843	965	1580988	0
France	667	653	12682884	0
Chile	640	640	1441012	919
Greece	610	684	1164717	0
Viet Nam	553	553	1228111	0
Hungary	398	503	1449996	0
Egypt	333	333	723166	0
Colombia	242	242	1095688	0
Algeria	218	218	427043	0
Sweden	163	538	13223221	0
Austria	126	126	830778	0
Philippines	114	114	187907	0
Kenya	72	72	382230	0
Denmark	56	136	268006	0
Guatemala	32	32	77082	0
Nigeria	20	20	49400	0
Costa Rica	4	4	363542	0

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)	449314	449314
Rigid Industrial Packaging and Services (RIPS)	121838	133786
Flexible Products and Services (FPS)	29056	30158
Tri-Sure also known as the Global Packaging Accessories (GPA) division	9258	10129
Life Cycle Services (LCS)	3405	3405
Corporate	1320	1320

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	169799	169799
Sweetwater	33231	33231
Austell	31424	31424
Milwaukee	30886	30886
Massillon	29813	29813
Baltimore	22869	22869
Mobile	22367	22367
Tama	17449	17449
Cincinnati (CCI)	13495	13495
Fitchburg	12054	12054
Taylors	9690	9690
Houston	9679	9679
Hadimkoy	8355	8355
Alsip	7353	7353
Santa Clara	6907	6907
Commerce	6903	6903
Samandira	6759	6759
Ein Hahoreshe	6310	6310
Tacoma	6179	6179
Lockport	5872	5872
Castenedolo	5224	7624
Bottanuco	4882	7125
Lavonia	4374	4374
Chicago	4224	4224
Mason (MPM)	4083	4083
Changzhou	4015	4015
Caojing	3892	3892
Negresti	3824	4776
Grand Rapids	3784	3784
Petaling Jaya	3447	3447
Pioneer	3216	3216
Zhitomir	3204	3204
Mt. Sterling	3069	3069
Rybnik	3016	3756
Louisville (MCC)	2985	2985
Carrol Stream	2798	2798
Mendig	2797	4526
Harrisburg (SPC)	2757	2757
Bradley	2651	2651
Asterweg	2639	3013
Europoort	2607	2977
Ede	2436	2781
Kingston Springs	2357	2357
Hazleton	2285	2285
Zhenjiang	2167	2167
Casablanca	2162	2162
Huckelhoven	2071	3351
Florence	2068	2068
Pineville	1754	1754
Santo Amaro	1552	1177
Arkadelphia	1544	1544
Tigre	1541	1541
Vanderbijlpark	1456	1456
Huizhou	1417	1417
Delaware	1320	1320
Warminster	1314	1314
Matehuala	1292	1292
Campana	1290	1290
Oshkosh	1237	1237
Lithonia	1166	1166
Mobeni	1161	1161
Kazan	1160	1160
Randleman	1148	1148
Jubail	1144	1144
Van Wert	1135	1135
Ellesmere Port	1079	1473
Tianjin	1078	1078
Lier	1016	1056

Facility	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Melzo	1007	1470
Wright City	963	963
Zhuhai	932	932
Muhlhoff	906	1466
Povoa	874	935
Naperville	854	854
Usti nad Labem	843	965
Sultanbeyli	837	837
St. Francis	836	836
Baytown	796	796
Atlanta	788	788
Riyadh	744	744
Kernersville	744	744
Loevenich	685	1109
Uberaba	673	529
Welcome	649	649
Pudahuel	640	640
Charlotte	636	636
Cuernavaca	630	630
Araucaria	626	565
Texarkana	619	619
Mandra	610	684
Beardstown	588	588
Oak Creek	587	587
Belleville	585	585
Merced	581	581
Auburndale	566	566
San Juan	565	565
Hamburg	554	897
Ghent	545	566
Istanbul	536	536
Rouen	524	513
Martorell	520	946
Perm	519	519
Burton on Trent	472	645
Rock Hill	471	471
Vologda	465	465
Los Angeles	431	431
Dalton	429	429
La Palma	406	406
Kaluga	403	403
Almasfuzito	398	503
Omsk	383	383
San Roque (Cadiz)	367	666
Vreeland	360	411
York	358	358
Winfield	345	345
Sadat City	333	333
Minerva	327	327
Volgograd	315	315
Kiev	311	311
Toledo	309	309
Londrina	306	280
Saginaw	305	305
Vung Tau	300	300
Franklin	298	298
Manaus	292	126
Newark	283	283
Doraville	281	281
Bay Minette	274	274
St. Gabriel (Evans)	274	274
Beloyarsk (Upakovka)	274	274
Arlington	273	273
Hochi Minh City	252	252
Okemah	250	250
Woodbine	247	247
Hardeeville	220	220
Algeria	218	218
Phoenix	207	207
Fontana	206	206

Facility	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Englishtown	198	198
Cleveland	198	198
Windsor Locks	197	197
Moraine	186	186
Meridian	178	178
Memphis	176	176
Corinth	175	175
Botosani	172	214
Palatka	168	168
Bogota	157	157
Indianapolis	149	149
Falkenburg	147	483
Cedartown	146	146
Don Benito	137	250
Silsbee	135	135
Thirsk	127	173
Vienna	126	126
Crossett	126	126
Chattanooga	119	119
Denver	119	119
Tonawanda	118	118
Morgan Hill	117	117
Chicopee	116	116
Longview	116	116
Manilla	114	114
Shanghai	114	114
Cornell	113	113
Angarsk	112	112
Nashville	110	110
Rio de Janeiro	106	106
Augusta	105	105
Kingston	105	105
Monterrey	103	103
Stoney Creek	100	100
Columbus	99	99
Ontario	97	97
Izegem	97	101
Weyers Cave	92	92
Rheine	91	148
Laudun	86	84
Cartagena	85	85
West Monroe	79	79
Salt Lake City	79	79
Scarborough	79	79
Burlington	79	79
Aratu	74	74
Mombasa	72	72
Green Bay	71	71
Fort Worth	71	71
Salem	69	69
Shreveport	62	62
Riviera Beach	61	61
Stockton	61	61
Hedehusne (Roskilde)	56	136
Buffalo	52	52
Lille	50	49
Mississauga	50	50
Esteio	46	46
Tallahassee	44	44
Johnsonville	44	44
Winnipeg	40	40
San Jose	36	36
Guatemala	32	32
De Pere	25	25
Ageuda	23	25
Neenah	23	23
Apapa	20	20
Vaesterhaninge	17	55
Montceau	7	7

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?

Increased

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	3600	Decreased	1	Greif's renewable energy purchases in FY19 increased by approximately 9,000 MWh over FY18, with the resulting decrease in emissions of 3600 metric tonnes of CO2e or less than 1% of FY 19 scope 1 and 2 emissions. $(3600/1,304,000)*100$.
Other emissions reduction activities	5000	Decreased	1	FY19 emission reduction projects reduced s1 and s2 emissions by approximately 15,000 T CO2e. This reduction is approximately 1% of FY19 emissions. $(15,000/1,304,000)*100$.
Divestment	0	No change	0	No divestment in 2019.
Acquisitions	495000	Increased	38	Greif's acquisition of Caraustar in FY19 resulted in an increase in scope 1 and scope 2 emissions of 495,000 T CO2e, or 38% of FY19 emissions. $(495,000/1,304,000)*100$
Mergers	0	No change	0	No mergers in 2019.
Change in output	0	No change	0	Not Applicable
Change in methodology	0	No change	0	Not Applicable
Change in boundary	0	No change	0	Not Applicable
Change in physical operating conditions	0	No change	0	Not Applicable
Unidentified	0	No change	0	Not Applicable
Other	0	No change	0	Not Applicable

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?

Location-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)	643260	3332853	3976113
Consumption of purchased or acquired electricity	<Not Applicable>	11799	1370892	1382691
Consumption of purchased or acquired heat	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired steam	<Not Applicable>	0	23574	23574
Consumption of purchased or acquired cooling	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of self-generated non-fuel renewable energy	<Not Applicable>	3426	<Not Applicable>	3426
Total energy consumption	<Not Applicable>	658485	4727320	5385805

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.

Fuels (excluding feedstocks)

Wood

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

461119

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

461119

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

0

Emission factor

94.54

Unit

kg CO2e per million Btu

Emissions factor source

US EPA

Comment

Stationary

Fuels (excluding feedstocks)

Black Liquor

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

152299

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

152299

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

0

Emission factor

94.54

Unit

kg CO2e per million Btu

Emissions factor source

US EPA

Comment

Stationary

Fuels (excluding feedstocks)

Coal

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

2739

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

2739

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

0

Emission factor

104.42

Unit

kg CO2e per million Btu

Emissions factor source

US EPA

Comment

Stationary

Fuels (excluding feedstocks)

Distillate Oil

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

35767

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

35767

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

Emission factor

74.2

Unit

kg CO2e per million Btu

Emissions factor source

US EPA

Comment

Stationary

Fuels (excluding feedstocks)

Motor Gasoline

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

2276

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

2276

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

Emission factor

70.48

Unit

kg CO2e per million Btu

Emissions factor source

US EPA

Comment

Stationary

Fuels (excluding feedstocks)

Jet Kerosene

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

1256

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

1256

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

Emission factor

70.21

Unit

kg CO2e per million Btu

Emissions factor source

US EPA

Comment

Mobile

Fuels (excluding feedstocks)

Kerosene

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

25

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

25

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

Emission factor

75.44

Unit

kg CO2e per million Btu

Emissions factor source

US EPA

Comment

Stationary

Fuels (excluding feedstocks)

Liquefied Petroleum Gas (LPG)

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

7429

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

7429

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

Emission factor

61.95

Unit

kg CO2e per million Btu

Emissions factor source

US EPA

Comment

Stationary

Fuels (excluding feedstocks)

Natural Gas

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

3176607

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

241591

MWh fuel consumed for self-generation of steam

2829582

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

105434

Emission factor

53.11

Unit

kg CO2e per million Btu

Emissions factor source

US EPA

Comment

Stationary

Fuels (excluding feedstocks)

Diesel

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

68383

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

68383

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

Emission factor

73.86

Unit

kg CO2e per million Btu

Emissions factor source

US EPA

Comment

Mobile

Fuels (excluding feedstocks)

Propane Liquid

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

38371

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

38371

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

Emission factor

64.66

Unit

kg CO2e per million Btu

Emissions factor source

US EPA

Comment

Mobile

Fuels (excluding feedstocks)

Other, please specify (OLD CORRUGATED CONTAINER PULP (OCC))

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

29842

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

29842

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

0

Emission factor

94.54

Unit

kg CO2e per million Btu

Emissions factor source

US EPA

Comment

Stationary

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	42174	42174	3426	3426
Heat	286569	286569	0	0
Steam	2940361	2940361	520838	520838
Cooling	0	0	0	0

C8.2e

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

Sourcing method

Unbundled energy attribute certificates, Renewable Energy Certificates (RECs)

Low-carbon technology type

Low-carbon energy mix

Country/region of consumption of low-carbon electricity, heat, steam or cooling

US, Latin America and Caribbean (USLAC)

MWh consumed accounted for at a zero emission factor

4568

Comment

Sourcing method

Power purchase agreement (PPA) with a grid-connected generator with energy attribute certificates

Low-carbon technology type

Low-carbon energy mix

Country/region of consumption of low-carbon electricity, heat, steam or cooling

Brazil

MWh consumed accounted for at a zero emission factor

6311

Comment

Sourcing method

Power purchase agreement (PPA) with a grid-connected generator with energy attribute certificates

Low-carbon technology type

Low-carbon energy mix

Country/region of consumption of low-carbon electricity, heat, steam or cooling

Chile

MWh consumed accounted for at a zero emission factor

919

Comment

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 2019 GHG Verification Statement.pdf

Page/ section reference

All

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 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 2019 GHG Verification Statement.pdf

Page/ section reference

All

Relevant standard

ISO14064-3

Proportion of reported emissions verified (%)

100

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 2019 GHG Verification Statement.pdf

Page/ section reference

All

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

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 2019 GHG Verification Statement.pdf

Page/section reference

All

Relevant standard

ISO14064-3

Proportion of reported emissions verified (%)

100

Scope 3 category

Scope 3: Capital goods

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 2019 GHG Verification Statement.pdf

Page/section reference

All

Relevant standard

ISO14064-3

Proportion of reported emissions verified (%)

100

Scope 3 category

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

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 2019 GHG Verification Statement.pdf

Page/section reference

All

Relevant standard

ISO14064-3

Proportion of reported emissions verified (%)

100

Scope 3 category

Scope 3: Upstream transportation and distribution

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 2019 GHG Verification Statement.pdf

Page/section reference

All

Relevant standard

ISO14064-3

Proportion of reported emissions verified (%)

100

Scope 3 category

Scope 3: Waste generated in operations

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 2019 GHG Verification Statement.pdf

Page/section reference

All

Relevant standard

ISO14064-3

Proportion of reported emissions verified (%)

100

Scope 3 category

Scope 3: Business travel

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 2019 GHG Verification Statement.pdf

Page/section reference

All

Relevant standard

ISO14064-3

Proportion of reported emissions verified (%)

100

Scope 3 category

Scope 3: Employee commuting

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 2019 GHG Verification Statement.pdf

Page/section reference

All

Relevant standard

ISO14064-3

Proportion of reported emissions verified (%)

100

Scope 3 category

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 2019 GHG Verification Statement.pdf

Page/section reference

All

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, we do not verify any other climate-related information reported in our CDP disclosure

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
France carbon tax
Massachusetts state ETS
Singapore carbon tax
Sweden carbon tax
Ukraine carbon tax

C11.1b

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

California CaT

% of Scope 1 emissions covered by the ETS

0.6

% of Scope 2 emissions covered by the ETS

1.4

Period start date

January 1 2019

Period end date

December 31 2019

Allowances allocated

238500

Allowances purchased

0

Verified Scope 1 emissions in metric tons CO2e

4131

Verified Scope 2 emissions in metric tons CO2e

8435

Details of ownership

Facilities we own and operate

Comment

Massachusetts state ETS

% of Scope 1 emissions covered by the ETS

4.3

% of Scope 2 emissions covered by the ETS

2

Period start date

January 1 2019

Period end date

December 31 2019

Allowances allocated

798600

Allowances purchased

0

Verified Scope 1 emissions in metric tons CO2e

29167

Verified Scope 2 emissions in metric tons CO2e

12239

Details of ownership

Facilities we own and operate

Comment

C11.1c

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

France carbon tax

Period start date

January 1 2019

Period end date

December 31 2019

% of total Scope 1 emissions covered by tax

0.5

Total cost of tax paid

167726

Comment

No comment.

Singapore carbon tax

Period start date

January 1 2019

Period end date

December 31 2019

% of total Scope 1 emissions covered by tax

0.3

Total cost of tax paid

21138

Comment

No comment.

Sweden carbon tax

Period start date

January 1 2019

Period end date

December 31 2019

% of total Scope 1 emissions covered by tax

0.2

Total cost of tax paid

67226

Comment

No comment.

Ukraine carbon tax

Period start date

January 1 2019

Period end date

December 31 2019

% of total Scope 1 emissions covered by tax

0.1

Total cost of tax paid

13

Comment

No comment.

C11.1d

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

As an organization with operations across the globe, current and emerging regulations are considered as part of Greif's ongoing climate-related risk assessments. Each Regional VP is responsible for monitoring the regulatory environment, ensuring their operations are compliant with all applicable regulations, and notifying executive leadership of emerging changes. Greif's Director of Sustainability and Senior Vice President, Rigid Industrial Packaging & Services and Global Sustainability monitor existing and emerging climate-related regulations globally and inform the Sustainability Steering Committee of regulations that may impact Greif. Through this process, the organization maintains awareness of climate-related regulations globally, including carbon pricing systems, and is better able to identify risk and opportunity within these regulations, based on input from Regional VPs and the Risk Leader Committee. Both current and emerging regulatory risks are discussed at Sustainability Steering Committee meetings. Climate-related regulatory risk, including carbon pricing systems, 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, and annually by Greif's Board of Directors. Failure to comply with these regulations could result in fines to our company and could affect our business, financial condition and results of operations. We, along with other companies, including our customers, are considering and implementing ways to reduce GHG emissions.

Greif looks to collaborate with our customers to align on how our products impact their value chain. Greif's sustainability-driven products better enable Greif and our customers to achieve sustainability goals and maintain regulatory compliance. Products such as our NexDRUM® plastic drum is produced with 15% less material and results in a 12% CO2 emissions reduction compared with conventional drums. Similarly, our EcoBalance product line is produced using up to 75% recycled plastic and reduces CO2 emissions 30-53% compared to conventional drums and GCUBE Intermediate Bulk Container (IBC) reduces the carbon footprint of the IBC bottle by up to 38% and up to 11% for the entire IBC. Further, some products, such as certain Greif Jerry Cans, can be produced using 100% PCR. Our Green Tool allows customers to evaluate the environmental impact of our products, providing our customers with the optimal packaging solution to mitigate emissions. These programs and initiatives support our efforts to maintain our business, financial conditions and results of operations while maintaining compliance with regulatory requirements.

As we evaluate emission reduction activities and energy efficiency improvements, we consider regulatory factors. In 2019, completed 84 energy efficiency projects, saving 88,000 metric tons of Co2e and \$2.76 million annually. Some of these projects were informed by or benefited from regulatory factors. For example, we replaced equipment at our paperboard mills in Los Angeles, California and Fitchburg, Massachusetts with more energy efficient technology. These improvements led to a reduction of both greenhouse gasses and air pollutants such as Nitrogen Oxides (NOx) and Volatile Organic Compounds (VOCs). The updates allowed Greif to take advantage of Cap-and-Trade programs in California and Massachusetts that provide Emission Reduction Credits (ERCs). In 2019, Greif was awarded \$1,037,100 in ERCs through these programs.

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

Yes, other partners in the value chain

C12.1a

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

Type of engagement

Innovation & collaboration (changing markets)

Details of engagement

Run a campaign to encourage innovation to reduce climate impacts on products and services

% of suppliers by number

95

% total procurement spend (direct and indirect)

60

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

45

Rationale for the coverage of your engagement

Greif focuses our supplier engagement efforts on our largest suppliers by spend and on raw materials that are most commonly used in our business, which are also most subject to climate-related raw material price volatility (steel and resin). We chose to engage our largest suppliers as they have the largest impact on our footprint. We formally collaborate with these suppliers via our Global Sourcing and Procurement and Global Innovation Teams to identify opportunities for material down gauging, light weighting products and identifying more environmentally friendly materials.

Impact of engagement, including measures of success

Our innovation and collaboration efforts led to the launch of new products lines and reduced costs. For example, the EcoBalance™ product line in North America, which is produced using approximately 75 percent recycled plastic and reduces CO2 emissions 30 to 53 percent compared to comparable conventional products. Our down gauging program led to \$1 million in savings from reduced raw materials use in 2019, a figure higher than anticipated. Collectively, 7% of savings realized by Greif's procurement team in 2019 was attributable to supplier innovation and collaboration efforts.

Comment

Percentage of Scope 3 emissions are provided for emissions from purchased goods and services (79% of scope three emissions) for the 60% of suppliers (by spend) being engaged in this activity.

Type of engagement

Compliance & onboarding

Details of engagement

Included climate change in supplier selection / management mechanism

% of suppliers by number

100

% total procurement spend (direct and indirect)

100

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

79

Rationale for the coverage of your engagement

Greif has publicly posted its Supplier Code of Conduct on its website and incorporates sustainability measures into its Supplier Scorecard, Supplier Selection Criteria and Supplier Quality Audits / Criteria of grading suppliers at their facilities. We also empower our suppliers to act on potential violations of the Code of Conduct, including reporting suspected violations committed by Greif employees, by providing a hotline for our suppliers to call should they observe a peer or Greif employee displaying values that are inconsistent with our Code of Conduct. We expect all suppliers to adhere to our Supplier Code of Conduct as any violations along our supply chain have the potential to expose us to reputational risk. Beginning in 2019, Greif incorporated the Supplier Code of Conduct into every purchase order issued to a supplier in North America, approximately 35% of Greif's global supplier base by number and 50% by spend. By signing our Purchase Order, these suppliers have attested to and agree to adhere to our Supplier Code of Conduct.

Impact of engagement, including measures of success

Sustainability criteria accounts for 5% of our supplier scorecard.

Comment

Percentage of Scope 3 emissions are provided for emissions from purchased goods and services (79% of scope three emissions) for the 100% of suppliers (by spend) being engaged in this activity.

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

2

% total procurement spend (direct and indirect)

79

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

55

Rationale for the coverage of your engagement

In 2016, Greif conducted an EcoVadis assessment of its top 25 suppliers, providing Greif with a better understanding of: • Which of our suppliers are leading in sustainability (suppliers who received gold or silver ratings). We chose to engage our largest suppliers as they have the largest impact on our footprint. This engagement has a favorable impact on our relationship and helps us prioritize the suppliers on which we focus our deeper engagement. • Activities implemented by our suppliers to reduce their emissions, which will in turn have a positive impact on our scope 3 emissions. • A foundation by which we were able to develop a sustainable procurement program and set goals. The results of the EcoVadis study aided in the creation of our revised Supplier Scorecard and inform our ongoing engagement efforts. In 2019, we worked with EcoVadis to develop a three-year plan to assess our suppliers once again. Throughout 2020, we will conduct assessments, through EcoVadis, on 35 of our most critical suppliers by spend.

Impact of engagement, including measures of success

As a result of our engagement efforts, we created our first set of supplier sustainability goals. These goals have a FY2017 baseline and a target completion year of 2025. This "Green Procurement" Vision focuses on: 1) A one percent reduction in overall material used to produce current product offerings by using innovative materials 2) Moving from Non-Green to Green Material Sourcing if it is economically feasible and doing so provides high quality of product to our customers. We score each of our top 20 suppliers on a supplier scorecard (which accounts for approximately 70% of our supplier spend) that considers cost, quality, delivery, value-added services, technical support and environmental and social criteria. We track supplier scorecard performance in Greif's Quality Control System, allowing us to tie quality issues to specific suppliers. If a supplier gets a low score, we expect corrective action to happen.

Comment

Percentage of Scope 3 emissions are provided for emissions from purchased goods and services (79% of scope three emissions) for the 70% of suppliers (by spend) being engaged in this activity.

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

Type of engagement

Collaboration & innovation

Details of engagement

Other, please specify (More information provided below.)

% of customers by number

15

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

15

Portfolio coverage (total or outstanding)

<Not Applicable>

Please explain the rationale for selecting this group of customers and scope of engagement

Greif works with a multitude of 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 joint projects to reduce each other's carbon emissions. In addition, we meet with customers during conferences such as Interpack and send out updates to all customers regarding our sustainability-related products, achievements, and news. In 2014, we also held our first customer sustainability meeting in Latin America, where we engaged with customers to promote more sustainability policies and actions in the region. In 2010, we developed the Greif Green Tool to assist customers in selecting the most efficient container 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. In total, over 80 customers have used the tool. In 2019 we continued to update the tool with our latest product information, ensuring data and product classifications are as up-to-date as possible. Going forward, we will continue to keep data in the tool as up-to-date as possible and all new product launches will be analyzed and added to our sustainable product portfolio if they meet the criteria. In 2019, Greif used the Green Tool to collaborate with a customer in the chemical specialties industry in Italy to identify more sustainable products for them. The analysis helped identify four projects to present to the customer – transitioning to lighter-weight jerry cans, increasing use of products with high percentages of postconsumer resin (PCR), create and coordinate closed loop packaging in Europe and test Greif's GCUBE Track technology to optimize logistics and supply chain. The customer will be implementing one of these projects in 2020 and will continue to evaluate the remaining for implementation in 2020 or 2021. All new product launches will be analyzed with the Green Tool and added to the portfolio if they meet the criteria.

Impact of engagement, including measures of success

We measure the success of customer engagement through customers actively engaged in sustainability discussions, number of customers completing a Green Tool Analysis, and revenue from sustainability-tagged products. In 2019, we achieved: • 20 customers actively engaged in sustainability discussions • 15 customers completing a Green Tool Analysis • \$430 million in revenue from sustainability-tagged products (9% of total revenue). Size of engagement and percentage of scope 3 emissions are provided as a percentage of revenue attributable to sustainability tagged-products, which are viewed as an outcome of these engagements. Greif collaborates with our customers through a variety of associations, including WBCSD. Greif is an active participant in WBCSD's 41-member Circular Economy working group, which includes 15 Greif customers and 63-member PPA and renewables technology working group, of which 9 members are Greif customers.

C12.1d

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

In 2017 Greif completed our first formal materiality assessment, engaging stakeholders along our value chain to determine significant impacts, risks, and opportunities that are most relevant to Greif and its stakeholders. Our materiality process involved mapping our value chain. As disclosed on the [Stakeholder Engagement & Materiality](#) page of our sustainability report, Greif's value chain consists of raw material suppliers, transportation and distribution partners, customers, end-of-life services (fulfilled by EarthMinded Life Cycle Services (LCS)/CLCM network) and external stakeholders that influence our activities, including investors, communities in which Greif operates and sustainable development organizations in which Greif participates.

Greif engages with our transportation and distribution partners daily to incorporate climate-related factors into our logistics decision-making processes. Since 2014 we have 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.

We include SmartWay certification during our new carrier certification process. Greif's SmartWay-approved carrier base accounts for 89 percent of miles traveled in NA. From 2014 to 2018, we have saved over 231,535 tons of CO2 mass emissions through the use of SmartWay carriers.

Greif engages investors in our climate-related strategy through formal earnings calls, daily interactions, sustainability reporting, and active responses to sustainability assessments, including CDP and EcoVadis. We engage with sustainability assessment firms to ensure accuracy and improve our scores for the investor community. We also attend meetings with current and potential investors to discuss our climate strategy, circular economy strategy, and other aspects of our sustainability program. Greif engages the communities in which we operate through our public reporting, including our sustainability report, social media, attending various conferences, and public meetings in certain cases. For more information on community engagement related to our CLCM joint venture, please visit [Clcmwi.com](#).

Greif engages with the World Business Council for Sustainable Development (WBCSD) and the UN Global Compact (UNGC). Greif began engaging with WBCSD in 2009 to demonstrate our 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. We are proud to have partnered with WBCSD to publish [From Cradle to Grave: Greif's Life Cycle Analysis](#), a case study on how we implement Life Cycle Analysis in our business. In 2019, Greif was an active member of WBCSD's circular economy and PPA & renewables technology working groups. Our CEO delivered the keynote address at WBCSD's 2019 Annual Council Meeting dinner and our 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. We also piloted a risk management program in collaboration with WBCSD to better integrate ESG issues into our enterprise risk management process. In addition to these activities, we continue to engage with WBCSD quarterly and are participating in a program to better ingrain climate-related risk into our enterprise risk management approach.

C12.3

(C12.3) Do you engage in activities that could either directly or indirectly influence public policy on climate-related issues through any of the following?

- Trade associations
- Funding research organizations

C12.3b

(C12.3b) Are you on the board of any trade associations or do you provide funding beyond membership?

Yes

C12.3c

(C12.3c) Enter the details of those trade associations that are likely to take a position on climate change legislation.

Trade association

International Confederation of Plastic Packaging Manufacturers (ICPP).

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

The ICPP's mission is "to promote the safe and efficient manufacturing, use and recycling of plastics packaging." This includes the fields of international transport of plastics packaging and test methods. The ICPP indirectly engages in the realm of climate change through advocating for, and encouraging environmentally sound practices in the management of the packaging life cycle.

How have you influenced, or are you attempting to influence their position?

Our Product Management and Development Director is the President of the ICPP. In this capacity, Greif, along with the ICPP, work with the United Nations' (UN) Committee of Experts on the Safe Transport of Hazardous Goods to promote regulatory aspects of the transport of dangerous goods, international standardization and lessen environmental impact of transportation.

Trade association

American Forest and Paper Association (AF&PA).

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

The AF&PA works to advance the sustainability of the U.S. pulp, paper, packaging and wood products manufacturing industry through public policy and marketplace advocacy. The organization engages directly in climate change and has set an industry-wide goal to reduce GHG emissions by at least 15 percent from 2005 to 2020. The program was recognized by the U.S. Environmental Protection Agency (US EPA) during the 2012 Climate Leadership Conference. Other AF&PA goals include increasing paper recovery and energy efficiency, and promoting sustainable forestry. These goals contribute directly toward climate change mitigation. Between 2005 and 2010, AF&PA membership has reduced their GHG emissions by 10.5 percent, and AF&PA member managed forests and forest products store approximately 10 percent of annual U.S. carbon dioxide emissions, playing a pivotal role in reducing climate change impacts.

How have you influenced, or are you attempting to influence their position?

Greif's Chief Executive Officer serves as a Director for the AF&PA, in addition to serving on the board of directors and executive committee. Through our membership in the AF&PA, Greif supported their 2030 goal setting initiative including goals aimed at reducing GHG emissions and mitigating the effects of climate change. Greif also helps to establish long-term planning goals, form industry committees to work on the most critical sustainability opportunities, and publish annual sustainability reports for the public. By supporting these activities, Greif reinforces the AF&PA's commitment to addressing climate change. Various Greif leaders occupy other AF&PA positions: General Counsel, Resource Committee member, Chairman Containerboard sector, Water subcommittee, Workplace Health and Safety subcommittee, Recovered Fiber Sector group, and Containerboard Sector group.

Trade association

World Business Council for Sustainable Development (WBCSD).

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

The WBCSD works with the global business community to create a sustainable future business, society and environment. The WBCSD's Vision 2050 promotes a global transition to sustainable business including the halving of carbon emissions worldwide through a shift to low-carbon energy systems, the halting of deforestation, incorporating carbon externalities into the marketplace and improving demand-side energy efficiency. Through its Action 2020 initiative, the WBCSD provides solutions for companies to utilize carbon sinks and capture and storage technologies promote zero emissions and increase climate change resilience.

How have you influenced, or are you attempting to influence their position?

Greif's Senior Vice President, Rigid Industrial Packaging & Services and Global Sustainability, directly manages Greif's partnership with the WBCSD. In our partnership, we are active members of the WBCSD ReScale and Factor 10 working groups, contribute to various WBCSD reports, and supported the development of the WBCSD circular economy metrics tool/calculator they published.

Trade association

SERRED (Association of European reconditioners).

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

According to SERRED's website, they provide environmental services to its business partners "by collecting, transporting, cleaning and reprocessing millions of packaging every year. Packaging reuse saves energy and the production of greenhouse gases, making our community a better place in which to live."

How have you influenced, or are you attempting to influence their position?

EarthMinded EMEA's LCS Product Director serves as SERRED's president while other Greif employees hold membership. EarthMinded LCS serves as a means to recondition and remanufacture industrial drums and intermediate bulk containers. By EarthMinded representatives participating in SERRED, Greif brings its leadership and expertise in packaging sustainability.

Trade association

Fiber Box Association (FBA).

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

In response to the growing demand for sustainability practices, the Fibre Box Association formed a sustainability committee to help in "defining and articulating the sustainable practices of the corrugated packaging industry." The FBA promotes sustainable forestry practices and recycling.

How have you influenced, or are you attempting to influence their position?

Greif's Senior Vice President and Group President of Paper Packaging & Services and Soterra LLC, serves as on the FBA's board of directors and as a chairman. Through their leadership, the individual reinforces the FBA's position on climate change by commissioning lifecycle analyses and carbon foot-printing for the industry as a whole, establishing long-term planning goals, forming industry committees to work on the most critical sustainability opportunities, and publishing annual sustainability reports for the public.

Trade association

Reusable Industrial Packaging Association (RIPA).

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

The Reusable Industrial Packaging Association (RIPA) promotes policies and practices that encourage additional use and reuse of reusable industrial and transport packaging. Packaging reuse reduces greenhouse gas emissions and RPCCA seeks to encourage greater use of such packaging by corporations where practical and feasible.

How have you influenced, or are you attempting to influence their position?

Container Life Cycle Management LLC is a member of RIPA.

Trade association

European Industrial Packaging Association (EIPA).

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

The consumption of fossil-based fuels and raw materials cannot be truly considered as 'sustainable', by the simple fact that the natural processes for production of oil, gas and minerals occurs over millions of years, yet they are obtained, refined and consumed within a matter of months. Ideally the manufacture of sustainable industrial packaging, along with the manufacture of any tools or equipment used in such a process, would include use of renewable energy sources such as wind, solar, tidal and wave energy.

How have you influenced, or are you attempting to influence their position?

As Chairman of EIPA, Greif has worked to create a standardized definition for Sustainable Industrial Packaging and worked to create a shared view of the circular economy among industry partners.

C12.3d

(C12.3d) Do you publicly disclose a list of all research organizations that you fund?

No

C12.3f

(C12.3f) What processes do you have in place to ensure that all of your direct and indirect activities that influence policy are consistent with your overall climate change strategy?

[The Greif Way](#), which outlines Greif's core tenets, and our [Environmental Health and Safety Policy](#) cover climate change and inform our organizational strategy, including how we both directly and indirectly influence policy through our activities. Sustainability is a critical component of The Greif Way and permeates our organization. Interaction between Greif and groups influencing climate change are coordinated from our Corporate Headquarters through Greif's Senior Vice President, Rigid Industrial Packaging & Services and Global Sustainability with input from the Board and Peter Watson, Greif's CEO. All Greif employees are expected to engage with our value chain in accordance with our [Code of Business Conduct](#), which sets expectations for Compliance with Laws, Regulations and Policies, People and Planet, and Business Ethics. The code of conduct specifically states our policy regarding political contributions and engagement, "Do not make any payments or donations by or on behalf of Greif to political candidates or political parties or their institutions, agencies or representatives." Further, the policies set forth in the Code of Business Conduct are written to ensure our activities are consistent with our business strategies, including our overall climate change strategy. In 2017, we conducted our first robust materiality assessment. The assessment revealed Ethics & Compliance to be a material topic for our organization. Our [Ethics and Compliance](#) policies are reported as part of our 2019 Sustainability Report. Additionally, we have established a goal to provide online training of the Greif Code of Business Conduct and Ethics to 100 percent of employees with access to computers by 2025. As of 2019, 78 percent of colleagues with access to computers (excluding legacy Caraustar colleagues) completed training on Greif's Code of Business Conduct and Ethics.

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

Greif-AR-10K-Wrap-Final_single-page.pdf

Page/Section reference

1, 15-17, 22

Content elements

Governance

Strategy

Risks & opportunities

Other metrics

Comment

2019 Annual Report

Publication

In voluntary sustainability report

Status

Complete

Attach the document

Greif 2019 Sustainability Report.pdf

Page/Section reference

Relevant content to Greif's holistic sustainability strategy is included on all pages of the report however key content is on the following pages: Governance – 4 Strategy – 9-14, 23-25 Risk & opportunities 23-25, 49-60 Emissions figures – 63 Emissions targets – 62 Other metrics – 63-69

Content elements

Governance

Strategy

Risks & opportunities

Emissions figures

Emission targets

Other metrics

Comment

2019 Sustainability Report

C15. 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.

C15.1

(C15.1) 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 (CEO)	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	4595000000

SC0.2

(SC0.2) Do you have an ISIN for your company that you would be willing to share with CDP?

Please select

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.

SC1.2

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

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
-----------------------	--

SC1.4

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

Please select

SC2.1

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

SC2.2

(SC2.2) Have requests or initiatives by CDP Supply Chain members prompted your organization to take organizational-level emissions reduction initiatives?

Please select

SC3.1

(SC3.1) Do you want to enroll in the 2020-2021 CDP Action Exchange initiative?

Please select

SC3.2

(SC3.2) Is your company a participating supplier in CDP's 2019-2020 Action Exchange initiative?

Please select

SC4.1

(SC4.1) Are you providing product level data for your organization's goods or services?

Please select

Submit your response

In which language are you submitting your response?

English

Please confirm how your response should be handled by CDP

	I am submitting to	Public or Non-Public Submission	Are you ready to submit the additional Supply Chain Questions?
I am submitting my response	Investors Customers	Public	Yes, submit Supply Chain Questions now

Please confirm below

I have read and accept the applicable Terms