



**SASB
STANDARDS**

Now part of IFRS Foundation

Semiconductors

Sustainability Accounting Standard

TECHNOLOGY & COMMUNICATIONS SECTOR

Sustainable Industry Classification System® (SICS®) TC-SC

Under Stewardship of the International Sustainability Standards Board

INDUSTRY STANDARD | VERSION 2023-12



IFRS®
Sustainability

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ABOUT THE SASB STANDARDS

As of August 2022, the International Sustainability Standards Board (ISSB) of the IFRS Foundation assumed responsibility for the SASB Standards. The ISSB has committed to maintain, enhance and evolve the SASB Standards and encourages preparers and investors to continue to use the SASB Standards.

IFRS S1 *General Requirements for Disclosure of Sustainability-related Financial Information* (IFRS S1) requires entities to refer to and consider the applicability of disclosure topics in the SASB Standards when identifying sustainability-related risks and opportunities that could reasonably be expected to affect an entity's prospects. Similarly, IFRS S1 requires entities to refer to and consider the applicability of metrics in the SASB Standards when determining what information to disclose regarding sustainability-related risks and opportunities.

In June 2023, the ISSB amended climate-related topics and metrics in the SASB Standards to align them with the industry-based guidance accompanying IFRS S2 *Climate-related Disclosures*. In December 2023, the ISSB amended the non-climate-related topics and metrics in connection with the International Applicability of SASB Standards project.

Effective Date

This version 2023-12 of the Standard is effective for all entities for annual periods beginning or after January 1, 2025. Early adoption is permitted for all entities.

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INTRODUCTION

Overview of SASB Standards

The SASB Standards are a set of 77 industry-specific sustainability accounting standards (“SASB Standards” or “Industry Standards”), categorised pursuant to the [Sustainable Industry Classification System® \(SICS®\)](#).

SASB Standards include:

1. **Industry descriptions** – which are intended to help entities identify applicable industry guidance by describing the business models, associated activities and other common features that characterise participation in the industry.
2. **Disclosure topics** – which describe specific sustainability-related risks or opportunities associated with the activities conducted by entities within a particular industry.
3. **Metrics** – which accompany disclosure topics and are designed to, either individually or as part of a set, provide useful information regarding an entity’s performance for a specific disclosure topic.
4. **Technical protocols** – which provide guidance on definitions, scope, implementation and presentation of associated metrics.
5. **Activity metrics** – which quantify the scale of specific activities or operations by an entity and are intended for use in conjunction with the metrics referred to in point 3 to normalise data and facilitate comparison.

Entities using the SASB Standards as part of their implementation of ISSB Standards should consider the relevant ISSB application guidance.

For entities using the SASB Standards independently from ISSB Standards, the [SASB Standards Application Guidance](#) establishes guidance applicable to the use of all Industry Standards and is considered part of the Standards. Unless otherwise specified in the technical protocols contained in the Industry Standards, the guidance in the SASB Standards Application Guidance applies to the definitions, scope, implementation, compilation and presentation of the metrics in the Industry Standards.

Historically, the [SASB Conceptual Framework](#) set out the basic concepts, principles, definitions and objectives that guided the SASB Standards Board in its approach to setting standards for sustainability accounting.

Use of the Standards

SASB Standards are intended to aid entities in disclosing information about sustainability-related risks and opportunities that could reasonably be expected to affect the entity's cash flows, its access to finance or cost of capital over the short, medium or long term. An entity determines which Industry Standard(s) and which disclosure topics are relevant to its business, and which associated metrics to report. In general, an entity should use the SASB Standard specific to its primary industry as identified in [SICS[®]](#). However, companies with substantial business in multiple SICS[®] industries should refer to and consider the applicability of the disclosure topics and associated metrics in additional SASB Standards.

The disclosure topics and associated metrics contained in this Standard have been identified as those that are likely to be useful to investors. However, the responsibility for making materiality judgements and determinations rests with the reporting entity.

Industry Description

Semiconductors industry entities design or manufacture semiconductor devices, integrated circuits, their raw materials and components, or capital equipment. Some entities in the industry provide outsourced manufacturing, assembly or other services for designers of semiconductor devices.

SUSTAINABILITY DISCLOSURE TOPICS & METRICS

Table 1. Sustainability Disclosure Topics & Metrics

TOPIC	METRIC	CATEGORY	UNIT OF MEASURE	CODE
Greenhouse Gas Emissions	(1) Gross global Scope 1 emissions and (2) amount of total emissions from perfluorinated compounds	Quantitative	Metric tonnes (t) CO ₂ -e	TC-SC-110a.1
	Discussion of long- and short-term strategy or plan to manage Scope 1 emissions, emissions reduction targets, and an analysis of performance against those targets	Discussion and Analysis	n/a	TC-SC-110a.2
Energy Management in Manufacturing	(1) Total energy consumed, (2) percentage grid electricity and (3) percentage renewable	Quantitative	Gigajoules (GJ), Percentage (%)	TC-SC-130a.1
Water Management	(1) Total water withdrawn, (2) total water consumed; percentage of each in regions with High or Extremely High Baseline Water Stress	Quantitative	Thousand cubic metres (m ³), Percentage (%)	TC-SC-140a.1
Waste Management	(1) Amount of hazardous waste from manufacturing, (2) percentage recycled	Quantitative	Metric tonnes (t), Percentage (%)	TC-SC-150a.1
Workforce Health & Safety	Description of efforts to assess, monitor, and reduce exposure of workforce to human health hazards	Discussion and Analysis	n/a	TC-SC-320a.1
	Total amount of monetary losses as a result of legal proceedings associated with employee health and safety violations ¹	Quantitative	Presentation currency	TC-SC-320a.2
Recruiting & Managing a Global & Skilled Workforce	Percentage of employees that require a work visa ²	Quantitative	Percentage (%)	TC-SC-330a.1

continued...

¹ Note to **TC-SC-320a.2** – The entity shall briefly describe the nature, context and any corrective actions taken because of monetary losses.

² Note to **TC-SC-330a.1** – The disclosure shall include a description of any potential risks of recruiting employees that require a work visa and how the entity manages these risks.

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TOPIC	METRIC	CATEGORY	UNIT OF MEASURE	CODE
Product Lifecycle Management	Percentage of products by revenue that contain IEC 62474 declarable substances ³	Quantitative	Percentage (%)	TC-SC-410a.1
	Processor energy efficiency at a system-level for: (1) servers, (2) desktops and (3) laptops ⁴	Quantitative	Various, by product category	TC-SC-410a.2
Materials Sourcing	Description of the management of risks associated with the use of critical materials	Discussion and Analysis	n/a	TC-SC-440a.1
Intellectual Property Protection & Competitive Behaviour	Total amount of monetary losses as a result of legal proceedings associated with anti-competitive behaviour regulations ⁵	Quantitative	Presentation currency	TC-SC-520a.1

Table 2. Activity Metrics

ACTIVITY METRIC	CATEGORY	UNIT OF MEASURE	CODE
Total production ⁶	Quantitative	See note	TC-SC-000.A
Percentage of production from owned facilities	Quantitative	Percentage (%)	TC-SC-000.B

³ Note to **TC-SC-410a.1** – Disclosure shall include a discussion of efforts to minimise usage of these substances.

⁴ Note to **TC-SC-410a.2** – Disclosure shall include a discussion of efforts to design for new and emerging usage patterns with respect to energy efficiency in all product categories (i.e., applications for servers, desktops, laptops, workstations, netbooks, tablets, mobile phones, and storage).

⁵ Note to **TC-SC-520a.1** – The entity shall briefly describe the nature, context and any corrective actions taken because of monetary losses.

⁶ Note to **TC-SC-000.A** – The entity shall disclose total production from its own manufacturing facilities and those with which it contracts for manufacturing services. For semiconductor equipment manufacturers the total production shall be reported on a per unit basis. For semiconductor device manufacturers the total production shall be reported consistent with International SEMATECH Manufacturing Initiative's *Semiconductor Key Environment Performance Indicators Guidance*, Technology Transfer #09125069A-ENG.

Greenhouse Gas Emissions

Topic Summary

Entities in the Semiconductors industry generate greenhouse gas (GHG) emissions, particularly those from perfluorinated compounds, from semiconductor manufacturing operations. GHG emissions may create regulatory compliance costs and operating risks for semiconductors entities, although resulting financial effects may vary depending on the magnitude of emissions and the prevailing emissions regulations. Entities that cost-effectively manage GHG emissions through greater energy efficiency, the use of alternative chemicals or manufacturing process advances may benefit from improved operating efficiency and reduced regulatory risk.

Metrics

TC-SC-110a.1. (1) Gross global Scope 1 emissions and (2) amount of total emissions from perfluorinated compounds

- 1 The entity shall disclose its (1) gross global Scope 1 greenhouse gas (GHG) emissions to the atmosphere of the seven GHGs covered under the Kyoto Protocol—carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF₆), and nitrogen trifluoride (NF₃).
 - 1.1 Emissions of all GHGs shall be consolidated and disclosed in metric tonnes of carbon dioxide equivalents (CO₂-e) calculated in accordance with published 100-year time horizon global warming potential (GWP) values. To date, the preferred source for GWP values is the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (2014).
 - 1.2 Gross emissions are GHGs emitted into the atmosphere before accounting for offsets, credits or other similar mechanisms that have reduced or compensated for emissions.
- 2 The entity shall disclose its (2) gross global Scope 1 GHG emissions, in metric tonnes of CO₂-e, originated from perfluorinated compounds.
- 3 Scope 1 emissions are defined and shall be calculated according to the methodology contained in *The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard* (GHG Protocol), Revised Edition, March 2004, published by the World Resources Institute and the World Business Council on Sustainable Development (WRI/WBCSD).
 - 3.1 Acceptable calculation methodologies include those that conform to the *GHG Protocol* as the base reference, but provide additional guidance, such as industry- or region-specific guidance. Examples may include:
 - 3.1.1 *GHG Reporting Guidance for the Aerospace Industry* published by the International Aerospace Environmental Group (IAEG)

3.1.2 *Greenhouse Gas Inventory Guidance: Direct Emissions from Stationary Combustion Sources* published by the US Environmental Protection Agency (EPA)

3.1.3 India GHG Inventory Program

3.1.4 ISO 14064-1

3.1.5 *Petroleum Industry Guidelines for reporting GHG emissions*, 2nd edition, 2011, published by Ipieca

3.1.6 *Protocol for the quantification of greenhouse gas emissions from waste management activities* published by Entreprises pour l'Environnement (EpE)

3.2 GHG emissions data shall be consolidated and disclosed according to the approach with which the entity consolidates its financial reporting data, which generally is aligned with the 'financial control' approach defined by the *GHG Protocol*, and the approach published by the Climate Disclosure Standards Board (CDSB) described in REQ-07, 'Organisational boundary', of the *CDSB Framework for reporting environmental and social information*.

- 4 The entity may discuss any change in its emissions from the previous reporting period, including whether the change was because of emissions reductions, divestment, acquisition, mergers, changes in output or changes in calculation methodology.
- 5 In the case that current reporting of GHG emissions to the CDP or other entity (for example, a national regulatory disclosure programme) differs in terms of the scope and consolidation approach used, the entity may disclose those emissions. However, primary disclosure shall be according to the guidelines described above.
- 6 The entity may discuss the calculation methodology for its emissions disclosure, such as if data are from continuous emissions monitoring systems (CEMS), engineering calculations or mass balance calculations.

TC-SC-110a.2. Discussion of long- and short-term strategy or plan to manage Scope 1 emissions, emissions reduction targets, and an analysis of performance against those targets

- 1 The entity shall discuss its long- and short-term strategy or plan to manage its Scope 1 greenhouse gas (GHG) emissions.
 - 1.1 Scope 1 emissions are defined according to *The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard* (GHG Protocol), Revised Edition, March 2004, published by the World Resources Institute and the World Business Council on Sustainable Development (WRI/WBCSD).
 - 1.2 The scope of GHG emissions includes the seven GHGs covered under the Kyoto Protocol—carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF₆), and nitrogen trifluoride (NF₃).
 - 1.3 The entity shall specifically discuss its strategy or plan to manage Scope 1 GHG emissions that originate from perfluorinated compounds.

- 2 The entity shall discuss its emission reduction target(s) and analyse its performance against the target(s), including, if relevant:
 - 2.1 The scope of the emission reduction target (for example, the percentage of total emissions to which the target is applicable);
 - 2.2 Whether the target is absolute or intensity-based, and the metric denominator if it is an intensity-based target;
 - 2.3 The percentage reduction against the base year, with the base year representing the first year against which emissions are evaluated towards the achievement of the target;
 - 2.4 The time lines for the reduction activity, including the start year, the target year and the base year;
 - 2.5 The mechanism(s) for achieving the target; and
 - 2.6 Any circumstances in which the target or base year emissions have been, or may be, recalculated retrospectively or the target or base year has been reset.
- 3 The entity shall discuss the activities and investments required to achieve the plans or targets, and any risks or limiting factors that might affect achievement of the plans or targets.
 - 3.1 Relevant activities and investments may include energy efficiency efforts, demand-response programmes and development of renewable energy portfolios consistent with the IPCC Fifth Assessment Report: Climate Change 2014: Mitigation of Climate Change, Contribution of Working Group III.
- 4 The entity shall discuss the scope of its strategies, plans or reduction targets, such as whether they pertain differently to different business units, geographies or emissions sources.
- 5 The entity shall discuss whether its strategies, plans or reduction targets are related to, or associated with, emissions limiting or emissions reporting-based programmes or regulations (for example, the EU Emissions Trading Scheme, Quebec Cap-and-Trade System, California Cap-and-Trade Program), including regional, national, international or sectoral programmes.
- 6 Disclosure of strategies, plans or reduction targets shall be limited to activities that were ongoing (active) or reached completion during the reporting period.

Energy Management in Manufacturing

Topic Summary

Energy is a critical input for manufacturing semiconductor devices. The price of conventional grid electricity and volatility of fossil fuel prices may increase because of evolving climate change regulations and new incentives for energy efficiency and renewable energy, among other factors, while alternative energy sources become more cost-competitive. Decisions regarding energy sourcing and type, as well as alternative energy use, may create trade-offs related to the energy supply's cost and reliability for operations. As industry innovation adds complexity to manufacturing processes, new technologies to manufacture semiconductors may consume more energy unless entities invest in the energy efficiency of their operations. The way an entity manages energy efficiency, reliance on different types of energy, the associated sustainability risks, and alternative energy source access may affect financial performance.

Metrics

TC-SC-130a.1. (1) Total energy consumed, (2) percentage grid electricity and (3) percentage renewable

- 1 The entity shall disclose (1) the total amount of energy it consumed as an aggregate figure, in gigajoules (GJ).
 - 1.1 The scope of energy consumption includes energy from all sources, including energy purchased from external sources and energy produced by the entity itself (self-generated). For example, direct fuel usage, purchased electricity, and heating, cooling and steam energy are all included within the scope of energy consumption.
 - 1.2 The scope of energy consumption includes only energy directly consumed by the entity during the reporting period.
 - 1.3 In calculating energy consumption from fuels and biofuels, the entity shall use higher heating values (HHV), also known as gross calorific values (GCV), which are measured directly or taken from the Intergovernmental Panel on Climate Change (IPCC).
- 2 The entity shall disclose (2) the percentage of energy it consumed that was supplied from grid electricity.
 - 2.1 The percentage shall be calculated as purchased grid electricity consumption divided by total energy consumption.
- 3 The entity shall disclose (3) the percentage of energy it consumed that was renewable energy.
 - 3.1 Renewable energy is defined as energy from sources that are replenished at a rate greater than or equal to their rate of depletion, such as geothermal, wind, solar, hydro and biomass.
 - 3.2 The percentage shall be calculated as renewable energy consumption divided by total energy consumption.

- 3.3 The scope of renewable energy includes renewable fuel the entity consumed, renewable energy the entity directly produced and renewable energy the entity purchased, if purchased through a renewable power purchase agreement (PPA) that explicitly includes renewable energy certificates (RECs) or Guarantees of Origin (GOs), a Green-e Energy Certified utility or supplier programme, or other green power products that explicitly include RECs or GOs, or for which Green-e Energy Certified RECs are paired with grid electricity.
- 3.3.1 For any renewable electricity generated on site, any RECs and GOs shall be retained (not sold) and retired or cancelled on behalf of the entity for the entity to claim them as renewable energy.
- 3.3.2 For renewable PPAs and green power products, the agreement shall explicitly include and convey that RECs and GOs be retained or replaced and retired or cancelled on behalf of the entity for the entity to claim them as renewable energy.
- 3.3.3 The renewable portion of the electricity grid mix outside the control or influence of the entity is excluded from the scope of renewable energy.
- 3.4 For the purposes of this disclosure, the scope of renewable energy from biomass sources is limited to materials certified to a third-party standard (for example, Forest Stewardship Council, Sustainable Forest Initiative, Programme for the Endorsement of Forest Certification or American Tree Farm System), materials considered eligible sources of supply according to the *Green-e Framework for Renewable Energy Certification, Version 1.0* (2017) or Green-e regional standards, or materials eligible for an applicable jurisdictional renewable portfolio standard.
- 4 The entity shall apply conversion factors consistently for all data reported under this disclosure, such as the use of HHVs for fuel use (including biofuels) and conversion of kilowatt hours (kWh) to GJ (for energy data including electricity from solar or wind energy).

Water Management

Topic Summary

Water is critical to the semiconductor production process, which requires significant volumes of 'ultra-pure' water for cleaning purposes, to avoid trace molecules from affecting product quality. As manufacturing becomes more complex, entities in the industry are discovering the importance of reducing ultra-pure water use. Water is becoming a scarce resource around the world, because of increasing consumption from population growth and rapid urbanisation, and reduced supplies because of climate change. Furthermore, water pollution in developing countries makes available water supplies unusable or expensive to treat. Without careful planning, water scarcity may result in higher supply costs, social tensions with local communities and governments, or loss of water access in water-scarce regions, thereby presenting a critical risk to production. Semiconductor entities that increase water use efficiency during manufacturing may maintain a lower risk profile and face reduced regulatory risks as local, regional and national environmental laws place increasing emphasis on resource conservation.

Metrics

TC-SC-140a.1. (1) Total water withdrawn, (2) total water consumed; percentage of each in regions with High or Extremely High Baseline Water Stress

- 1 The entity shall disclose the amount of water, in thousands of cubic metres, withdrawn from all sources.
 - 1.1 Water sources include surface water (including water from wetlands, rivers, lakes and oceans), groundwater, rainwater collected directly and stored by the entity, and water and wastewater obtained from municipal water supplies, water utilities or other entities.
- 2 The entity may disclose portions of its supply by source if, for example, significant portions of withdrawals are from non-freshwater sources.
 - 2.1 Fresh water may be defined according to the local laws and regulations where the entity operates. If no legal definition exists, fresh water shall be considered to be water that has less than 1,000 parts per million of dissolved solids.
 - 2.2 Water obtained from a water utility in compliance with jurisdictional drinking water regulations can be assumed to meet the definition of fresh water.
- 3 The entity shall disclose the amount of water, in thousands of cubic metres, consumed in its operations.
 - 3.1 Water consumption is defined as:
 - 3.1.1 Water that evaporates during withdrawal, use and discharge
 - 3.1.2 Water that is directly or indirectly incorporated into the entity's product or service
 - 3.1.3 Water that does not otherwise return to the same catchment area from which it was withdrawn, such as water returned to another catchment area or the sea

- 4 The entity shall analyse all of its operations for water risks and identify activities that withdraw and consume water in locations with High (40–80%) or Extremely High (>80%) Baseline Water Stress as classified by the World Resources Institute's (WRI) Water Risk Atlas tool, Aqueduct.
- 5 The entity shall disclose water withdrawn in locations with High or Extremely High Baseline Water Stress as a percentage of the total water withdrawn.
- 6 The entity shall disclose water consumed in locations with High or Extremely High Baseline Water Stress as a percentage of the total water consumed.

Waste Management

Topic Summary

Semiconductor manufacturing requires hazardous materials, many of which are subject to environmental, health and safety regulations, and generate harmful waste, which may be released into the environment in the form of water and air emissions, as well as solid waste. The handling and disposal of hazardous wastes produced during manufacturing may result in increased operating costs, capital expenditures, and in some instances, regulatory costs. Entities that reduce waste produced during manufacturing and ensure it is reused, recycled or disposed of appropriately may achieve a lower risk profile and face reduced regulatory risks as local, regional and national environmental laws place increasing emphasis on resource conservation and waste management.

Metrics

TC-SC-150a.1. (1) Amount of hazardous waste from manufacturing, (2) percentage recycled

- 1 The entity shall disclose (1) the total weight of hazardous waste generated, in metric tonnes, from manufacturing operations.
 - 1.1 Hazardous wastes are defined in accordance with applicable jurisdictional legal or regulatory frameworks where the waste was generated.
- 2 The entity shall disclose (2) the percentage of hazardous waste recycled as the weight of hazardous waste generated from manufacturing operations that was recycled, divided by the total weight of all hazardous waste generated.
 - 2.1 Hazardous waste that is reused, reclaimed or remanufactured shall be considered within the scope of recycled.
 - 2.2 Recycled, reused, reclaimed and remanufactured hazardous waste is defined in accordance with applicable jurisdictional legal or regulatory frameworks where the waste was generated.
 - 2.3 Materials incinerated, including for energy recovery, shall not be considered within the scope of recycled.
 - 2.3.1 Energy recovery is defined as the use of combustible waste to generate energy through direct incineration, with or without other waste, but with recovery of the heat.
 - 2.3.2 The entity may disclose separately the percentage of hazardous waste generated that was incinerated.
 - 2.4 Electronic waste material (e-waste) shall be considered recycled only if the entity can demonstrate this material was transferred to entities with third-party certification to a standard for e-waste recycling, such as the e-Steward® Standard for Responsible Recycling and Reuse of Electronic Equipment or the Responsible Recycling Practices (R2) Standard for Electronics Recyclers.

2.5 The entity shall disclose the standards with which the entities it has transferred e-waste to are compliant.

- 3 The entity may use the United Nations Environmental Programme's (UNEP) *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal* (Basel Convention) for the purposes of defining hazardous waste or recycled hazardous waste for operations located in jurisdictions that lack applicable legal or regulatory definitions.
- 4 The entity shall disclose the frameworks used to define hazardous waste and recycled hazardous waste, and the quantities and percentages defined in accordance with each applicable framework.

Workforce Health & Safety

Topic Summary

The long-term effects of chemical usage in semiconductor manufacturing on worker health is a major area of concern for the industry. Workers in fabrication facilities, particularly maintenance workers, are at risk of exposure to chemicals known to be hazardous to human health. Violations of health and safety standards may result in monetary penalties and additional costs of corrective actions, with effects on net profits and contingent liabilities. Furthermore, such violations also may result in non-monetary penalties and reputational impacts which may decrease revenues, as well as market share. Effective management of health and safety issues include implementing effective engineering controls, introducing less hazardous chemicals if possible or using smaller amounts, and seeking chemicals presenting the fewest risks to the workforce. In addition to protecting brand value, entities taking these measures may also protect themselves from adverse legal outcomes related to both regulated and unregulated hazardous substances.

Metrics

TC-SC-320a.1. Description of efforts to assess, monitor, and reduce exposure of workforce to human health hazards

- 1 The entity shall discuss efforts to assess, monitor and reduce exposure of its workforce to human health hazards.
 - 1.1 Human health hazards may include solvents, corrosives, lead (and its compounds), arsenic (and its compounds), cadmium and sulphuric acid, as well as known or suspected carcinogens, teratogens and mutagens.
 - 1.2 Relevant efforts to discuss may include risk assessments, risk monitoring, participation in long-term health studies, ambient air monitoring in cleanrooms, implementation of technology to control worker exposure, worker use of personal protective equipment, automation of processes, and phasing out, substituting or using alternatives to hazardous materials.
 - 1.3 The discussion shall include:
 - 1.3.1 efforts to reduce the occurrence of events such as fires, explosions, freeze burns and electrocution; and
 - 1.3.2 a description of management's approach to mitigating short-term (acute) and long-term (chronic) risks.
- 2 The workforce includes any personnel conducting company business on behalf of the entity, including all direct employees and contract employees.
 - 2.1 Direct employees are defined as individuals on the entity's payroll, whether they are full-time, short service, part-time, executive, labour, salary, seasonal, migrant or hourly employees.

- 2.2 Contract employees are defined as individuals who are not on the entity's payroll, but whom the entity supervises or manages, including independent contractors and those employed by third parties (for example, temp agencies and labour brokers).
- 3 The disclosure shall focus on cleanroom workers in fabrication plants, but the entity may discuss other employees and contractors as relevant.

TC-SC-320a.2. Total amount of monetary losses as a result of legal proceedings associated with employee health and safety violations

- 1 The entity shall disclose the total amount of monetary losses incurred during the reporting period resulting from legal proceedings associated with employee health and safety violations.
- 2 The legal proceedings shall include any adjudicative proceeding involving the entity, whether before a court, a regulator, an arbitrator or otherwise.
- 3 The losses shall include all monetary liabilities to the opposing party or to others (whether as the result of settlement or verdict after trial or otherwise), including fines and other monetary liabilities incurred during the reporting period as a result of civil actions (for example, civil judgements or settlements), regulatory proceedings (for example, penalties, disgorgement or restitution) and criminal actions (for example, criminal judgements, penalties or restitution) brought by any entity (for example, governmental, business or individual).
- 4 The scope of monetary losses shall exclude legal and other fees and expenses incurred by the entity in its defence.
- 5 The scope of the disclosure shall include legal proceedings associated with the enforcement of applicable jurisdictional laws or regulations.

Note to TC-SC-320a.2

- 1 The entity shall briefly describe the nature (for example, judgement or order issued after trial, settlement, guilty plea, deferred prosecution agreement or non-prosecution agreement) and context (for example, employee injury) of all monetary losses resulting from legal proceedings.
- 2 The entity shall describe any corrective actions implemented in response to the legal proceedings. This may include specific changes in operations, management, processes, products, business partners, training or technology.

Recruiting & Managing a Global & Skilled Workforce

Topic Summary

Employees are important contributors to value creation in the Semiconductors industry. Entities face competition and challenges in recruiting qualified employees globally, including electrical engineers, research scientists and process engineers. Compensation for such employees is a significant cost component for the industry. Semiconductors entities may improve their competitive positioning by establishing education, training and recruitment policies that develop and leverage the talents of skilled, global employees to meet their human capital needs. Such initiatives may help drive innovation and improve worker productivity, thereby improving access to new markets and possible new sources of revenue, while also creating a more engaged workforce and reducing employee turnover.

Metrics

TC-SC-330a.1. Percentage of employees that require a work visa

- 1 The entity shall disclose the percentage of employees that require a work visa in the country in which they are employed as of the close of the reporting period.
 - 1.1 A work visa is defined as any non-immigrant visa, permit or other associated documentation issued by the applicable jurisdictional legal or regulatory immigration authorities to permit an employee who is a foreign national to work temporarily in the country in which they are employed. Work visas exclude permanent work and residence authorizations granted to foreign nationals (for example, permanent leave to remain or permanent resident status).
 - 1.2 The percentage shall be calculated as the number of employees requiring a work visa divided by the total number of the entity's employees at the close of the reporting period.
- 2 The scope of employees includes those directly employed by the entity and excludes contractors and outsourced employees.
- 3 The scope of employees includes both full- and part-time employees.

Note to TC-SC-330a.1

- 1 The entity shall describe potential risks from recruiting employees that require a work visa, which may arise from immigration, naturalisation and visa regulations.
- 2 The entity shall describe how it manages identified risks related to recruiting employees that require a work visa.

Product Lifecycle Management

Topic Summary

As an increasing number of devices become connected to each other and to the internet, semiconductor entities face greater demand for products that increase computing power and decrease energy costs. Semiconductor machinery and device manufacturers may reduce the environmental and human health impacts of their products by increasing the energy-efficiency of equipment and chips and reducing the use of harmful materials in products. As consumer demand grows for energy-efficient devices that increase battery life, reduce heat output and decrease energy consumption, semiconductor manufacturers that satisfy these may gain a competitive advantage, driving revenue and market share growth. Entities also may benefit from reducing the use of toxic materials from chips destined for consumer devices, which has implications for the end-of-life management of electronic waste, an issue of growing legislative importance in many countries.

Metrics

TC-SC-410a.1. Percentage of products by revenue that contain IEC 62474 declarable substances

- 1 The entity shall disclose the percentage of products sold during the reporting period that contain declarable substances.
 - 1.1 A product contains a declarable substance if, according to the International Electrotechnical Commission's IEC 62474—Material Declaration for Products of and for the Electrotechnical Industry, it contains an amount of the declarable substance that is:
 - 1.1.1 Above the 'reporting threshold'
 - 1.1.2 Within the scope of the 'reporting application' identified
 - 1.1.3 Within the mandatory 'reporting requirement'
 - 1.2 The entity shall calculate the percentage as the revenue from electrical, electronic and related technology products sold that contain a declarable substance(s) divided by total revenue from electrical, electronic and related technology products sold.
- 2 The scope of disclosure includes all electrical, electronic and related technology products, including products from an entity not required to declare, or otherwise make declarations, according to IEC 62474.

Note to TC-SC-410a.1

- 1 The entity shall describe how it manages the use of substances that appear as declarable substance groups or declarable substances in IEC 62474, including a discussion of specific operational processes during which use of these substances is considered as well as a discussion of actions the entity has taken to manage the use of these substances.

- 1.1 Relevant management approaches and actions to describe may include:
 - 1.1.1 Product design criteria for the exclusion of substances (for example, banned substances lists)
 - 1.1.2 Use of material substitution assessments, materials and parts procurement guidelines, product safety testing, product declarations (for example, material safety data sheets), and product labelling
- 2 If the entity assesses and manages the impact of known or potentially toxic substances with reference to other regulations, industry norms or accepted chemical lists, it may identify those practices, and it shall describe the degree of overlap with IEC 62474.

TC-SC-410a.2. Processor energy efficiency at a system-level for: (1) servers, (2) desktops and (3) laptops

- 1 The entity shall disclose the energy efficiency of its processors based on benchmarked performance per watt of energy consumed for (1) servers, (2) desktops and (3) laptops, using the following parameters:
 - 1.1 Representative product: The entity shall calculate performance using a representative product for each product category (servers, desktops, laptops), in which a representative product typically would be the entity's bestselling specification of processor in the product category. If the entity determines its representative product differently, it shall explain the criteria it used in this determination.
 - 1.2 System-level testing: Testing shall be conducted—and disclosure shall be made—at the system-level for a computer integrating the entity's processor and not at a component-level. The entity shall conduct testing using a representative computer system structure, such as the bestselling system using the entity's processor or one that is widely commercially available.
 - 1.3 Specified benchmark: At a minimum, the entity shall disclose performance to the benchmarks defined below for each product category; the entity may disclose performance to additional benchmarks.
- 2 As described below, the entity shall conduct testing and disclose performance, depending on product category, consistent with guidance provided by:
 - 2.1 The Standard Performance Evaluation Entity (SPEC)
 - 2.2 MobileMark®
- 3 For (1) servers the entity shall conduct testing according to the SPEC Power SPECpower_ssj2008 and disclose the results as: overall ssj_ops/watt
- 4 For (2) desktop computers the entity shall conduct testing according to the SPEC CPU2006 benchmark and disclose results as both:
 - 4.1 SPECspeed2017_int_base score/watt
 - 4.2 SPECspeed2017_fp_basescore/watt

5 For (3) laptops the entity shall conduct testing according to the MobileMark® 2014 v1.5 and disclose results as both:

5.1 Performance qualification score

5.2 Battery life score (in minutes)

6 The entity shall consider the guidance references provided by SPEC and MobileMark® as normative references; thus any future updates made to them shall be considered updates to this guidance.

7 The entity may additionally disclose energy efficiency performance for other product categories, for which a benchmark is not specified above (for example, workstations, netbooks, tablets, mobile phones, and storage), using a relevant benchmark.

7.1 The entity shall describe the parameters it used to select and test to applicable benchmarks.

Note to **TC-SC-410a.2**

1 The entity shall discuss how it incorporates product energy efficiency considerations into design for new and emerging usage patterns in all relevant product categories.

1.1 The discussion may include how, in the entity's view, the energy efficiency of processors is influenced by factors such as growth of new product categories (for example, machine-to-machine communication), new usage patterns (for example, increased data consumption via mobile devices), purchasing specifications or consumer demand (for example, environmentally conscious consumers).

Materials Sourcing

Topic Summary

Entities in the Semiconductors industry rely on numerous critical materials as important inputs for finished products. Many of these inputs have few or no available substitutes and often are sourced from only a few countries, many of which may be subject to geopolitical uncertainty. Other sustainability impacts related to climate change, land use, resource scarcity and conflict in regions where the industry's supply chain operates are also increasingly shaping the industry's ability to source materials. Additionally, increased competition for these materials because of growing global demand from other sectors may result in price increases and supply risks. The management of potential materials shortages, supply disruptions, price volatility and reputational risks is made more difficult by the practice of commonly sourcing materials from supply chains that often lack transparency. Failure to effectively manage this issue may constrain access to necessary materials, reduce margins, impair revenue growth or increase costs of capital.

Metrics

TC-SC-440a.1. Description of the management of risks associated with the use of critical materials

- 1 The entity shall describe how it manages the risks associated with the use of critical materials in its products, including physical limits on availability and access, changes in price, and regulatory and reputational risks, in which:
 - 1.1 a critical material is defined as a material both essential in use and subject to the risk of supply restriction; and
 - 1.2 examples of critical materials may include:
 - 1.2.1 antimony, cobalt, fluorspar, gallium, germanium, graphite, indium, magnesium, niobium, tantalum and tungsten;
 - 1.2.2 platinum group metals (platinum, palladium, iridium, rhodium, ruthenium and osmium); and
 - 1.2.3 rare earth elements, which include yttrium, scandium, lanthanum and the lanthanides (cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium and lutetium).
- 2 The entity shall identify the critical materials that present a significant risk to its operations, the type of risks they represent and the strategies the entity uses to mitigate the risks.
 - 2.1 Relevant strategies may include diversification of suppliers, stockpiling of materials, development or procurement of alternative and substitute materials, and investments in recycling technology for critical materials.
- 3 All disclosure shall be sufficient such that it is specific to the risks the entity faces, but that disclosure itself would not compromise the entity's ability to maintain confidential information.

- 3.1 For example, if an entity determines not to identify a specific critical material that presents a significant risk to its operations because of the competitive harm that could result from the disclosure, the entity shall disclose the existence of such risks, the type of risks and the strategies used to mitigate the risks, but the entity is not required to disclose the relevant critical material.

Intellectual Property Protection & Competitive Behaviour

Topic Summary

Although intellectual property (IP) protection is inherent to the Semiconductors industry business model, entities' IP practices may be a contentious social issue. IP protection can be an important driver of innovation, but some entities may also acquire and enforce patents and other IP protection to restrict competition, particularly if they are dominant market players. Industry standard-setting can involve complex negotiations over patent rights and licensing terms, and entities use cross-licenses and patent pools to address difficulties around patent thickets. However, such industry cooperation also may raise antitrust concerns, for example, with provisions in portfolio cross-licenses that could enable price fixing. Adverse legal or regulatory rulings related to antitrust and IP may expose software and IT services entities to costly and lengthy litigations and potential monetary losses as a result. Such rulings may also affect an entity's market share and pricing power, if its patents or dominant position in important markets are challenged legally, with significant financial consequences. Therefore, entities that balance the IP protection and its use to spur innovation and ensure their IP management and other business practices do not unfairly restrict competition may reduce regulatory scrutiny and legal actions while protecting market value.

Metrics

TC-SC-520a.1. Total amount of monetary losses as a result of legal proceedings associated with anti-competitive behaviour regulations

- 1 The entity shall disclose the total amount of monetary losses incurred during the reporting period resulting from legal proceedings associated with anti-competitive behaviour such as those related to price fixing, antitrust behaviour (for example, exclusivity contracts), patent misuse, or network effects, as well as bundling services and products to limit competition.
- 2 The legal proceedings shall include any adjudicative proceeding involving the entity, whether before a court, a regulator, an arbitrator or otherwise.
- 3 The losses shall include all monetary liabilities to the opposing party or to others (whether as the result of settlement, verdict after trial or otherwise), including fines and other monetary liabilities incurred during the reporting period as a result of civil actions (for example, civil judgements or settlements), regulatory proceedings (for example, penalties, disgorgement or restitution) and criminal actions (for example, criminal judgements, penalties or restitution) brought by any entity (for example, governmental, business or individual).
- 4 The scope of monetary losses shall exclude legal and other fees and expenses incurred by the entity in its defence.
- 5 The scope of the disclosure shall include legal proceedings associated with the enforcement of applicable jurisdictional laws or regulations.

Note to TC-SC-520a.1

- 1 The entity shall briefly describe the nature (for example, guilty plea, deferred agreement or non-prosecution agreement) and context (for example, price fixing, patent misuse or antitrust) of fines and settlements.

- 2 The entity shall describe any corrective actions implemented in response to the legal proceedings. This may include specific changes in operations, management, processes, products, business partners, training or technology.



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