Books
Key Performance Indicators

Version 02.03

THESIS
BY THE SUSTAINABILITY CONSORTIUM

About the Books Key Performance Indicators

This THESIS Performance Assessment covers paper-based printed and bound products. This includes, but is not limited to, novels, non-fiction, fiction, travel guides, and manuals. It does not include e-book readers or magazines.
The information you collect for these KPIs should cover your global production and not be specific to any region or buyer (e.g., retailer).
Remember to download the assessment documents to help you in completing the KPIs. Make sure to review the detailed guidance and resources for each KPI. Your work is saved automatically but not shared until you are ready.

Introduction

The Sustainability Insight System, THESIS, from The Sustainability Consortium (TSC) is a comprehensive and holistic solution for understanding environmental and social performance in consumer goods supply chains. These key performance indicators (KPIs) can be used to assess action, transparency, and continuous improvement on the material sustainability issues for brands, manufacturers, and producers.

TSC created this KPI set using its science-based, multi-stakeholder, and full life-cycle development process. TSC members and partners, including manufacturers, retailers, suppliers, service providers, NGOs, civil society organizations, governmental agencies, and academics, contributed valuable perspectives and expertise.

TSC is a global organization dedicated to improving the sustainability of consumer products that also offers a portfolio of services to help drive effective implementation. For more information, please visit www.sustainabilityconsortium.org

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Key Performance Indicators

QUESTION	RESPONSE OPTION
1. Certification - Paper sourcing What percentage of your paper supply, by dry mass, was third-party certified or underwent a third-party legality verification program?	**A.** Not applicable. We do not use virgin fiber in our products. **B.** We are unable to determine at this time or we do not source paper under a forest certification or legality verification program. **C.** The following percentage of our paper supply, by mass, were third-party certified or underwent third-party legality certification: **C1.**_____% of our paper only underwent third-party legality verification. **C2.**_____% of our paper supply was certified as FSC Controlled Wood. **C3.**_____% of our paper supply was certified to the SFI Fiber Sourcing Standard or under a PEFC Due Diligence System. **C4.**_____% of our paper supply was FSC-certified. **C5.**_____% of our paper supply was SFI-certified or certified under another PEFC-endorsed certification.
2. Efficient use - Fiber supply What is the conversion efficiency of your virgin fiber supply?	**A.** Not applicable. We do not use virgin fiber in our products. **B.** We are unable to determine at this time. **C.** We are able to report the following for our conversion efficiency: **C1.**_____% conversion efficiency. **C2.**_____% of our virgin fiber supply is represented in the number reported above.
3. Greenhouse gas emissions - Paper production What percentage of the paper used in your final product, by mass, was produced by suppliers that reported their annual Scope 1 and 2 greenhouse gas emissions?	**A.** We are unable to determine at this time. **B.** The following percentage of paper, by mass, was produced by suppliers that reported Scope 1 and 2 greenhouse gas emissions: **B1.**_____%.
4. Worker health and safety - Paper production How did your organization manage worker health and safety risks in the operations that produced the paper used in your final product?	**A.** We are unable to determine at this time. **B.** We are able to report the following for our supply: **B1.**_____% of our paper supply, by mass, was produced in operations that have performed a risk assessment to identify high-risk areas for health and safety. **B2.**_____% of our paper supply, by mass, was produced in operations that train workers on health and safety procedures. **B3.**_____% of our paper supply, by mass, was produced in operations that implement a verifiable worker health and safety plan. **B4.**_____% of our paper supply, by mass, was produced in operations that have a worker health and safety performance monitoring system in place. **B5.**_____% of our paper supply, by mass, was produced in operations that were audited in the last three years on worker health and safety issues.
5. Recycled and alternative fiber What percentage of your recycled and alternative fiber supply, by dry mass, can be considered the following types of material?	**A.** Not applicable. We only use certified virgin wood-derived fiber in our products. **B.** We are unable to report at this time. **C.** We can report the percentage of our alternative and recycled fiber supply, by dry mass, that can be considered the following types: **C1.**_____% was recycled material that was not third-party verified. **C2.**_____% was recycled material that was third-party verified. **C3.**_____% of our fiber supply, by dry mass, was from alternative natural fibers that were certified or have been determined to have lower life cycle impacts than wood-derived fibers.

6. Greenhouse gas emissions intensity - Manufacturing What was the greenhouse gas emissions intensity associated with company-owned or contract manufacturing facilities that manufactured your final product?	**A.** We are unable to determine at this time. **B.** Our greenhouse gas emissions intensity over our last twelve-month reporting period was: **B1.**_____ kg CO2e per metric tonne of product. **B2.**_____% of our total product, by mass, is represented by the number reported above.
7. Worker health and safety - Manufacturing What was the injury and illness rate at company-owned or contract manufacturing facilities that produced your final product?	**A.** We are unable to determine at this time. **B.** Our injury and illness rate was: **B1.**_____. **B2.**_____% of our product, by mass, is represented by the number reported above.
8. Product design Does your organization formally assess resource conservation, material and process efficiency, and volume or weight optimization as part of the product design?	**A.** We do not consider all of these factors during product design. **B.** We provide designers tools and training enabling them to optimize all of the factors during product design. **C.** In addition to B, we have established goals to address all of these factors and publicly report our progress towards these goals. **D.** In addition to C, we can demonstrate quantified environmental impact reduction as a result of this design process for the following percentage of the products sold, by mass, in this category: **D1.**_____%.
9. Transportation to Retailers What percentage of your final product was transported to downstream retail or distribution centers by logistics providers (carriers) that reported their annual greenhouse gas (GHG) emissions associated with transportation?	**A.** We are unable to determine at this time. **B.** The following percentage of our product, by mass, was shipped to retail or distribution centers by carriers who reported their GHG emissions associated with transportation: **B1.**_____%.

Key Performance Indicators with Guidance

1. CERTIFICATION - PAPER SOURCING

Question

What percentage of your paper supply, by dry mass, was third-party certified or underwent a third-party legality verification program?

Response Options

A. Not applicable. We do not use virgin fiber in our products.

B. We are unable to determine at this time or we do not source paper under a forest certification or legality verification program.

C. The following percentage of our paper supply, by mass, were third-party certified or underwent third-party legality certification:

C1._____% of our paper only underwent third-party legality verification.

C2._____% of our paper supply was certified as FSC Controlled Wood.

C3._____% of our paper supply was certified to the SFI Fiber Sourcing Standard or under a PEFC Due Diligence System.

C4._____% of our paper supply was FSC-certified.

C5._____% of our paper supply was SFI-certified or certified under another PEFC-endorsed certification.

Guidance

Calculation & Scope

Calculate C1 as the dry mass of your paper supply that only underwent third-party legality verification, divided by the total dry mass of your paper supply, then multiply by 100. Do not include in this calculation any supply that is included under one of the other response options.

Calculate C2 as the dry mass of your paper supply that had FSC Controlled Wood certification, divided by the total dry mass of your paper supply, then multiply by 100.

Calculate C3 as the dry mass of your paper supply that was certified to the SFI Fiber Sourcing Standard or sourced under a PEFC-Due Diligence System, divided by the total dry mass of your paper supply, then multiply by 100.

Calculate C4 as the dry mass of your paper supply that was FSC-certified, divided by the total dry mass of your paper supply, then multiply by 100.

Calculate C5 as the dry mass of your paper supply that was SFI-certified or certified under another PEFC-endorsed program, divided by the total dry mass of your paper supply, then multiply by 100.

The sum of C1, C2, C3, C4, and C5 must not exceed 100%. Do not include the same wood supply in the calculation of more than one response option. The last day of the 12-month reporting period must be within 12 months of the completion date of this question.

Certifications, Standards & Tools

CSA - Canadian Standards Association: CSA Group is an internationally-accredited standards development and testing and certification organization that provides consumer product evaluation, education, and training services dedicated to advancing safety, sustainability, and social good. Some programs include environmental product performance, management systems and processes, registry services, worker and workplace safety, energy efficiency verification, and greenhouse gas clean projects. Programs specific to wood sourcing are outlined in Canada's National Standard for Sustainable Forest Management. CSA is a PEFC-endorsed program.
http://www.csagroup.org/

EU Forest Law Enforcement, Governance and Trade Volunteer Partnership Agreement: Voluntary Partnership Agreements (VPAs) are a central element of the EU's strategy in the fight against illegal logging. A VPA is a bilateral trade agreement between the EU and a timber-exporting country outside the EU.
https://www.euflegt.efi.int/vpa

Forest Legality Alliance's Risk Tool: This tool is designed to present useful information about the sourcing of forest products. You can search the tool's content by country or by species to find specific information.
https://forestlegality.org/risk-tool/

FSC Controlled Wood: The Forest Stewardship Council (FSC) Controlled Wood is non-certified material subject to controlled conditions that can be mixed with FSC-certified material during manufacturing FSC-Mix products. This has enabled manufacturers to manage low and fluctuating supplies of FSC certified forest products, while creating demand for FSC certified wood.
https://us.fsc.org/en-us/certification/controlled-wood

FSC Forest Certification: Products with FSC certification come from responsibly managed forests that provide environmental, social, and economic benefits. The following website provides more information related to the principles that guide the certification process.
https://us.fsc.org/en-us/certification

PEFC - Program for the Endorsement of Forest Certification: The Program for the Endorsement of Forest Certification (PEFC) provides guidance for integrating best practices for the entire forest supply chain to ensure that timber and non-timber forest products are produced with consideration of ecological, social, and ethical standards.
http://www.pefc.org

PEFC - Program for the Endorsement of Forest Certification Due Diligence System: The PEFC DDS is an integral part of the PEFC Chain of Custody standard and is the mechanism that avoids the inclusion of timber from controversial sources in products with a PEFC claim.
https://www.pefc.org/for-business/supply-chain-companies

Rainforest Alliance Legality Verification: The Rainforest Alliance's legality verification standards verify the legality of the wood at the forest level and ensures the traceability of legal timber at all points in the supply chain (Chain of Custody).
http://www.rainforest-alliance.org/business/forestry/verification/legal

SFI - Sustainable Forestry Initiative - 2015-2019 Fiber Sourcing Standard: The SFI Fiber Sourcing Standard is for organizations that do not own or manage land but do procure wood directly from forests. Program Participants must show that the raw material in their supply chain comes from legal and responsible sources, whether the forests are certified or not. Primary producers must be third-party audited and certified to the SFI 2015-2019 Fiber Sourcing Standard. SFI is a PEFC-endorsed program.
https://www.sfiprogram.org/fibersourcingstandard/

SFI - Sustainable Forestry Initiative - 2015-2019 Standard: The SFI 2015-2019 Standard addresses sustainable forest management and responsible sourcing. SFI also has a chain of custody standard to track wood and paper flow through the supply chain. SFI is a PEFC-endorsed program.
http://www.sfiprogram.org/sfi-standard/

Hotspots Addressed

1. *Illegal logging - Forestry operations*

2. *Land conversion and deforestation - Forestry operations*

3. *Worker health and safety - Forestry operations*

2. EFFICIENT USE - FIBER SUPPLY

Question	Response Options
What is the conversion efficiency of your virgin fiber supply?	**A.** Not applicable. We do not use virgin fiber in our products. **B.** We are unable to determine at this time. **C.** We are able to report the following for our conversion efficiency: **C1.**_____% conversion efficiency. **C2.**_____% of our virgin fiber supply is represented in the number reported above.

Guidance

Calculation & Scope

Calculate C1 as the dry mass of pulp produced by the mills that produced your virgin fiber supply, divided by the dry mass of wood entering the mills, then multiply by 100.

Alternatively, you may calculate C1 as the average of the most recent conversion efficiency (yield) estimates for the pulp mills that produced your virgin fiber supply, weighted by the mass of fiber supplied by each mill.

Calculate C2 as the dry mass of your virgin fiber supply for which you were able to obtain conversion efficiency data, divided by the total mass of your virgin fiber supply, then multiply by 100.

Perform these calculations using data from a 12-month period that ended within 12 months of the date you respond to this question.

Forest product conversion factors can vary by region, fiber type, and final product. Reference values are provided by the UN Economic Commission and are included in the Background Information.

Background Information

Forest Product Conversion Factors - UN Economic Commission for Europe Region: Forest Product Conversion Factors for the UNECE Region provides ratios of raw material input to the output of wood-based forest products for sixteen countries of the UNECE region.
https://www.unece.org/fileadmin/DAM/timber/publications/DP-49.pdf

Tree Free Paper: A Path to Saving Trees & Forests?: Findings are presented from various investigations into environmental impacts of alternative fiber and paper production systems, including a recent cradle-to-grave life cycle assessment (LCA) of alternative fiber use in production of tissue. The tree-free paper movement is analyzed to determine that reducing or avoiding altogether the use of wood-derived fiber in making paper would, in fact, lead to more extensive forests and more trees.
https://www.dovetailinc.org/portfoliodetail.php?id=5e2f0a77600d1

Hotspots Addressed

***4.** Environmental impacts - Paper and Pulp production*

3. GREENHOUSE GAS EMISSIONS - PAPER PRODUCTION

Question

What percentage of the paper used in your final product, by mass, was produced by suppliers that reported their annual Scope 1 and 2 greenhouse gas emissions?

Response Options

A. We are unable to determine at this time.

B. The following percentage of paper, by mass, was produced by suppliers that reported Scope 1 and 2 greenhouse gas emissions:

B1._____%.

Guidance

Calculation & Scope

Scope 1 and 2 emissions are defined by the Greenhouse Gas Protocol Corporate Standard (2015).

Calculate B1 as the mass of your paper supply from paper suppliers that reported emissions, divided by total mass of your paper supply from all paper suppliers, then multiply by 100.

Reporting can occur through public disclosure or private disclosure from the supplier to your organization directly or through another party.

Perform this calculation using data from a 12-month period that ended within 12 months of the date you respond to this question.

If suppliers completed the CDP Climate Change 2020 Questionnaire, refer to C6.1 and C6.3 to determine if they report emissions.

Certifications, Standards & Tools

Greenhouse Gas Protocol: Calculation Tools: This site provides a list of sector toolsets developed by GHG Protocol, third-party databases, and other tools based on the GHG Protocol standards that can be used to calculate greenhouse gas inventories for use in emissions calculations.
https://ghgprotocol.org/calculation-tools

Background Information

CDP Climate Change Questionnaire: The CDP Climate Change Questionnaire provides questions that assess a company's greenhouse gas emissions, goals, and management. The report provided by CDP provides the overview of the results from companies responding to the request.
https://www.cdp.net/en/guidance/guidance-for-companies

Greenhouse Gas (GHG) Protocol Corporate Standard: The Greenhouse Gas (GHG) Protocol provides guidance and is a useful resource published by the World Resources Institute with the World Business Council for Sustainable Development as a guide for monitoring and accounting for greenhouse gas emissions.
https://ghgprotocol.org/corporate-standard

GRI G4 Sustainability Reporting Guidelines: The GRI G4 Sustainability Reporting Guidelines provide a standard set of metrics for companies to report on material environmental, social, and economic impacts, actions, and outcomes.
https://www.globalreporting.org/standards/

Definitions

Greenhouse gas: Gases that contribute to the greenhouse effect by absorbing infrared radiation in the atmosphere, e.g., carbon dioxide, methane, nitrous oxide, ozone, and chlorofluorocarbons.

Hotspots Addressed

4. *Environmental impacts - Paper and Pulp production*

5. *Energy consumption - Paper production*

4. WORKER HEALTH AND SAFETY - PAPER PRODUCTION

Question

How did your organization manage worker health and safety risks in the operations that produced the paper used in your final product?

Response Options

A. We are unable to determine at this time.

B. We are able to report the following for our supply:

B1._____% of our paper supply, by mass, was produced in operations that have performed a risk assessment to identify high-risk areas for health and safety.

B2._____% of our paper supply, by mass, was produced in operations that train workers on health and safety procedures.

B3._____% of our paper supply, by mass, was produced in operations that implement a verifiable worker health and safety plan.

B4._____% of our paper supply, by mass, was produced in operations that have a worker health and safety performance monitoring system in place.

B5._____% of our paper supply, by mass, was produced in operations that were audited in the last three years on worker health and safety issues.

Guidance

Calculation & Scope

To be included in B1-B5, risk assessments, training programs, safety plans, performance monitoring systems, and audits must be verifiable and address health and safety issues such as worker injury and worker exposure to harmful elements. The assessments and audits must be conducted by second or third parties. The risk assessment must be conducted once per year while the audit must have been conducted at least once every three years, both using a standard based on internationally-recognized principles such as International Labour Organization Occupational Safety and Health Conventions (e.g., No. 155). The standards and websites listed in Background Information below may be helpful for conducting your risk assessment(s) and for understanding appropriate corrective actions, which can inform your responses. See the Certifications, Standards & Tools for examples of initiatives that meet these requirements.

Calculate B1 as the mass of your paper supply that came from operations that have performed a risk assessment to identify high risk areas for health and safety, divided by the total mass of your paper supply, then multiply by 100.

To determine if an operation is high risk for health and safety, you may utilize a country risk analysis tool. The tool should measure the strength of a country's ability to govern and enforce laws, regulations, and internationally recognized principles. The country risk assessment may be a first party systematic review assessment, or external risk analyses tools may be utilized. It must be conducted at least once per year. The country risk assessment can be complemented with risks associated with specific activities, regions, and suppliers.

Calculate B2 as the mass of your paper supply that came from operations that train workers on health and safety procedures, divided by the total mass of your paper supply, then multiply by 100. To be included in B2, the training on health and safety procedures must be available in the language of the employee, including migratory and seasonal workers, and must be renewed as appropriate to maintain competency and implementation of good practices for workers on health and safety procedures and to prevent training exhaustion. Additional worker training may be required to perform job duties. On-site audits, where necessary, should be conducted by second or third parties and must be conducted at least once every three years using a standard based on internationally-recognized principles.

Calculate B3 as the mass of your paper supply that came from operations that implement a verifiable worker health and safety plan, divided by the total mass of your paper supply, then multiply by 100. To be included in B3, a worker health and safety plan must be verifiable and must be available in the language of the employee, including migratory and seasonal workers, and be prominently displayed in the workplace where employees normally report. The plan should include best practices specific to ergonomics; repetitive motions; chemical and particulate exposure; appropriate use of personal protective equipment (PPE); and proper use of tools, machinery, and the handling of animals (if applicable). On-site audits, where necessary, should be conducted by second or

third parties and must be conducted at least once every three years using a standard based on internationally-recognized principles.

Calculate B4 as the mass of your paper supply that came from operations that have a worker health and safety performance monitoring system in place, divided by the total mass of your paper supply, then multiply by 100. To be included in B4, a worker health and safety performance monitoring system should include metrics on issues including, but not limited to, incidence of worker injuries and prevalence of diseases. On-site audits, where necessary, should be conducted by second or third parties and must be conducted at least once every three years using a standard based on internationally-recognized principles.

Calculate B5 as the mass of your paper supply that came from operations that were audited in the last three years on worker health and safety issues, divided by the total mass of your paper supply, then multiply by 100. Audits should be conducted by second or third parties at least once every three years, or more often depending on the requirements of the standard organization. See the Certifications, Standards & Tools for more information. Government regulations or parties in the supply chain may initiate these audits.

To be included in B5, the audits must be verifiable and address preventive measures, freely provided personal protective equipment, identification of worker health and safety hazards and effects on the exposed people, statistics and reasons behind injuries, design of work area, processes, installations, machinery/work equipment, operating processes and work organization, as outlined by internationally-recognized labor principles. Examples include, but are not limited to, principles outlined by the United Nations Global Compact, the International Labour Organization Standards on Occupational Health and Safety.

Perform these calculations using data from a 12-month period that ended within 12 months of the date you respond to this question. Audits must have been conducted in the 36 months prior to the end of the 12-month period.

Certifications, Standards & Tools

Amfori Country Risk Classification: This list classifies countries' risk of social injustice in an effort to assist companies in determining high and low risk for their sourcing and operations.
http://duediligence.amfori.org/CountryRiskClassification

Recommended Practices for Safety and Health Programs: Defines and enforces standards for the safe and healthful working conditions for working men and women. OHSA also provides training, outreach education, and assistance. The OSHA tools can be used for self-evaluations, to compare elements and actions of different health and safety standards, to track implemented actions, identify remaining weaknesses, and strategies for continued improvement.
https://www.osha.gov/shpguidelines/explore-tools.html

SA8000® Standard: Social Accountability International (SAI) is a global non-governmental organization that aims to advance human rights at work via the SA8000® Standard. SA 8000 measures social performance in eight areas that are relevant for workplaces in factories and organizations worldwide.
https://sa-intl.org/programs/sa8000/

Sedex Members Ethical Trade Audit: Sedex Members Ethical Trade Audit is an auditing system that aligns with Ethical Trading Initiative's Base Code as well International Labour Organization Conventions. It has been developed to provide a public auditing methodology and format for companies to use to assess compliance.
https://www.sedex.com/our-services/smeta-audit/

Background Information

IS0 26000 Social Responsibility: ISO 2600 is not a certification tool, but it offers guidance about social responsibility to all sorts of organizations regardless of their activity, size or location.
https://www.iso.org/iso-26000-social-responsibility.html

Social Accountability International Guidance Document for Social Accountability 8000: According to Social Accountability International, "this guidance document provides various tools and information for users of the Social Accountability 8000 standard, including definitions, background information, and examples."
https://sa-intl.org/wp-content/uploads/2020/02/SA8000-2014-Guidance-Document.pdf

United Nations Global Compact Human Rights and Business Dilemmas Forum: United Nations Global Compact Human Rights and Business Dilemmas Forum present an introduction to, analysis of, and business recommendations for minimizing social sustainability risks in the supply chain.

https://www.unglobalcompact.org/library/9

Definitions

Corrective actions: Prompt actions taken to eliminate the causes of a problem, thus preventing their recurrence.

First party systematic risk assessment: A first party systematic risk assessment is conducted by the organization itself for management review and other internal purposes and may form the basis for an organization's declaration of conformity.

Risk assessment: A systematic process to evaluate potential risks within an operation, system, or supply chain. It can include an on-site audit by a second party or third party or a country risk classification analysis that judges the site risk due to prevailing conditions, controls, or other mitigating factors.

Second-party audit: An audit conducted by a party having an interest in the organization, such as customers, or by another entity on their behalf.

Third-party audit: An audit conducted by external, independent auditing organizations, such as those providing certification of conformity to a standard.

Verifiable: Having the ability to demonstrate, through a reputable assessor, the truth or accuracy of a claim.

Worker exposure to harmful elements: Contact with potentially harmful chemical, physical, or biological elements that occurs as a result of one's job-related activities. Examples include chronic interaction with chemicals, dusts, radiation, environmental elements, allergens, noise, and vibrations.

Worker health and safety: Worker health and safety consists of worker injury and worker exposure to harmful elements. Please see the corresponding terms.

Worker injury: Physical damage to an individual due to a single act that causes immediate damage or repetitive acts that cause damage over time. Examples of causes of injury include repetitive motions, non-ergonomic motions, damage from use of tools and machinery, falls, and burns.

Hotspots Addressed

6. *Worker health and safety - Intermediate production*

7. *Solvent use - Printing operations*

8. *Chemical use - Pulp production*

5. RECYCLED AND ALTERNATIVE FIBER

Question

What percentage of your recycled and alternative fiber supply, by dry mass, can be considered the following types of material?

Response Options

A. Not applicable. We only use certified virgin wood-derived fiber in our products.

B. We are unable to report at this time.

C. We can report the percentage of our alternative and recycled fiber supply, by dry mass, that can be considered the following types:

C1._____% was recycled material that was not third-party verified.

C2._____% was recycled material that was third-party verified.

C3._____% of our fiber supply, by dry mass, was from alternative natural fibers that were certified or have been determined to have lower life cycle impacts than wood-derived fibers.

Guidance

Calculation & Scope

Calculate C1 as the dry mass of your recycled and alternative fiber supply that was recycled material and not third-party verified, divided by the total dry mass of your recycled and alternative fiber supply, then multiply by 100. Include both pre- and post-consumer recycled material

Calculate C2 as the dry mass of your recycled and alternative fiber supply that was recycled material and third-party verified, divided by the total dry mass of your recycled and alternative fiber supply, then multiply by 100. Include both pre- and post-consumer recycled material. Verification may be through certification to the SFI Fiber Sourcing Standard, PEFC-endorsed standards, or as FSC Recycled material. Other third-party verification such as an audit may also be used.

Co-products from virgin material and forestry waste are not considered recycled material.

Calculate C3 as the dry mass of your alternative fiber supply that was certified or has been determined to have lower environmental impact than wood-derived fibers, divided by the total dry mass of your recycled and alternative fiber supply, then multiply by 100. Differences in environmental impact must be demonstrated through a life cycle assessment conducted in accordance with ISO 14040:2006 or another externally reviewed study. Differences in social impact must be demonstrated by an externally reviewed, publicly available study. Impacts addressed must include biodiversity and food security. Alternative fiber that has been certified under the Roundtable on Sustainable Biomaterials Standard, FSC standards, SFI standards, or a PEFC-endorsed certification system may also be included in the calculation.

The sum of C1, C2, and C3 may not exceed 100%.

Perform these calculations using data from a 12-month period that ended within 12 months of the date you respond to this question.

Certifications, Standards & Tools

FSC Forest Certification: Products with FSC certification come from responsibly managed forests that provide environmental, social, and economic benefits. The following website provides more information related to the principles that guide the certification process.
https://us.fsc.org/en-us/certification

PEFC - Program for the Endorsement of Forest Certification: The Program for the Endorsement of Forest Certification (PEFC) provides guidance for integrating best practices for the entire forest supply chain to ensure that timber and non-timber forest products are produced with consideration of ecological, social, and ethical standards.
http://www.pefc.org

SFI - Sustainable Forestry Initiative - 2015-2019 Standard: The SFI 2015-2019 Standard addresses sustainable forest management and responsible sourcing. SFI also has a chain of custody standard to track wood and paper flow through the supply chain. SFI is a PEFC-endorsed program.
http://www.sfiprogram.org/sfi-standard/

	The Responsible Alternative Fibers Methodology: The Responsible Alternative Fibers Assessment Methodology (RAFAM) is a tool that helps assess the environmental and social issues associated with production of alternative plants grown as feedstock for pulp and paper applications. https://www.worldwildlife.org/publications/responsible-alternative-fibers-assessment-methodology **The Roundtable for Sustainable Biomaterials Certification:** The Roundtable on Sustainable Biomaterials (RSB) is an independent and global multi-stakeholder coalition which works to promote the sustainability of biomaterials. The certification verifies that biomaterials are ethical, sustainable and credibly-sourced. https://rsb.org/?s=CERTIFICATION#
Background Information	**United States Environmental Protection Agency: Paper Task Force:** This document is the result of a collaboration to reduce environmental impacts from the pulp and paper industry. https://19january2017snapshot.epa.gov/www3/epawaste/conserve/tools/warm/pdfs/EnvironmentalDefenseFund.pdf
Definitions	**Alternative materials:** Materials that are substitutes for conventional materials, however are not commonly used. These materials can be used to reduce environmental and social impacts. **Post-consumer recycled material:** "Material generated by households or by commercial, industrial, and institutional facilities in their role as end-users of the product that can no longer be used for its intended purpose. This includes returns of materials from the distribution chain." (ISO 14021:2016 - Environmental labels and declarations — Self-declared environmental claims (Type II environmental labelling)) **Pre-consumer recycled material:** "Material diverted from the waste stream during the manufacturing process. Excluded is reutilization of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it." (ISO 14021:2016 - Environmental labels and declarations — Self-declared environmental claims (Type II environmental labelling))
Hotspots Addressed	***4.** Environmental impacts - Paper and Pulp production*

6. GREENHOUSE GAS EMISSIONS INTENSITY - MANUFACTURING

Question

What was the greenhouse gas emissions intensity associated with company-owned or contract manufacturing facilities that manufactured your final product?

Response Options

A. We are unable to determine at this time.

B. Our greenhouse gas emissions intensity over our last twelve-month reporting period was:

B1._____ kg CO2e per metric tonne of product.

B2._____% of our total product, by mass, is represented by the number reported above.

Guidance

Calculation & Scope

Included in the scope of this question are fuels combusted and electricity used in facilities that perform final manufacturing activities, as well as trace gases released during manufacture. This may include some or all of your organization's corporate scope 1 and 2 emissions, as well as scope 1 and 2 emissions from any final manufacturing facilities not within your organization's financial or operational control (e.g., contract manufacturers). Excluded from the scope of this question are GHG allowances, offsets, and credits.

You may calculate B1 using product-specific data or estimate intensity via facility data that is not product specific. If using product-specific data, calculate B1 as the average of each product's greenhouse gas emissions intensity, weighted by the total mass produced of each product.

If using facility data, calculate B1 as the average of each final manufacturing facility's greenhouse gas emissions intensity, weighted by the total mass of final product produced. If the manufacturing facilities produce more than one category of product, only weight using the total mass of production specific to the product category in question.

Calculate B2 as the mass of final products for which you are able to obtain data, divided by total mass of final products produced, then multiply by 100. For each final manufacturing facility, follow the instructions in the Greenhouse Gas Protocol Corporate Standard (2015) to calculate scope 1 and 2 greenhouse gas emissions generated from electricity purchased or produced, fuels combusted, and trace gases released, and then add them together. Worksheets are available on the GHG Protocol web site to facilitate these calculations.

Perform these calculations using data from a 12-month period that ended within 12 months of the date you respond to this question.

The data required for the CDP Climate Change 2020 Questionnaire combined with production data can be used to calculate your response (refer to C7.3b and C7.6b). The data required for "Disclosure 302-1 Energy consumption within the organization" in GRI 302: Energy 2016 or "Disclosure 305-1 Direct (Scope 1) GHG emissions" and "Disclosure 305-2 Energy indirect (Scope 2) GHG emissions" in GRI 305: Emissions 2016 can also be used to calculate your response.

Certifications, Standards & Tools

CDP Climate Change Questionnaire: The CDP Climate Change Questionnaire provides questions that assess a company's greenhouse gas emissions, goals, and management. The report provided by CDP provides the overview of the results from companies responding to the request.
https://www.cdp.net/en/guidance/guidance-for-companies

Greenhouse Gas Protocol: Calculation Tools: This site provides a list of sector toolsets developed by GHG Protocol, third-party databases, and other tools based on the GHG Protocol standards that can be used to calculate greenhouse gas inventories for use in emissions calculations.
https://ghgprotocol.org/calculation-tools

GRI G4 Sustainability Reporting Guidelines: The GRI G4 Sustainability Reporting Guidelines provide a standard set of metrics for companies to report on material environmental, social, and economic impacts, actions, and outcomes.
https://www.globalreporting.org/standards/

Background Information	**Greenhouse Gas (GHG) Protocol Corporate Standard:** The Greenhouse Gas (GHG) Protocol provides guidance and is a useful resource published by the World Resources Institute with the World Business Council for Sustainable Development as a guide for monitoring and accounting for greenhouse gas emissions. https://ghgprotocol.org/corporate-standard
Definitions	**Greenhouse gas:** Gases that contribute to the greenhouse effect by absorbing infrared radiation in the atmosphere, e.g., carbon dioxide, methane, nitrous oxide, ozone, and chlorofluorocarbons.
Hotspots Addressed	***9.*** *Energy consumption - Book printing* ***10.*** *Energy consumption - Magazine printing*

7. WORKER HEALTH AND SAFETY - MANUFACTURING

Question

What was the injury and illness rate at company-owned or contract manufacturing facilities that produced your final product?

Response Options

A. We are unable to determine at this time.

B. Our injury and illness rate was:

B1._____.

B2._____% of our product, by mass, is represented by the number reported above.

Guidance

Calculation & Scope

This question aligns with the United States Occupational Safety and Health Administration (OSHA) Injury and Illness rate. This rate can be normalized for global applicability.

Calculate B1 according to OSHA's injury and illness rate by multiplying the number of recordable injuries and illnesses by 200,000. Divide this number by the total employee hours worked to produce your final product. If multiple facilities manufacture the final product, the injury and illness rate will need to be adjusted using a weighted average based on each facility's percentage of total production. Include all employees at a facility that participate in the production of the final product. This includes both full-time and contracted employees.

Calculate B2 as the mass of your final product for which you were able to obtain data, divided by the total mass of your final product, then multiply by 100.

Perform these calculations using data from a 12-month period that ended within 12 months of the date you respond to this question.

THESIS General Guidance document provides guidance to calculate the weighted average. See Background Information for access to this document.

The Incidence Rate Calculator and Comparison Tool is an online calculator that will compute your injury and illness rate. The OSHA Forms for Recording Work-Related Injuries and Illnesses provides forms and information for computing your facility injury and illness rate.

Certifications, Standards & Tools

THESIS Help Center Video: Worker Health and Safety - Manufacturing KPI: Short video tutorial on the Worker Health and Safety - Manufacturing KPI. Use case-sensitive password 'thesis' when prompted.
https://vimeo.com/520108472

Background Information

How to Compute a Firm's Incidence Rate for Safety Management: This website from the U.S. Bureau of Labor Statistics provides in-depth guidance on computing injury and illness numbers.
https://www.bls.gov/iif/osheval.htm

SA8000® Standard: Social Accountability International (SAI) is a global non-governmental organization that aims to advance human rights at work via the SA8000® Standard. SA 8000 measures social performance in eight areas that are relevant for workplaces in factories and organizations worldwide.
https://sa-intl.org/programs/sa8000/

Definitions

Company-owned or contract manufacturing facilities: Facilities responsible for manufacturing and assembly of final products, whether these facilities are internal or external to the respondent’s organization.

Worker exposure to harmful elements: Contact with potentially harmful chemical, physical, or biological elements that occurs as a result of one's job-related activities. Examples include chronic interaction with chemicals, dusts, radiation, environmental elements, allergens, noise, and vibrations.

Worker health and safety: Worker health and safety consists of worker injury and worker exposure to harmful elements. Please see the corresponding terms.

	Worker injury: Physical damage to an individual due to a single act that causes immediate damage or repetitive acts that cause damage over time. Examples of causes of injury include repetitive motions, non-ergonomic motions, damage from use of tools and machinery, falls, and burns.
Hotspots Addressed	***7.*** *Solvent use - Printing operations*

8. PRODUCT DESIGN

Question	Response Options
Does your organization formally assess resource conservation, material and process efficiency, and volume or weight optimization as part of the product design?	**A.** We do not consider all of these factors during product design. **B.** We provide designers tools and training enabling them to optimize all of the factors during product design. **C.** In addition to B, we have established goals to address all of these factors and publicly report our progress towards these goals. **D.** In addition to C, we can demonstrate quantified environmental impact reduction as a result of this design process for the following percentage of the products sold, by mass, in this category: **D1.**_____%.

Guidance

Calculation & Scope

This question applies to producers of converted paper products and addresses prevention of the impacts of pulp production via source reduction and material efficiency.

The percentage response is calculated as the percentage of product sold in the last twelve months, by mass, for which quantified environmental impact reductions have been demonstrated since the inception of the product or purchase of the brand (if post-inception).

Perform this calculation using data from a 12-month period that ended within 12 months of the date you respond to this question.

A weighted average may be calculated for different product types in the same product category.

Methods for demonstrating quantified environmental impact reduction include but are not limited to life cycle impact assessment or assessment against ISO Standard 14040. Resource conservation in this context refers to prevention by source reduction. It should be noted that continual source reduction has benefits, but there are tradeoffs that must be assessed.

Certifications, Standards & Tools

ISO 14040:2006: ISO 14040:2006 is the International Organization for Standardization's "Principles and Framework" document for conducting life cycle assessments.
https://www.iso.org/standard/37456.html

Hotspots Addressed

4. *Environmental impacts - Paper and Pulp production*

5. *Energy consumption - Paper production*

9. TRANSPORTATION TO RETAILERS

Question

What percentage of your final product was transported to downstream retail or distribution centers by logistics providers (carriers) that reported their annual greenhouse gas (GHG) emissions associated with transportation?

Response Options

A. We are unable to determine at this time.

B. The following percentage of our product, by mass, was shipped to retail or distribution centers by carriers who reported their GHG emissions associated with transportation:
B1._____%.

Guidance

Calculation & Scope

Include shipments of your product from final manufacturing facilities to downstream retailers or distributors. Include both company-owned and contracted fleet. Exclude data for return trips.

If retailers are responsible for the transportation of some or all of your final product, the retailer may hold the information necessary to calculate your response. It may be made available in a public report or by request.

Calculate B1 as the mass of product transported by carriers that reported emissions, divided by total mass of product transported, then multiply by 100.

Reporting can occur through public disclosure or private disclosure from the supplier to your organization directly or through another party.

Perform this calculation using data from a 12-month period that ended within 12 months of the date you respond to this question.

If a supplier completed the CDP Climate Change 2020 Questionnaire, you may count that as compliance with this question.

Certifications, Standards & Tools

CDP Climate Change Questionnaire: The CDP Climate Change Questionnaire provides questions that assess a company's greenhouse gas emissions, goals, and management. The report provided by CDP provides the overview of the results from companies responding to the request.
https://www.cdp.net/en/guidance/guidance-for-companies

THESIS Help Center Video: Transportation to Retailers KPI: Short video tutorial on the Transportation to Retailers KPI. Use case-sensitive password 'thesis' when prompted.
https://vimeo.com/529545735

Background Information

Greenhouse Gas Protocol: Calculation Tools: This site provides a list of sector toolsets developed by GHG Protocol, third-party databases, and other tools based on the GHG Protocol standards that can be used to calculate greenhouse gas inventories for use in emissions calculations.
https://ghgprotocol.org/calculation-tools

Hotspots Addressed

11. *Fuel combustion - Distribution*

Category Sustainability Profile

Hotspots

Hotspots are activities in a product's life cycle that have a documented environmental or social impact. TSC evaluates the quality and quantity of the scientific sources of evidence for each hotspot according to a defined decision tree before they are included in the CSP. Items marked with an asterisk (*) are *additional issues* that have not achieved the same level of evidence as a hotspot. For more information on the methodology TSC uses to identify hotspots visit: http://www.sustainabilityconsortium.org/toolkit-methodology

RAW MATERIAL EXTRACTION

1. Illegal logging - Forestry operations Harvesting timber illegally may lead to losses of biodiversity and ecosystem services, to infringement on local communities' land rights, and revenue from illegal harvesting may also be used to finance armed conflict. **Related Improvement Opportunities** ***1.*** *Implement programs to minimize illegal logging* ***4.*** *Increase the use of wood from certification and third-party verified traceability programs* **KPIs** ***1.*** *Certification - Paper sourcing*	**References** ▪ Alemagi & Kozak, 2010 ▪ Davis, 2005 ▪ Gutierrez-Velez & MacDicken, 2008 ▪ Islam & Sato, 2012 ▪ Kuemmerle et al., 2009 ▪ Newsom, 2005 ▪ Sikor & To, 2011
2. Land conversion and deforestation - Forestry operations Ineffective forest management and the conversion of natural forest can lead to losses of biodiversity and ecosystem services and to greenhouse gas emissions. **Related Improvement Opportunities** ***2.*** *Implement sustainable forestry best management practices* ***4.*** *Increase the use of wood from certification and third-party verified traceability programs* ***5.*** *Preservation of high conservation value areas* **KPIs** ***1.*** *Certification - Paper sourcing*	**References** ▪ Adeoye & Ayeni, 2011 ▪ Bengtsson, Nilsson, Frank, & Menozzi, 2000 ▪ Durall, Gamiet, Simard, Kudrna, & Sakakibara, 2006 ▪ Pykala, 2004 ▪ Sangermano, Toledano, & Eastman, 2012 ▪ Siikamaki & Newbold, 2012
3. Worker health and safety - Forestry operations* Poor working and living conditions, long working hours, and inappropriate use of safety equipment leads to increased risk of worker injury or fatality and to a decreased quality of life in local communities. **Related Improvement Opportunities** ***3.*** *Improved job training and safety education* ***4.*** *Increase the use of wood from certification and third-party verified traceability programs* **KPIs** ***1.*** *Certification - Paper sourcing*	**References** ▪ Lawson, 2010 ▪ Ozden, Nayir, & Gol, 2011

INTERMEDIATE PRODUCTION

4. Environmental impacts - Paper and Pulp production Energy consumption for paper and pulp production leads to fossil fuel resource depletion, to climate change effects from greenhouse gas emissions, to adverse effects to human health from smog formation, and to emissions that lead to ecosystem acidification. Emissions to air and water from the use of chemicals for pulping and bleaching lead to eutrophying and acidifying emissions, which can impact ecosystems. Adsorbable Organic Halogens (AOX) emissions from bleaching and increased chemical oxygen demand (COD) from the pulp production process can lead to water quality impacts such as ecotoxicity and eutrophication. Water use during pulp production can lead to the depletion of freshwater resources. **Related Improvement Opportunities** ***6.*** *Eliminate elemental chlorine in the paper bleaching process* ***7.*** *Encourage the sustainable increase of reclaimed fiber use as appropriate* ***8.*** *Use of enzymes to increase production efficiency* ***9.*** *Use of pollution prevention technologies* **KPIs** ***2.*** *Efficient use - Fiber supply* ***3.*** *Greenhouse gas emissions - Paper production* ***5.*** *Recycled and alternative fiber* ***8.*** *Product design*	**References** ▪ American Forest & Paper Association, 2010 ▪ Boguski, 2010 ▪ Clement, 2011 ▪ Dias, Arroja, & Capela, 2007 ▪ Kozak, 2003 ▪ Lopes, Dias, Arroja, Capela, & Pereira, 2003 ▪ NCASI, 2013 ▪ Picken, Yuen, & Hennings, 2002 ▪ Pihkola et al., 2010
5. Energy consumption - Paper production Electricity production and energy consumption for manufacture of book and coated magazine paper leads to depletion of non-renewable resources and emissions of carbon dioxide, nitrogen oxides, particulate matter, and sulfur dioxide from combustion of fuels, which can impact human health and lead to ecosystem acidification and climate change. **Related Improvement Opportunities** ***7.*** *Encourage the sustainable increase of reclaimed fiber use as appropriate* ***8.*** *Use of enzymes to increase production efficiency* ***10.*** *Measuring and reporting energy use and greenhouse gas emissions* **KPIs** ***3.*** *Greenhouse gas emissions - Paper production* ***8.*** *Product design*	**References** ▪ Boguski, 2010 ▪ Clement, 2011 ▪ Kozak, 2003 ▪ Pihkola et al., 2010
6. Worker health and safety - Intermediate production* Worker exposure to carcinogens and particulate matter during pulping and paper making leads to risk of injury, disease, and fatality. **Related Improvement Opportunities** ***11.*** *Worker safety assessment and planning* **KPIs** ***4.*** *Worker health and safety - Paper production*	**References** ▪ Jaakkola, Ritva, & Jaakkola, 2003 ▪ Pan, Ugnat, & Mao, 2005

MANUFACTURING AND ASSEMBLY

7. Solvent use - Printing operations* Volatile organic compounds are released by the printing process, mainly from the damping systems and cleaning solvents, which can impact worker health. **Related Improvement Opportunities** ***12.*** *Illustration gravure best available technologies* ***13.*** *Offset printing best available technologies* **KPIs** ***4.*** *Worker health and safety - Paper production* ***7.*** *Worker health and safety - Manufacturing*	**References** ▪ Jepsen & Tebert, 2003 ▪ Rothenberg, Toribio & Becker, 2002
8. Chemical use - Pulp production Emissions to air and water from the use of chemicals for pulping and bleaching lead to eutrophying and acidifying emissions, which can impact ecosystems. **Related Improvement Opportunities** ***15.*** *Eliminate elemental chlorine in the paper bleaching process* **KPIs** ***4.*** *Worker health and safety - Paper production*	**References** ▪ Dias, Arroja, & Capela, 2007 ▪ Lopes, Dias, Arroja, Capela, & Pereira, 2003 ▪ Madsen, 2007 ▪ NCASI, 2013
9. Energy consumption - Book printing Electricity consumption for book printing leads to emissions that contribute to climate change, ecosystem acidification, and ozone depletion. **Related Improvement Opportunities** ***14.*** *Use of inkjet presses* **KPIs** ***6.*** *Greenhouse gas emissions intensity - Manufacturing*	**References** ▪ Kozak, 2003
10. Energy consumption - Magazine printing Energy consumption for printing operations during magazine production leads to depletion of non-renewable resources, climate change from combustion of fuels. Fossil fuel combustion for electricity used during printing operations leads to emissions that contribute to climate change. **Related Improvement Opportunities** ***14.*** *Use of inkjet presses* **KPIs** ***6.*** *Greenhouse gas emissions intensity - Manufacturing*	**References** ▪ Boguski, 2010 ▪ Pihkola et al., 2010

DISTRIBUTION

11. Fuel combustion - Distribution

Fuel combustion for distribution of books from the print service provider to retailers leads to non-renewable resource depletion and nitrogen oxide, particulate matter, and sulfur dioxide emissions which impact human health and contribute to climate change.

Related Improvement Opportunities

16. *Maximize efficiency of transportation modes and routes*

KPIs

9. *Transportation to Retailers*

References

- Clement, 2011

Improvement Opportunities

Improvement opportunities are practices that address one or more environmental or social hotspots and are actionable by brand manufacturers or their suppliers. TSC evaluates the quality of the evidence supporting each improvement opportunity according to a defined decision tree before including it in the CSP. For more information on the methodology TSC uses to identify hotspots visit: http://www.sustainabilityconsortium.org/toolkit-methodology

RAW MATERIAL EXTRACTION

1. Implement programs to minimize illegal logging Policies, plans, and programs to prevent illegal sourcing can include third-party certifications; policies that conform to forest law enforcement, governance, and trade plans; and risk assessments combined with purchasing policies that avoid areas of high risk. **Related Hotspots** ***1.*** *Illegal logging - Forestry operations*	**References** ▪ Alemagi & Kozak, 2010 ▪ Gutierrez-Velez & MacDicken, 2008
2. Implement sustainable forestry best management practices Reduce non-point source pollution by preharvest thinning, preserving streamside management areas, revegetating disturbed areas, optimizing forest chemical management, protecting wetland areas, and implementing best management practices specific to road construction and management, timber harvesting, preparation sites, and fire management. **Related Hotspots** ***2.*** *Land conversion and deforestation - Forestry operations*	**References** ▪ Arkansas Forestry Commission, 2011 ▪ Bawa & Seidler, 1998 ▪ Mbatu, 2009 ▪ Page-Dumroese et al., 2000 ▪ US EPA, 1993
3. Improved job training and safety education Improve worker health and safety by implementing a training program regarding personal protective equipment and industry standards for forestry safety. **Related Hotspots** ***3.*** *Worker health and safety - Forestry operations*	**References** ▪ Gandaseca & Yoshimura, 2001 ▪ Lawson, 2010 ▪ Ozden, Nayir, & Gol, 2011
4. Increase the use of wood from certification and third-party verified traceability programs Use third-party verified traceability and certification systems to address social and environmental risks at the forest management level and to ensure transparency along the supply chain. Effective traceability systems (for non-certified fiber) and certification systems should be rigorous, transparent, and involve multiple stakeholders, and should provide clear rules for sustainable forest management. **Related Hotspots** ***1.*** *Illegal logging - Forestry operations* ***2.*** *Land conversion and deforestation - Forestry operations* ***3.*** *Worker health and safety - Forestry operations*	**References** ▪ Espach, 2006 ▪ Forest Stewardship Council, 2012 ▪ Kuemmerle et al., 2009 ▪ Newsom, 2005 ▪ Newsom, Bahn, & Cashore, 2006 ▪ Nogueron, Laestadius, & Lawson, 2009 ▪ Salo, 2003 ▪ Sangermano, Toledano, & Eastman, 2012 ▪ Siikamaki & Newbold, 2012 ▪ World Wildlife Fund, 2006 ▪ World Wildlife Fund, 2010b
5. Preservation of high conservation value areas Protecting high conservation value habitat (e.g., old growth, forest habitat for endangered, threatened, critically imperiled, and vulnerable species) protects biodiversity and avoids significant carbon emissions to the atmosphere. **Related Hotspots** ***2.*** *Land conversion and deforestation - Forestry operations*	**References** ▪ Durall, Gamiet, Simard, Kudrna, & Sakakibara, 2006 ▪ Keith, Mackey, & Lindenmayer, 2009

INTERMEDIATE PRODUCTION

6. Eliminate elemental chlorine in the paper bleaching process Reduce emissions associated with the use of elemental chlorine during pulping through the use of elemental chlorine free (ECF), totally chlorine free (TCF), or process chlorine free (PCF) bleaching processes. **Related Hotspots** ***4.*** *Environmental impacts - Paper and Pulp production*	**References** ▪ Miller, Justiniano, & McQueen, 2005
7. Encourage the sustainable increase of reclaimed fiber use as appropriate Incorporating post-production and post-consumer recycled content has benefits, but there are also tradeoffs that have to be assessed. The net benefit or net negative of increasing the use of reclaimed fiber will be facility-specific. **Related Hotspots** ***4.*** *Environmental impacts - Paper and Pulp production* ***5.*** *Energy consumption - Paper production*	**References** ▪ Miller, Justiniano, & McQueen, 2005 ▪ Paper Task Force, 1995
8. Use of enzymes to increase production efficiency The use of enzymes during pulp production can reduce energy use and emissions by improving efficiencies of bleaching, de-inking, and thermomechanical pulping, among others. **Related Hotspots** ***4.*** *Environmental impacts - Paper and Pulp production* ***5.*** *Energy consumption - Paper production*	**References** ▪ Skals et al., 2008
9. Use of pollution prevention technologies Pollution prevention technologies during pulp production can improve wastewater emissions quality. **Related Hotspots** ***4.*** *Environmental impacts - Paper and Pulp production*	**References** ▪ Miller, Justiniano, & McQueen, 2005 ▪ Paper Task Force, 1995
10. Measuring and reporting energy use and greenhouse gas emissions Improve energy efficiency during manufacturing by establishing publicly available goals, implementing tracking systems, employing best management practices, and publicly reporting energy use. **Related Hotspots** ***5.*** *Energy consumption - Paper production*	**References** ▪ Environmental Paper Assessment Tool, 2012 ▪ Global Reporting Initiative, 2013 ▪ Lopes, Dias, Arroja, Capela, & Pereira, 2003 ▪ Miller, Justiniano, & McQueen, 2005 ▪ PE International, 2009
11. Worker safety assessment and planning Implement a program to monitor and control worker exposure to carcinogens and particulate matter that includes comprehensive hazard or risk assessment, worker training on safety procedures, and is compliance assured. **Related Hotspots** ***6.*** *Worker health and safety - Intermediate production*	**References** ▪ Cooper, 2009 ▪ International Finance Corporation & World Bank Group, 2007

MANUFACTURING AND ASSEMBLY

12.	**Illustration gravure best available technologies** Best available technologies for reducing volatile organic compounds during gravure printing include use of reduced toluene inks, ventilation at ink and solvent collection locations, alternative cleaning agents, and engineering controls. **Related Hotspots** ***7.*** *Solvent use - Printing operations*	**References** ▪ Jepsen & Tebert, 2003
13.	**Offset printing best available technologies** Best available technologies for reducing volatile organic compounds during offset printing include use of high boiling point substances for cleaning, improved handling of cleaning agents, use of blanket washers, switching to waterless offset printing, reduction of isopropanol, use of isopropanol substitutes, automated dosing of isopropanol, using water-miscible cleaning solvents, vegetable oil based blanket washes, or terpene cleaners. **Related Hotspots** ***7.*** *Solvent use - Printing operations*	**References** ▪ Jepsen & Tebert, 2003 ▪ Rothenberg, Toribio & Becker, 2002
14.	**Use of inkjet presses** Use of inkjet printing presses, combined with web-based, digital data transmission can reduce energy use and associated emissions compared to offset presses with analog data transfer. **Related Hotspots** ***9.*** *Energy consumption - Book printing* ***10.*** *Energy consumption - Magazine printing*	**References** ▪ Clement, 2011
15.	**Eliminate elemental chlorine in the paper bleaching process** Reduce emissions associated with the use of elemental chlorine during pulping through the use of elemental chlorine free (ECF), totally chlorine free (TCF), or process chlorine free (PCF) bleaching processes. **Related Hotspots** ***8.*** *Chemical use - Pulp production*	**References** ▪ Miller, Justiniano, & McQueen, 2005

DISTRIBUTION

16.	**Maximize efficiency of transportation modes and routes** Increase fuel efficiency through transportation planning. Work with transportation providers to encourage the use of fuel-efficient engine designs. **Related Hotspots** ***11.*** *Fuel combustion - Distribution*	**References** ▪ United States Environmental Protection Agency, 2013d

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Release Notes

*** 02.03.10, May 2021 ***
- In-text references and broken resource links (URLs) included in the KPI guidance were updated to the most recent available versions. Where no alternative resource was available, the item was substituted with a comparable resource or was removed.

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02.03.10 May 2020

- In-text references and broken resource links (URLs) included in the KPI guidance were updated to the most recent available versions

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*** 02.03.10, June 2019 ***
- Broken links referenced in the KPI guidance were corrected.
- KPI guidance language referencing CDP's Questionnaire for Climate Change was updated to reflect the 2019 version.
- Transportation to Retailer KPI guidance language referencing how to respond in situations where retailers are responsible for the transportation of some or all of the final product.
- The upstream Worker Health and Safety KPI was updated based on input received from TSC's Social Task Force. The response options for this KPI include a series of practices companies may enact to manage worker health and safety risks including risk assessment, training, and audits.

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02.02.10, June 2018
- Broken links referenced in the KPI guidance were corrected.
- KPI guidance language referencing CDP's Information Requests for Climate Change and Water were updated to reflect the 2018 versions.

02.02.10, June 2017
Language referring to the "last twelve months" was removed from the question and/or response options text to avoid any confusion with the related statement in the "Calculation and Scope" of the Guidance. The following KPIs were affected:
- Greenhouse gas emissions intensity – Paper production
- Worker health and safety – Manufacturing

Recycled and alternative fiber KPI
- Response options: The scoring of response options C2 (1.000) & C3 (1.000) are equal because the intent of the KPI is to track the use of both alternative and recycled fiber with both being suitable options.

Transportation to Retailers:
- The question and response options were changed to address whether carriers report GHG emissions rather than what those aggregate emissions are.

TSC's Multi-stakeholder Process
The Sustainability Consortium (TSC) is a multi-stakeholder organization comprised of leading companies, non-profit organizations, and other members that represent broad perspectives on sustainability. To build a KPI set that can be deployed widely, TSC acknowledges that members have diverse points of view. As such, the attributes, activities, KPIs, and scoring used in this KPI set represent a composite perspective of the current market and are not necessarily the views, policies, or program of any single member of TSC.