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SUSTAINABLE IMPACT FRAMEWORK

Hardware and Semiconductors

Sectors:

- Technology Hardware & Equipment
- Semiconductors & Semiconductor Equipment

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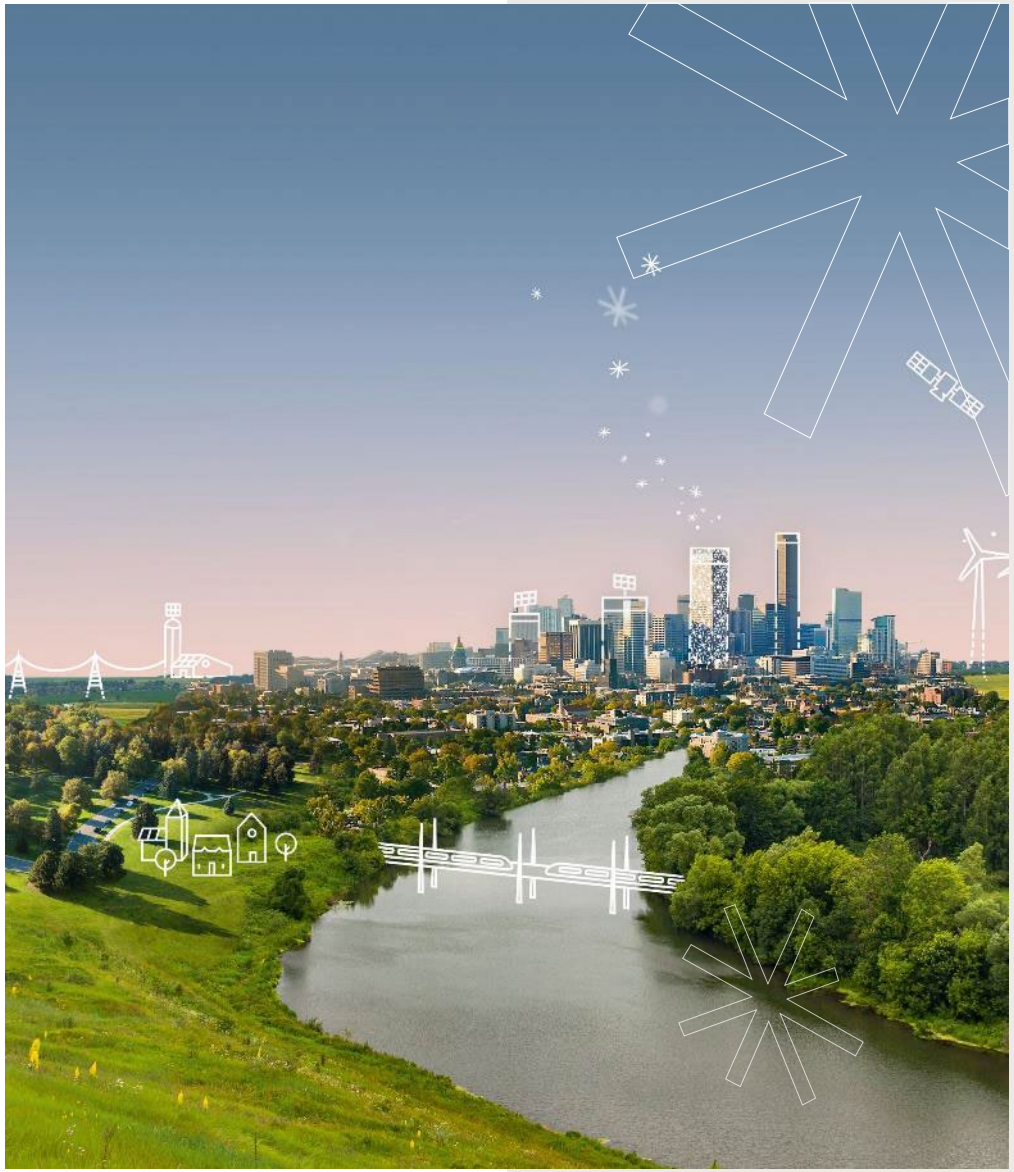
Executive summary



ICT – Hardware and Semiconductors

Hardware and Semiconductor companies, as true enablers of innovation, cannot ignore sustainability considerations if they want to be catalysts for development. Some applications, particularly those related to energy-efficient devices, clean transportation, renewable energy systems or medical technologies have strong environmental and social potential. However, technologies are also associated with many controversies such as labor-rights violations, minerals sourcing, energy consumption, etc. all of which highlighting the need for a sound approach. Without sustainability, the risks for our populations and planet may offset the potential benefits that could arise from such technological advancement.

The digital economy is responsible for **4% of total GHG emissions**[1].

Today, the digital economy is responsible for 4% of global GHG emissions (+8%/year since 2014), which is set to increase to 9% in 2025-2030 and could triple by 2050[1]. The growing use of digital technology has led to a surge in connected devices and a growing volume of data exchanged. Currently, terminals (smartphones, computers, TVs…) represent 66% of the sector's carbon footprint with 44% of emissions generated during the product manufacturing phase and 20% during product use. These statistics become even more significant considering that an increase in consumer electronic equipment, which becomes more affordable as technologies advance, subsequently leads to increased demand for computing and storage. In order for companies to support sustainable development through their climate practices, we expect them to implement comprehensive decarbonization strategies encompassing equipment design (green product strategy), the manufacturing phase (energy-efficient fabs, green energy procurement) and supply-chain.

62 MT of e-waste was generated worldwide in 2022, up 82% from 2010[2].

With 62 million metric tons (MT) generated across the world in 2022[2], the volume of discarded electronic material has nearly doubled since 2010. The Information and Technology (ICT) sector is directly responsible for one-fifth of the waste produced worldwide by electrical and electronic equipment. Electronic waste (e-waste) is a major health and environmental hazard, containing toxic additives or hazardous substances such as mercury. E-waste recycling remains a challenge today with only 22% of e-waste mass properly collected and recycled in 2022, and only 1% of rare earth. Improper disposal leads to environmental and health and safety risks, including the release of pollutants and exploitation in developing countries where violations of fundamental human rights are widespread. To address these challenges, action is needed throughout the product life-cycle, including reducing toxic substances in design, establishing efficient recovery systems, raising awareness and educating users, and setting stringent control mechanisms to ensure responsible management of the e-waste challenge down the value chain.

19% of global output of cobalt goes to the production of consumer electronics[3]

The electronics industry is a heavy consumer of "conflict minerals" (gold, tin, tungsten and tantalum) that are used extensively in semiconductors for their physico-chemical properties. 40% of tantalum reserves and 50% of cobalt reserves are located in DRC (U.S.G.S., 2023) where armed militias are taking advantage of extraction revenues, perpetuating the conflict there. In addition, electronic equipment' production chains encompass a large number of players involved in extracting of the raw materials to manufacturing products that implies combination of several social risk factors: mass production, low-skilled employees, high production speed, limited regulatory framework of working conditions and a lack of clarity in the supply chain. The industry is therefore highly exposed to the risks of noncompliance with labor conventions.

The information provided reflects Mirova's opinion/the situation as of the date of this document and is subject to change without notice. 1. The Shift Projet, 2021. 2.World Health Organization. 3. The Shift Project, 2021.

Drivers of contribution and obstruction to sustainability goals

	Activities	Practices
Positive Impact	**Sustainable Activities** HEALTHCARE SAFETY CLEAN TRANSPORTATION LOW-CARBON ENERGY EFFICIENCY SOLUTIONS SUSTAINABLE AGRICULTURE WATER	**Advanced Practices** HUMAN CAPITAL MANAGEMENT: • Diversity and inclusion • Job quality CLIMATE BIODIVERSITY *Advanced governance models*
ESG Risks	**Harmful Activities*** *Military equipment and weapons* PAI #14	**Risk Mitigation** CLIMATE CHANGE BIODIVERSITY FOOTPRINT WORKING CONDITIONS PRODUCT SAFETY AND SECURITY GOVERNANCE : • Governance of sustainability • Business ethics • Taxes

*As defined in: Minimum standards and exclusions, Mirova. The information provided reflects Mirova's opinion/the situation as of the date of this document and is subject to change without notice. Source: Mirova.

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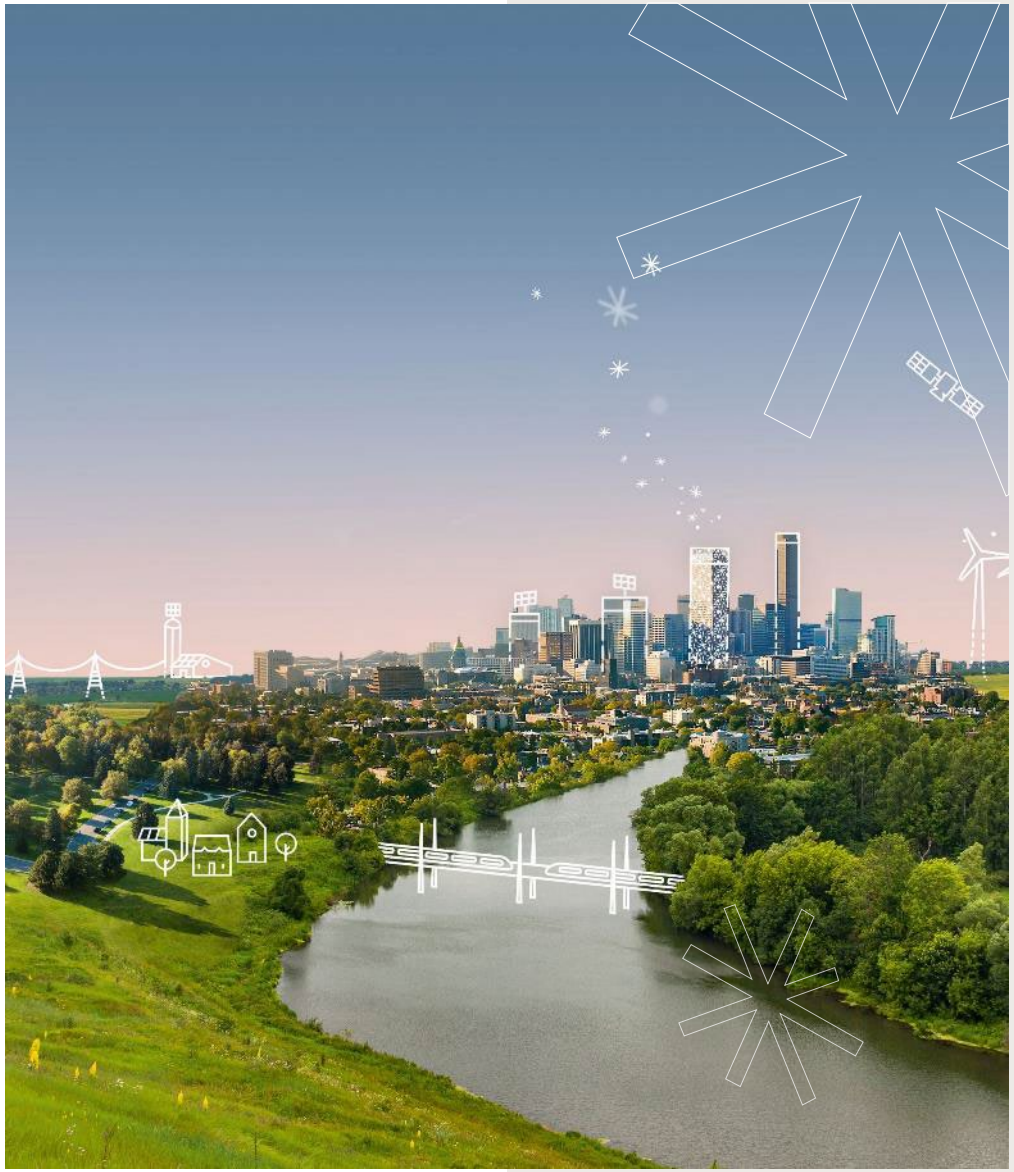
Positive impact



Sustainable activities

	CONTEXT	SUSTAINABLE ACTIVITY	
SOCIAL OPPORTUNITIES	Technology has revolutionized the way we approach health challenges, providing innovative solutions that can improve the quality of life for individuals and communities. From wearable devices monitoring vital signs to telemedicine services providing remote consultations, technology has enabled us detect and prevent health issues at an earlier stage. Medical technologies can save lives, improve health and contribute to sustainable healthcare. Today, many devices used in healthcare rely on semiconductor manufacturing technology and "Medtech" (for "medical technologies") has established itself as an essential equipment provider for laboratories and care centers, but also as for diagnostic/remote monitoring solutions. Then, companies developing innovation that is safe, effective and affordable, aligned to population health needs must be actively encouraged.	**Healthcare** Companies/projects ensuring the development of diagnostics products and services; healthcare equipment and devices.	**IMPACT CRITERIA** Companies analyzed as supporting/enabling medical research and services are analyzed in line with the Medical Products and Devices sector methodology. In the Hardware & Semiconductor sector, companies developing tailored and dedicated components for the healthcare industry will fall under this category.
	According to the World Health Organization, approximately 1.19 million people die each year due to road traffic accidents and it is the leading cause of death for children and young adults aged 5–29 years. This represents a significant global burden, underscoring the critical role of advanced safety features in vehicles, which hardware and semiconductor companies are instrumental in developing. In industrial safety, hardware and semiconductor companies are developing sensors, monitoring systems, and data processing technologies to enhance workplace safety and prevent accidents. In food safety, same technologies are used to monitor and control food quality, detect contaminants, and track storage conditions, ultimately ensuring the safety and quality of food products.	**Safety** Automotive safety products including ABS (anti-lock braking systems), airbags, ADAS (Advanced driver-assistance systems), LIDAR (Light detection and ranging), chassis-related safety, etc. Industrial safety products, including safety equipment, meters and testing devices Food/water safety products including meters and testing devices, decontamination devices, etc.	

In this sector, the positive contribution is mainly analyzed through **revenues exposure** but not only. For this sector, the positive contribution of activities is analyzed through a combination of revenues exposure, R&D investment and other indicators **to determine the product's innovative feature.**

LOW POSITIVE IMPACT	MODERATE POSITIVE IMPACT	HIGH POSITIVE IMPACT
> 10% revenus from sustainable activities	> 20% to 50% sustainable activities	> 50% sustainable activities

Sustainable activities

CLIMATE

CONTEXT	SUSTAINABLE ACTIVITY
To get on track with the Net Zero Emissions (NZE) by 2050 Scenario, CO2 emissions from the transport sector must fall by more than 3% per year to 2030 according to the International Energy Agency (IEA). To meet this target, electric vehicles (Evs) and hydrogen vehicles are critical. Manufacturers of battteries and power semiconductor components for electric motors and inverters (SiC, GaN) as well as EV chargers are key elements in the deployment of clean transportation technologies.	**Clean Transportation** Equipment and/or components for EVs and hydrogen vehicles such as batteries, fuel cells, powertrains, etc. Equipment and/or components for charging infrastructures based on electricity, biofuels or e-fuels.
Companies providing components and electronic devices play a key role in supporting renewable energies, which helps fight climate change. Semiconductor components are widely used in solar panels but also in energy storage solutions, without which renewable energies could not become a reliable source. Electronic components are present as well in the electric charging stations that are essential for the wide dissemination of these sustainable solutions.	**Low-Carbon Energy** Equipment and/or components for photovoltaic solar/wind electricity. Equipment and/or components for low-carbon energy storage solutions. Equipment and/or components for low-carbon energy charging stations.
Semiconductors are key to developing more energy-efficient products across multiple end markets. In particular, semiconductor equipment plays a major role in increasing chips' efficiency (miniaturization, 3D deposition, hybrid bonding, etc.) and improve the efficiency of components in various industrial applications. In addition, smart equipment for production processes (connected meters, sensors, etc.) can make real efficiency gains, thereby limiting energy consumption and reducing GHG emissions. Furthermore, companies developing smart grid management equipment (connected meters, sensors, etc.) and smart building equipment (intelligent lightening/heating control, home energy management systems, etc.) can contribute to the support of renewable energy as well as efficiency gains.	**Efficiency solutions (climate)** Efficient semiconductor manufacturing equipment or components enabling upstream industrial efficiency. Equipment and/or components for smart-grid and storage. Equipment and/or components for smart-buildings.

IMPACT CRITERIA

The benefits of these solutions largely depend on their implementation and end-applications. Efficiency solutions applied to consumer electronics are not considered green solutions because efficiency gains are likely to be offset by the growing carbon footprint from increased computing power (rebound effect).

In this sector, the positive contribution is mainly analyzed through **revenues exposure** but not only. We complement this exposure with an analysis **of exposure to end markets and relevant efficiency key performance indicators (KPIs) e.g., kwH of energy saved, carbon dioxide emissions avoided etc., to assess companies' material contribution to climate challenges.**

LOW POSITIVE IMPACT	MODERATE POSITIVE IMPACT	HIGH POSITIVE IMPACT
> 10% sustainable activities	> 20% to 50% sustainable activities	> 50% sustainable activities

Sustainable activities

	CONTEXT	SUSTAINABLE ACTIVITY
BIODIVERSITY/CLIMATE	According to the Food and Agriculture Organization (FAO), by 2050, the global population will be over 9.5 billion, and we will require 70% to 100 % more agricultural output to feed the world. Technologies will play a key role in agricultural development in the coming decades. Precision agriculture (PA) involves using technology to improve the ratio between agricultural output (food) and input (land, energy, water, fertilizers, pesticides, etc.). PA consists of using sensors to identify crop or livestock needs precisely (in space or time) and then intervening in a targeted way to maximize the productivity of each plant and animal, minimizing any waste of resources.	**Sustainable agriculture** Companies/projects offering precision agriculture equipment as sensors, robots, satellites, etc.
	According to the World Wildlife Fund, two-thirds of the world's population may experience water scarcity by 2025. The Internet of Things (IoT) can provide solutions to this worrying challenge. Smart water monitoring and management systems, based on combination of sensors, big data and Artificial Intelligence technologies, can provide tools to measure, monitor and control the water distribution networks of water utility operators, farmers and companies. Less waste and less consumption can also improve the preservation of our planet's resources.	**Water efficiency and quality** Companies/projects providing water efficiency and water quality equipment like smart-metering, leak monitoring, etc.
	Industrial efficiency provided by hardware technologies is crucial for biodiversity preservation. By integrating advanced hardware systems, such as IoT sensors, meters and data analytics, industries can optimize resources, minimize waste, and reduce emissions. This lessens their impact on natural ecosystems and contributes to biodiversity preservation. According to the World Economic Forum, industrial activities generate 70% of global waste, highlighting the urgent need for efficient waste reduction strategies to preserve biodiversity.	**Efficiency solutions (biodiversity)** Testing equipment for pollution and toxicity management (air/water/soil quality, toxic content detection in products, etc.) Industrial Internet of Things (IIoT) systems for waste/pollution reduction.

In this sector, the positive contribution is mainly analyzed through **revenues exposure** but not only. We complement this exposure with an analysis **of relevant impact key impact indicators (KPIs) e.g., tons of waste avoided, amount of inputs/water saved, carbon dioxide emissions avoided, etc. to assess the effectiveness of the solution in advancing biodiversity challenges.**

LOW POSITIVE IMPACT	MODERATE POSITIVE IMPACT	HIGH POSITIVE IMPACT
> 10% sustainable activities	> 20% to 50% sustainable activities	> 50% sustainable activities

Advanced practices

	CONTEXT	ADVANCED PRACTICES	
		Actions/measures expected:	Impact indicators examples:
HUMAN CAPITAL	**Job Quality** The workforce profile of Hardware and Semiconductor companies varies. Fabless and front-end equipment manufacturers rely on highly-skilled employees (e.g., white-collars, mainly in research and development) while hardware manufacturers, foundries or Integrated Device Manufacturers rely on employees working in production sites, hence subject to higher social risks. Today, around 30% of employees in semiconductor companies are working in R&D, within a high-salary environment and increased competition from Southeast Asia. As such, adopting advanced human capital management practices is an opportunity for these companies to attract and retain qualified workers, both in R&D and production. For this cutting-edge and rapidly evolving sector, it is also necessary to actively support workers' skills through continuous trainings. Initiatives to ensure employees' well-being (pay, benefits, social dialogue) are also important components of an advanced human capital strategy. On average, employee turnover is around 11%[1], which is lower than the global average (15% all sectors).	• **Develop employees' skills that are recognized on the labor market and anticipate shifts in skills.** • **Ensure fair remuneration and social benefits that are sufficient for good living conditions.** • **Ensure employee satisfaction and well-being.**	• Number of training hours per employees, % of workforce trained. • Qualitative analysis of the training offering including, upskilling programs, mentorships focused on young talents, leadership development…). • Providing internal training and education in various skills and making that training and education accessible to most employees. • Analysis of employees', executives' and shareholders' remunerations. • Existing and effective employees' association mechanisms. • Workplace well-being measures: flexible work arrangements, mental health support, counseling, etc.
	Diversity and Inclusion Overall, women represent 32% of the workforce within hardware companies and 25% of the workforce within semiconductor companies (vs. 38% MSCI World) and they hold 17% and 13% of executives' roles[2]. These figures are improving, but the progression is slow, and the tech sector still lags in terms of feminization. The persistent gender pay gap also remains an issue (21% median gender pay gap in tech vs. 16% overall)[2]. To overcome the challenge that lies in attracting women, companies can bring awareness among female students about career opportunities in engineering and technology (only 19% of graduates in STEM[3] are women) and provide them with the structure to climb the corporate ladder, break the glass ceiling and achieve pay parity. Moreover, diversity and inclusion do not pertain to gender only. Particular attention should be paid to the socioeconomic background of employees and their age, making sure that the working environment is inclusive for everyone regardless of their minority profile. To do so, diversifying recruitment pools, ensuring equal opportunities in terms of professional development, and raising awareness of employees and management on biaises are essential.	• **Improve female and diverse representation, especially at management/leadership level.** • **Ensure equal opportunities and increase awareness to overcome inequalities.** • **Ensure adapted and flexible career options.**	• Percentage of women in the Executive Committees, difference between women representation in the workforce and Executive Committee, C-Suite female representation (CEO, CFO, CIO, CTO, CCO). • Wage gap or credible target to reach pay equality & unadjusted pay gap. • Succession planning including at least one woman as a possible candidate for every senior position. • Road map to improve recruitment of minorities and ensure unbiased recruitment. • Gender-neutral leave policy. • Provision of daycare options (affordable and/or paid by the company) and work flexibility options.

LOW POSITIVE IMPACT

> Advanced practices - Medium Stake* topic

> Credible strategy to achieve advanced practices

MODERATE POSITIVE IMPACT

> Advanced practices - High Stake* issues

1. BNP Paribas Exane estimates, 2023 for 1500 companies across Europe and North America 2. Equileap. 3. Science, Technology, Engineering, and Mathematics. * As defined in appendices. Source: Mirova.

Advanced practices

	CONTEXT	ADVANCED PRACTICES	
		Actions/measures expected:	Impact indicators examples:
CLIMATE	Today, the digital economy is responsible for 4% of global GHG[1] emissions (+8%/ year since 2014), which is set to increase to 9% between 2025 and 2030 and could triple by 2050[2]. The growing use of digital technology has resulted in an increase in the number of connected objects (+170% vs. 2014) [2] and a growing amount of data exchanged. All energy needed for the production and use of products should be included in a life cycle assessment (LCA). The carbon footprint of consumer electronics (smartphones, computers, TVs…) currently represents 66% of the sector's total carbon footprint, 44% of these emissions are generated during the manufacturing phase and 20% during the product use[2]. These impacts are even more significant as the number of consumer electronic equipment increases, becoming more affordable as technologies mature, generating more computing and storage demand for data centers and networks and ultimately nurturing a rebound effect. As such, for companies to contribute to sustainable development through their climate practices, they need to implement comprehensive strategies covering the design of equipment (green product strategy), the manufacturing phase (energy efficient fabs, green energy procurement) and the decarbonization of their supply chain.	**Implement robust decarbonization strategy on all scopes and lifecycle phases**	• GHG emissions reduction targets on all 3 scopes, preferably aligned with the Science Based Target Initiative (SBTi). • Scopes 1 & 2[3]: reduce Scope 1 emissions from gases, switch towards more energy efficient manufacturing sites and sourcing from renewable energy. • Scope 3[4]: collaborate with low-carbon material suppliers, supply-chain carbon footprint analysis, suppliers committing to SBTi targets, energy-efficient product design to control GHG emissions from use phase. • Effective decreasing trend of GHG emissions on Scope 1, Scope 2 and Scope 3 emissions.
BIODIVERSITY	The production of hardware and semiconductors has various effects on biodiversity pressures. First, upstream, these companies rely on a variety of minerals (silicon, gallium, cobalt, etc.) whose extraction and refining involve high levels of pollution. Second, the manufacturing process releases chemicals and heavily uses water and finally downstream as electronic equipment are hard to recycle and global end-of-life management system on a global scale is still lacking. The question of circularity is also central: if we continue with linear production techniques, worldwide demand for resources could almost triple by 2060[5] exhausting Earth's resources by more than 400%. As such, it is important that hardware and semiconductor companies limit the use of materials from the design stage by giving priority to recycled materials and design products that are made to last and easily recyclable.	**Implement robust biodiversity strategy** • **Responsible sourcing of materials** • **Management of water, waste and pollution in the production phase** • **Circular design and product life extension and end-of-life management**	• Responsible sourcing: supply-chain audits, engagement with suppliers and training on biodiversity issues. • Production phase: ambitious targets to reduce water and ultrapure water (UPW), increase water recycling, pollution control in air/water/soil, commitment to phase-out perfluoroalkyl and polyfluoroalkyl substances (PFAS) and R&D efforts in substitutes. • End-of-life management: programs to take back and recycle/reuse/refurbish e-waste, wastewater. management, maximize the amount of hazardous waste diverted from disposal, scrap recycling, user awareness campaigns. • Circularity: light weighting, increased recycled materials, product life extension and extended warranty period, components that can be easily repaired/reused/recycled, repair/take-back programs, decrease plastic in packaging.

LOW POSITIVE IMPACT

> Advanced practices - Medium Stake* topic

> Credible strategy to achieve advanced practices

MODERATE POSITIVE IMPACT

> Advanced practices - High Stake* issues

The information provided reflects Mirova's opinion/the situation as of the date of this document and is subject to change without notice. 1. Greenhouse gases. 2. The Shift Project, 2021 3. Direct emissions created by a company's activities and Emissions from the electricity a company uses in its operations. 4. Indirect emissions from a company's supply chain, distribution, use of products, and product disposal. * As defined in appendices. Source: Mirova

Advanced governance model

CONTEXT

Mirova aims to promote the development of a corporate vision focused on the creation of collective value over the long term. Corporate governance should be shaped to include the interests of its key stakeholders. We believe that the creation of wealth requires a long-term perspective, which takes into account sustainability issues.

Mirova encourages companies to include environmental and social issues in its purpose, and to adapt their articles of association accordingly. We feel that shareholders have a role to play in spreading this vision of what a company should be.

Thus, we are promoting the development of a long-term shareholder base, the creation of governing bodies that serve all stakeholders and address CSR[1] issues, the introduction of a compensation policy which is not only fair to its stakeholders, but also promotes sustainable growth, and -increased transparency and a better quality of both financial and extra financial information, through annual audited reports covering all these issues.

Advanced governance practices only foster sustainability but is not a standalone driver of impact.

ADVANCED GOVERNANCE MODEL DETAILS

Practices/measures expected:	Impact indicators examples:
Commitment to long-term and shared value creation	• Demonstrate how value created is shared fairly among company stakeholders. • Strive towards purpose-driven organization or/and a B-Corp.
Integration of stakeholders in the decision-making process	• Create a Sustainable Development Committee or sustainability representative at the board level, with regular meetings throughout the year. Sustainability items are systematically integrated into the board's agenda.
Fair taxes	• Provide country-by-country reporting on tax payments.

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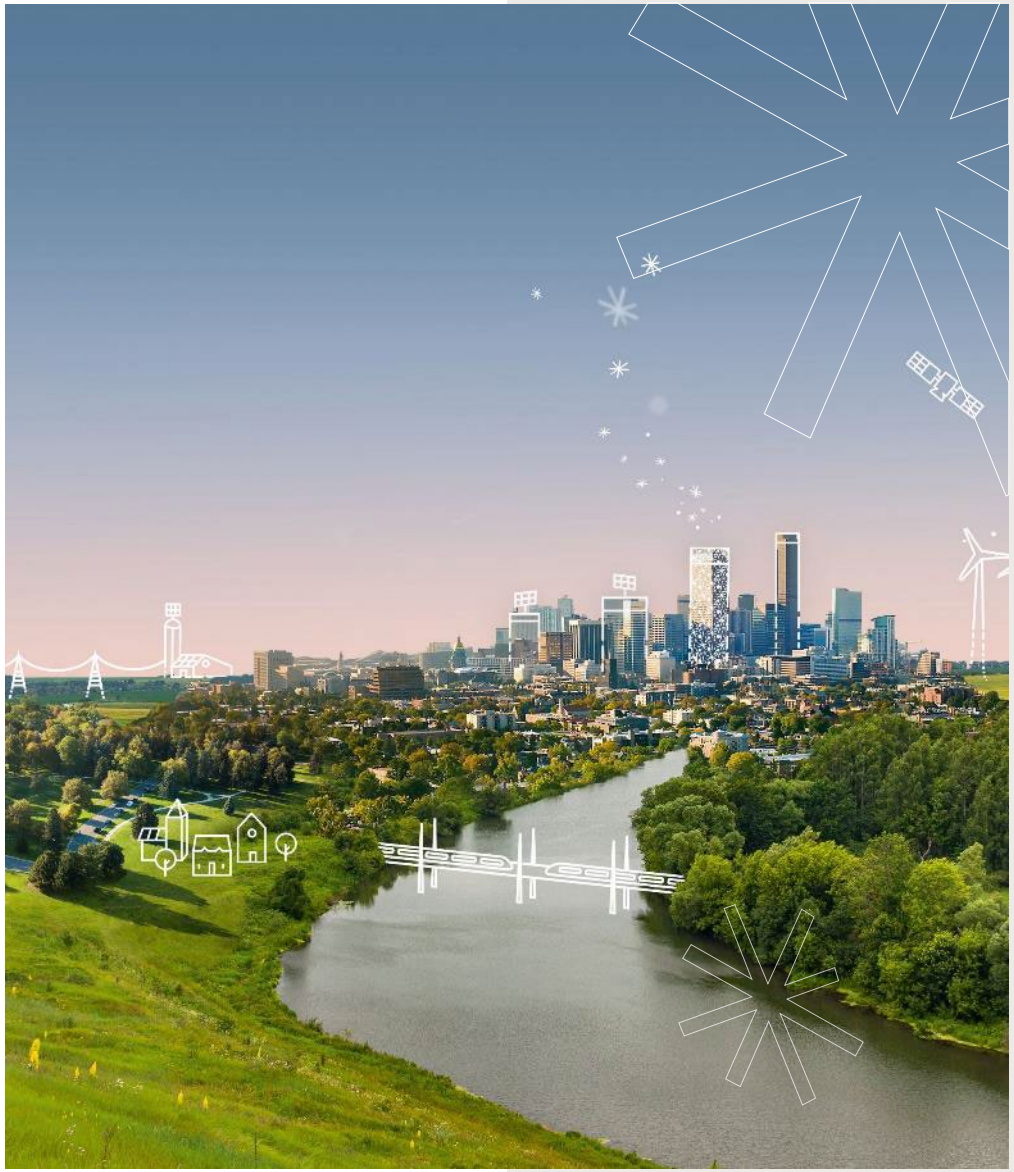
ESG risks



Climate and biodiversity

CONTEXT

Terminals (e.g., smartphones, computers, TVs) represent 65% of the digital sector carbon footprint with 45% of emissions from product manufacturing and 20% from product use over lifetime[1]. As such, a decarbonization strategy on the entire product life cycle from minerals sourcing to the use phase is critical.

Upstream hardware and semiconductors production relies on a variety of minerals and materials (silicon, gallium, cobalt), including rare earths[2]. Their extraction, refining and waste generate high levels of pollution in soil, air and water, These pollutions are responsible for vegetation destruction, soil degradation, water acidification, gaseous discharges, radioactivity, etc. Many of those minerals are extracted in developing countries, where practices are insufficiently regulated, which is increasing the level of risk. Electronic equipment also present risks due to materials' choice including pollutants, such as phthalates in polyvinyl chloride (PVC) cables and amount of water consumption at manufacturing sites. Downstream, the sector is responsible for a lot of e-waste. Some countries have closed their borders to these exports, and the recycling problem is still present. Other hazardous waste (e.g., heavy metals, etc.) generated during the manufacturing process are still to be properly handled.

MINIMUM STANDARDS

Type of ESG risk:	Risk assessment indicators examples:
Climate footprint	• Definition of a decarbonization strategy to reduce major sources of emissions. • Reduction of Scope 1 emissions from gases with high Global Warming Potential from the manufacturing process (PFCs, HFCs, $NF3^3$, etc.) and targets on Scope 2 (renewable energy sourcing). • Calculation of GHG emissions on all relevant 3 scopes categories or ongoing evaluation (purchased goods and services capital goods, use of sold products, transport). **PAI #1 PAI #2 PAI #5**
Environmental risks in the supply chain	• Environmental procurement policy. • Suppliers' code of conduct. • Participation in a multistakeholder industry initiative to promote ambitious standards in the supply chain. • Sites located in biodiversity-sensitive areas. **PAI #7**
Chemicals and water	• Ban hazardous substances with regard to regulations in place (RoHs, REACH[4], etc.) • Risk mapping of location of manufacturing sites in high-water stress regions and related action plans. • Water policy and management systems.
Waste management	• Waste and wastewater from the manufacturing process are managed with regard to regulations . • Emissions to water. • Orientate waste to waste-disposal providers that are working in compliance with applicable standards & regulations and make regular audits. **PAI #8 PAI #9**

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Working conditions

CONTEXT	Type of ESG risk:	Risk assessment indicators examples:
The production chains for electronic equipment involve numerous participants and many steps are low value added. Several health and safety risks occur in the chain and are exacerbated by multiple factors such as mass production, low-skilled labor, high production speed, and a limited regulatory framework regarding working conditions. Workers' health and safety is then of paramount importance for hardware and semiconductor manufacturers, given the nature of the industry's operations. The production of hardware and semiconductor products entails complex manufacturing processes, the use of intricate machinery, and the handling of dangerous substances. Ensuring the well-being of workers is essential to prevent workplace accidents, injuries, and occupational health risks. Additionally, maintaining a safe and healthy work environment is crucial for fostering employee satisfaction, productivity, and retention, which are also challenges within the sector	**Health and safety**	• Measures to reduce the use harmful substances in the production process (PFAS, fluocarbons, volatile organic compounds, etc.) and compliance with standards and regulations. • Frequency and severity of accidents (direct workers and contractors), number of fatal accidents in the past few years. • Measures to promote fair working conditions and a sustained social dialogue in countries with less stringent regulations. • Anonymous reporting channel to report nonethical behaviors in the workplace.
The industry is highly exposed to the risks of noncompliance with labor conventions. Furthermore, the electronics industry is a heavy consumer of "conflict minerals" (gold, tin, tungsten and tantalum) used extensively in semiconductors for their physicochemical properties. These resources are often available in countries with a tense geopolitical situation. For example, approximately 40% of tantalum reserves are located in the Democratic Republic of Congo (U.S.G.S., 2023) and where armed militias are taking advantages of revenues to perpetuate local conflicts. Therefore, companies in this sector are facing a risk of indirectly financing armed groups, which endangers surrounding civilian populations. The concentration of heavy metals, rare earth dust and the risk of radioactivity also affect the health of the surrounding populations and workers at the extraction sites. These risks are heightened as rare earth extraction is currently carried out mainly in China, where practices are insufficiently regulated. Finally, e-waste is a source of societal risk due to the precious metals it contains, which can lead to human rights violations.	**Human rights in the production chain**	• Transparency and traceability of the raw materials supply chain. • Existence of a Code of Conduct for Suppliers that includes human rights and labor rights considerations. • Audit of suppliers based on a collaborative scheme, such as Responsible Business Alliance (RBA) audit program or equivalent third-party audit programs for integrity of supply chain. • Implementation of a policy, audits and reports on conflict minerals and leverage industry frameworks, such as the RMI (Responsible Minerals Initiative). • Violation of the United Nations Global Compact (UNGC) principles and the Organization for Economic Cooperation and Development (OECD) guidelines for multinational enterprises and implementation of corrective measures. • Implementation of a policy to monitor compliance with UNGC principles or OECD guidelines for multinational enterprises. • Number of identified cases of severe human rights issues and incidents.

PAI #10
PAI #11
PAI #16

Product Safety and Security

CONTEXT

Ensuring product safety is critical for the hardware and semiconductor industry. As technology has grown more complex and interconnected, the need to protect consumers from potential hazards and ensure compliance with regulatory requirements has become increasingly important. As hardware devices are often in direct contact with consumers, it increases the risk of electrical hazards. Companies should prioritize product safety throughout the design, manufacturing, and distribution phases. In addition, function creep is a risk for the sector and components may be found in application for which they have not designed or licensed for. As such, companies are encouraged to conduct thorough due diligence on their business partners and strong export control. Product diversion, counterfeiting and misuse remains a risk difficult to mitigate as tracking the full supply chain indeed requires detailed investigations involving many stakeholders.

The number of connected devices worldwide is set to reach 30 billion units by 2030[1], with a growing amount of personal and sensitive data processed by these technologies. Hardware and semiconductor companies must prioritize data privacy to safeguard individuals' personal information, maintain the integrity of their products, and protect freedoms. Moreover, this data may be subject to cyberattacks, leading to abusive use of data and also information gathering by government agencies for surveillance purposes, which do not always comply with international conventions on fundamental rights and freedoms. We expect manufacturers of electronic devices to adopt a "security & privacy-by-design" approach for their products through dedicated tools. It is also necessary for these companies to put in place policies and practices to prevent abusive use of their products by public authorities (surveillance, privacy violations, discrimination, etc).

MINIMUM STANDARDS

Type of ESG risk:	Risk assessment indicators examples:
Product safety	• Risk assessment to identify potential hazards in the design stage. • Incorporate safety features into product. • Implement rigorous testing and validation procedures (simulations, prototypes). • Deliver user safety information and training to address potential risks. • Establish processes for employees, suppliers, and customers to report incidents. • Number of product recalls, effectiveness and transparency on recalls. • Respect of export control and sanctions laws. • Due diligence on business partners and third-party distributors.
Data privacy & Security	• Data privacy and security policies and procedures. • Establish a data privacy management system and clear accountability for data. • Risk assessment/threat modelling to identify potential security risks. • "Security-by-design" approach (hard disk encryption, cryptographic chip). • Ensure regular security testing and code reviews. • Establish prevention mechanisms for abusive use by public authorities (rejection of backdoor installations, noncommunication of encryption keys). • Provide security & privacy documentation and training for developers, testers and users. • Develop and maintain an incident response plan.

Military equipment and weapons*

Military equipment can play a role in both war and peace; they are not necessarily excluded. The term "military equipment" includes all weapons, weapon systems, platforms, and ammunitions. Although they can contribute to peacekeeping, weapons must not be used on a discretionary basis or against civilians. Semiconductor and hardware components can be integrated into weapons in various ways to enhance their functionality, precision, and capabilities, including for combat missions. For this reason, our exclusion targets components that are key for lethality/essential in the offensiveness of weapons and for which non-reexportation cannot be ensured. As such, a case-by-case analysis is performed whenever a company from these sectors is exposed to the military and defense industry to assess compliance with minimum standards.

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Governance

CONTEXT

The credibility and robustness of the company's sustainability strategy is supported by a comprehensive governance structure and the integration of Environmental, Social and Governance (ESG) criteria in the management remuneration. Moreover, business ethics is an important issue, and companies must be able to prevent the risk of internal bad practice (corruption, fraud, bribery, etc.). Tech companies are often exposed to competition regulation issues and price collusion. As such, it is still important that companies be transparent with regard to their lobbying practices and anti-corruption, anticompetitive, and bribery policies and initiatives. The risk assessment on this subject is essentially based on a detailed analysis of companies' controversies and reactions. Because of its strong propensity to generate intellectual property-related revenue, the sector is also keen to aggressive tax optimization strategies, which makes transparent tax communication essential.

MINIMUM STANDARDS

Type of ESG risk:	Risk assessment indicators examples:
Governance of sustainability	• Existing governance structure enabling the mitigation of environmental and social risks • Disclose breakdown of value among stakeholders, improving transparency around employee remuneration and payroll • Integration of ambitious and binding sustainability criteria – assessed through pre-determined, quantifiable metrics– into the variable compensation of top executives • All Board members are trained on sustainability topics • Presence of employee representatives at board level (beyond regulatory requirements). • Unadjusted gender pay gap and board gender diversity **PAI #12** **PAI #13**
Business ethics	• Robust business ethics policies covering anti-corruption, anti-competitive and bribery policies • Transparency about lobbying practices and objectives • Evidence of effective whistleblower channels and transparency around cases reported and actions implemented • Systematic training on company's and suppliers' code of conduct **PAI #17**
Tax practices	• Effective tax rate vs. equal statutory tax rate • Absence of controversies or evidence of aggressive tax optimization practices • Estimated exposure to tax havens* or tax noncooperative jurisdictions with no real activity in the country

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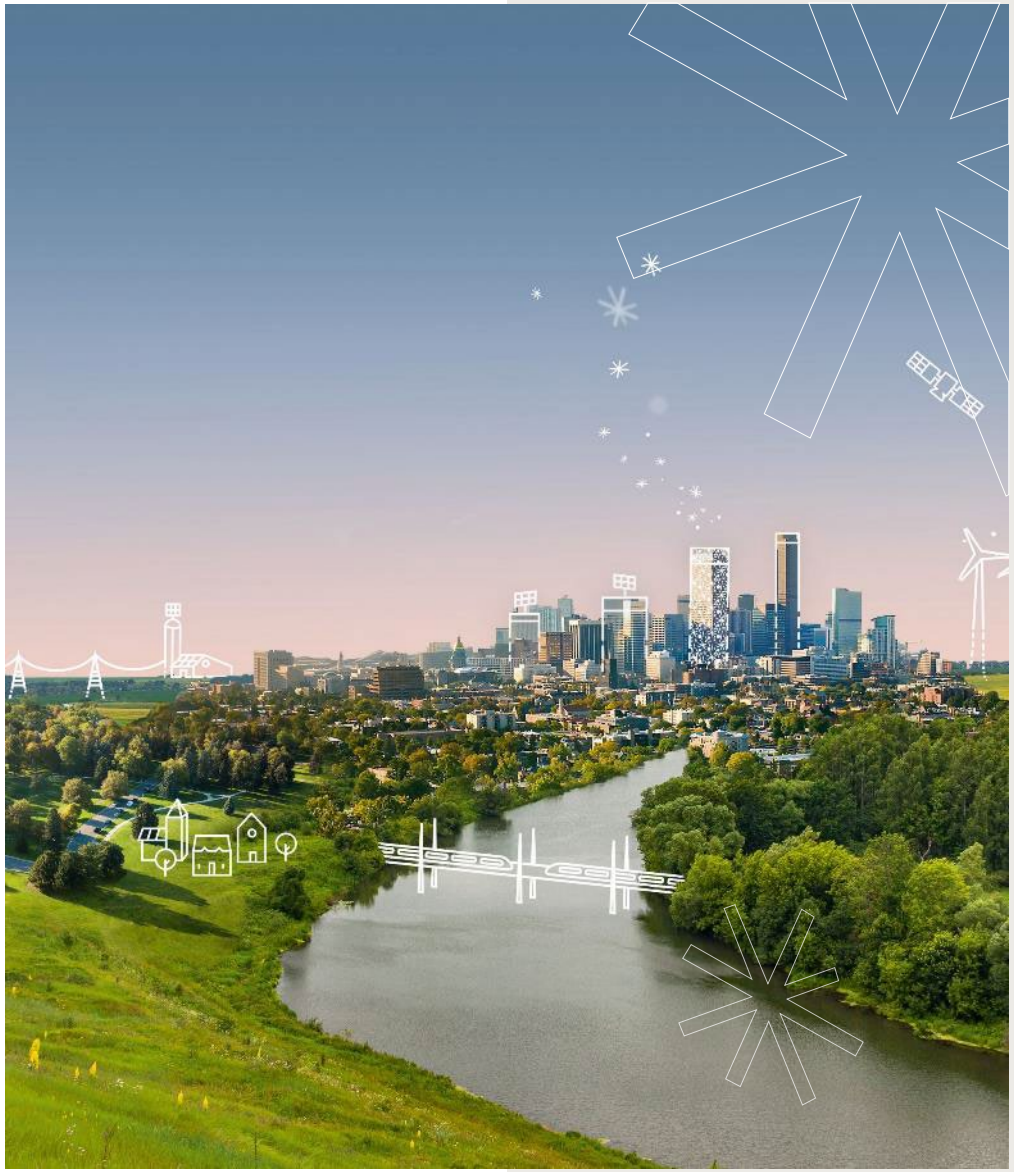
Appendices



Positive impact

According to Mirova's internal methodology[1], contribution to the SDGs can be grouped into two main categories, which are often complementary.

- The **"activities"** i.e., the products and services they offer.
- The "**practices**" i.e., the way operations can contribute to create sustainable and inclusive jobs, or by having strong commitments to net zero targets beyond their green products offerings, etc.

ACTIVITIES	Marginal or no exposure to sustainable activities.	From 10% to 20% revenues from sustainable activities.	From 20% to 50% revenues from sustainable activities.	> 50% revenues from sustainable activities.
	In these sectors, the positive contribution is mainly analyzed through revenues exposure but not only. We complement this exposure with a qualitative review of the solution's impact. ESG KPIs to assess the level of impact generated can include among others: number of users in low and lower-middle countries, share of sales in underserved areas, number of jobs created, investment in infrastructures, KwH of energy saved by the product etc.			
PRACTICES	Absence of advanced practices.	One or more **advanced practices** on Medium Stake issues. or credible strategy to transition to advanced practices.	One or more **advanced practices** on High Stake issues.	
	For the purpose of defining High/Medium Stakes, Mirova relies on external classifications, to the extent possible. Indicative High Stake sectors are defined as follows but may be adapted on a case-by-case basis, notably depending on a company/project effective exposure to high stake activities. • Climate: Mirova relies on the list defined by NZIF and retains Nace codes A to H and J to L as High Stake. • Biodiversity: Mirova relies on the definition of its supplier Iceberg Datalab and retains all GICS except from GICS 5020, 4510, 5010 and 3510 as High Stake. • Human Capital: Mirova considers sectors that are most exposed to arduous working conditions as High Stakes and all GICS except from GICS 5020, 4010, 4020, 4030, 4510, 3520, 6010 and 6020.			

ESG risks

SECTOR INHERENT RISK LEVEL: MEDIUM/HIGH

Hardware and semiconductor companies face many ESG risks. Terminals represent 65% of the digital sector carbon footprint with 45% of emissions from product manufacturing and 20% from product use over their lifetime. As such, a decarbonization strategy on the entire life cycle is critical. Downstream, the sector generates a large amount of e-waste that contains harmful components not easy to recycle. These companies have complex supply chains that heavily rely on minerals, whose extraction and refining pollute the air, soil and water, and are extremely energy and waste intensive. Critical metals used in electronics also generate concerns over human-rights violations, and conflict financing. The nature of the manufacturing process and the high geographical footprint of manufacturing sites in developing countries also create health and safety and human capital challenges. Companies in this sector also have the responsibility to put products in the market that are safe for consumers. Finally, the sector is also subject to business ethics and privacy risks.

COMPANY INHERENT RISK LEVEL

A company's inherent risk level may differ from the sector's inherent risk level.
The definition of a company's inherent risk level may also be determined by the specificities of the business model, and the nature of the activities and their locations as well as that of their suppliers (includes country-specific risks).

MAIN ESG RISKS FACTORS

CLIMATE CHANGE
BIODIVERSITY FOOTPRINT

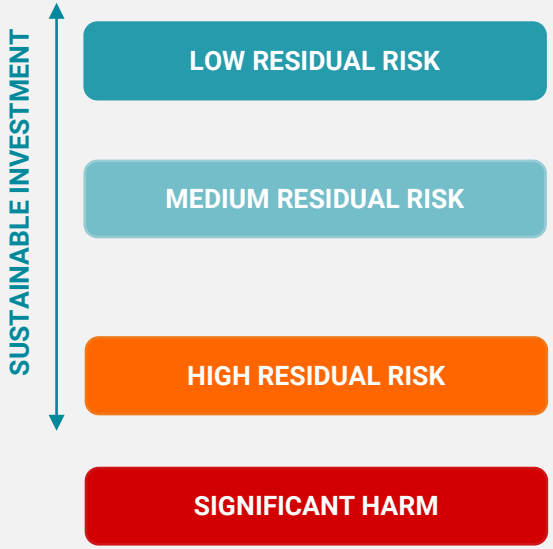
WORKING CONDITIONS

PRODUCT SAFETY AND SECURITY

GOVERNANCE :

- Governance of sustainability
- Business ethics
- Taxes

RESIDUAL ESG RISK LEVEL



Satisfactory management of the company's or project's main sustainability risks on most material issues.

Current management in place does not fully cover all ESG risks but these are considered as moderate and current practices are deemed acceptable.

Companies demonstrating significant mitigation efforts operating in sectors with industrywide complex and unaddressed challenges – systematically under targeted engagement.

Not eligible for investment.

Principal adverse impact indicators

ADVERSE SUSTAINABILITY INDICATOR		MOST RELEVANT	THRESHOLDS / CRITERIA
CLIMATE AND OTHER ENVIRONMENT-RELATED INDICATORS			
Greenhouse gas emissions	1. GHG emissions	X	Systematic integration in qualitative internal analysis and systematic engagement with the largest emitters to strengthen their Net Zero commitments.
	2. Carbon Footprint	X	
	3. GHG intensity of investee companies		Not applicable
	4. Exposure to companies active in the fossil fuel sector		Not applicable
	5. Share of non-renewable energy consumption and production	X	Systematic integration in qualitative internal analysis and systematic engagement with the largest emitters to strengthen their Net Zero commitments.
	6. Energy consumption intensity per high impact climate sector		
Biodiversity	7. Activities negatively affecting biodiversity sensitive areas	X	Exclusion of companies or projects significantly harming biodiversity sensitive areas.
Water	8. Emissions to water	X	Systematic integration in qualitative internal analysis and systematic engagement with relevant investee companies on this issue.
Waste	9. Hazardous waste and radioactive waste ratio	X	
INDICATORS FOR SOCIAL AND EMPLOYEE, RESPECT FOR HUMAN RIGHTS, ANTI-CORRUPTION AND ANTI-BRIBERY MATTERS			
Social and employee matters	10. Violations of UN Global Compact principles and Organization for Economic Cooperation and Development (OECD) Guidelines for Multinational Enterprises	X	Exclusion of companies violating UNGC and OECD principles and monitoring of exposure to violations as part of controversy monitoring process. Systematic integration in qualitative internal analysis.
	11. Lack of processes and compliance mechanisms to monitor compliance with UN Global Compact principles and OECD Guidelines for Multinational Enterprises	X	
	12. Unadjusted gender pay gap	X	Systematic integration in qualitative internal analysis and systematic engagement with relevant investee companies on this issue.
	13. Board gender diversity	X	
	14. Exposure to controversial weapons (anti-personnel mines, cluster munitions, chemical weapons and biological weapons)	X	Exclusion of companies or projects exposed to controversial weapons leads to and involved in the production of re-exportable weapons.
INDICATORS FOR SOCIAL AND EMPLOYEE, RESPECT FOR HUMAN RIGHTS, ANTI-CORRUPTION AND ANTI-BRIBERY MATTERS			
Human Rights	16. Number of identified cases of severe human rights issues and incidents	X	Systematic integration in qualitative internal analysis and monitoring of exposure to violations as part of controversy monitoring process.
Anti-corruption and anti-bribery	17. Number of convictions and number of fines for violation of anti-corruption and antibribery laws	X	

The information provided reflects Mirova's opinion/the situation as of the date of this document and is subject to change without notice. Our minimum standards policy also provides more information on thresholds for Principal Adverse Impacts Indicators : Mirova Minimum Standards Source: Mirova.

Useful Resources

SFDR

- Sustainable Finance Disclosure Regulation (SFDR): positioning of Mirova Funds
- Description of the principal adverse impacts on sustainability factors

POLICIES AND METHODOLOGIES

- Our approach to impact
- Our approach to impact & ESG assessment
- Minimum standards
- Voting and Engagement policies
- Temperature alignment of listed investment portfolios
- Transparency codes
- Our Taxonomy for Sustainable Solutions

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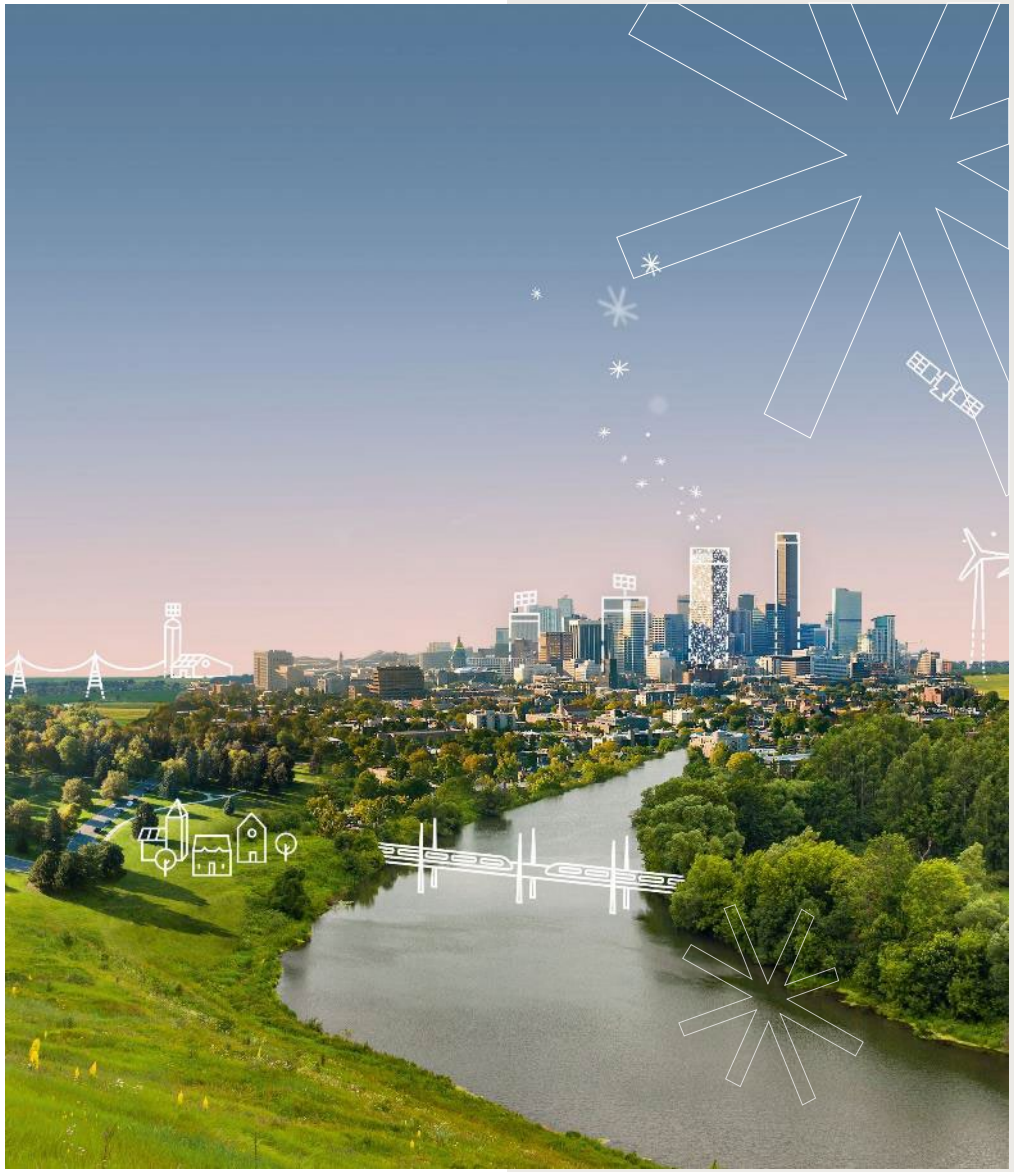
Disclaimer



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MAIN RISKS

ESG Investing Risk & Methodological limits

By using ESG criteria in the investment policy, the relevant Fund's objective would in particular be to better manage sustainability risk and generate sustainable, long-term returns. ESG criteria may be generated using Mirova's proprietary models, third party models and data or a combination of both. The assessment criteria may change over time or vary depending on the sector or industry in which the relevant issuer operates. Applying ESG criteria to the investment process may lead Mirova to invest in or exclude securities for non-financial reasons, irrespective of market opportunities available. ESG data received from third parties may be incomplete, inaccurate or unavailable from time to time. As a result, there is a risk that Mirova may incorrectly assess a security or issuer, resulting in the incorrect direct or indirect inclusion or exclusion of a security in the portfolio of a Fund.

Sustainability risks

The Sub-Funds are subject to sustainability risks as defined in the Regulation 2019/2088 (article 2(22)) by environmental, social or governance event or condition that, if it occurs, could cause an actual or a potential material negative impact on the value of the investment.

Sustainability Risks are principally linked to climate-related events resulting from climate change (i.e. Physical Risks) or to the society's response to climate change (i.e. Transition Risks), which may result in unanticipated losses that could affect the Sub-Funds' investments and financial condition. Social events (e.g. inequality, inclusiveness, labour relations, investment in human capital, accident prevention, changing customer behaviour, etc.) or governance shortcomings (e.g. recurrent significant breach of international agreements, bribery issues, products quality and safety, selling practices, etc.) may also translate into Sustainability Risks. Sustainability factors consist in environmental, social and employee matters, respect for human rights, anti-corruption and anti-bribery matters (the "Sustainability Factors"). Portfolio investment process includes binding and material ESG approach to focus on well rated securities from an ESG viewpoint in order to mitigate potential impact of Sustainability Risks on portfolio return. More information on the framework related to the incorporation of Sustainability Risks is to be found in the sustainability risk management policy of the Management Company on its website.

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