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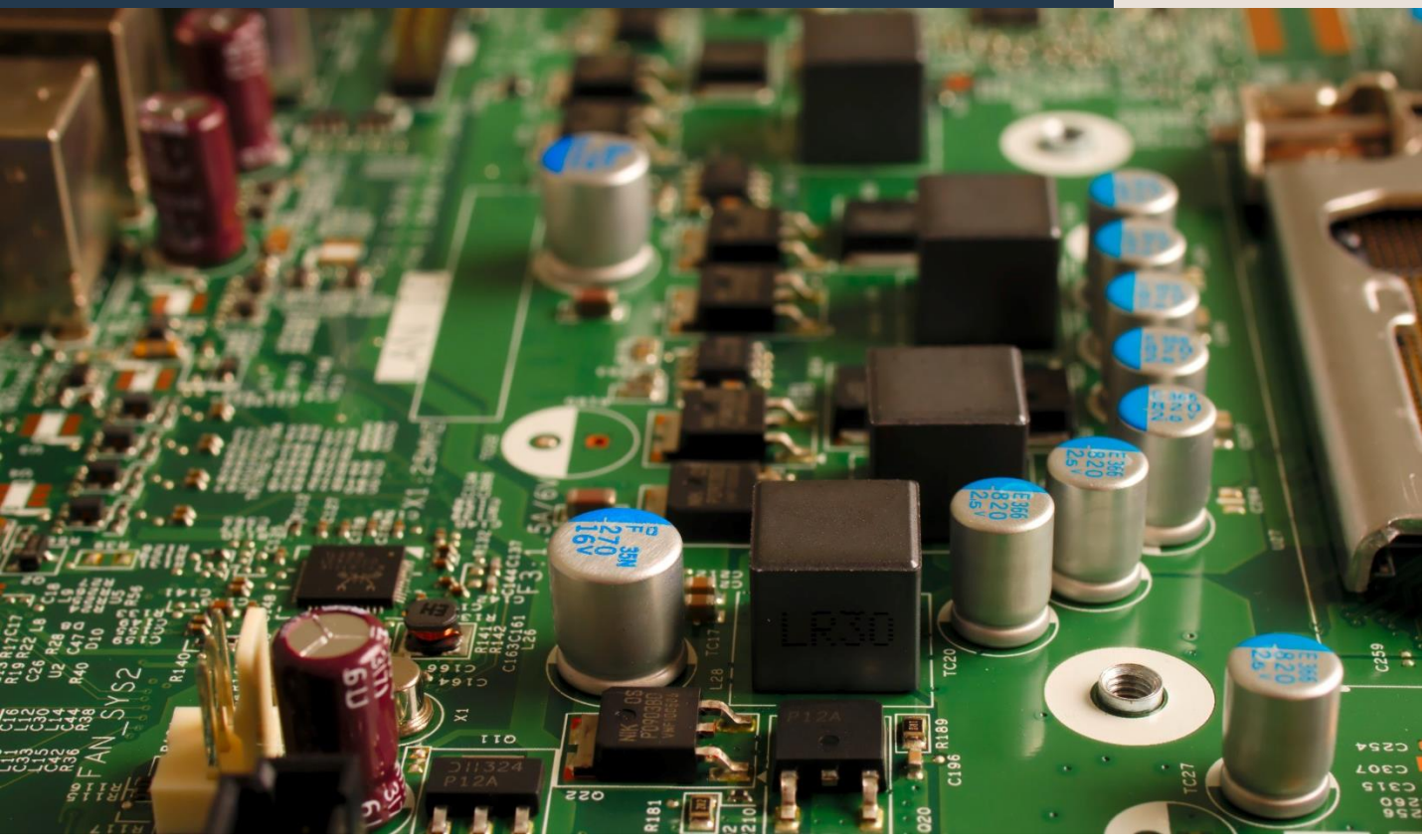
Investing in sustainability

Information and Communication Technology: Computer Equipment and Electronic Components

Sustainable Development Sector Analysis Framework

March 2020



This is a methodological document aimed at clarifying how Mirova takes into account sustainable development issues in the framework of the environmental, social and governance analysis of each sub-sector of activity.

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True enabler of innovation, the Information and Communication Technology (ICT) sector cannot ignore sustainability considerations if it is to be a real lever for development. Some applications, in particular those that allow access to knowledge and banking services in emerging countries, or the deployment of optimized infrastructure known as “smart” (smart grids, buildings, cities, etc.), represent a strong environmental and social potential. However, new technologies are also subject to many controversies: labour rights violations, minerals sourcing, energy consumption, etc. All of which underline the need for a sound approach. Without sustainability, the risks for our populations and planet will likely offset the potential benefits we could ultimately extract from ICT.

Sectors: Electronic equipment, consumer electronics, infrastructure and industrial equipment.

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Sustainability Opportunities

Social and/or Environmental Efficiency Solutions

For each additional global GDP point, CO2 emissions and resource consumption increase by 0.5% and 0.4%, respectively (GeSI, 2015). These figures reveal an unsustainable growth model.

Large scale ICT applications could break this correlation, provided they are developed to respect users' rights. Thus, smart grid management equipment and production processes (connected meters, sensors, etc.) make real efficiency gains, thereby limiting resource consumption. These solutions are also of social interest, as evidenced by certain applications in agriculture (e.g. soil control to limit inputs) or in healthcare (e.g. online medical records). In addition to process optimization, electronic equipment and components allow to improve the energy efficiency, such as LED lighting and some air conditioning solutions for buildings.

It should be noted that the benefits of these solutions largely depend on their implementation. These enablers are therefore assessed in regard to the materiality of their contribution. An uncertain or too low efficiency gain, which does not allow to substantially reduce the environmental footprint of a company or sector, cannot be considered as a sustainable development opportunity. At this stage, for example, efficiency solutions applied to ICT themselves (5G, "green" data centres, etc.) are not considered green solutions. Indeed, in this industry, efficiency gains are unlikely to offset the growing environmental footprint linked to the ever-increasing consumption of equipment and data.

We favor companies with significant part of the activities dedicated to the development of these efficiency solutions. We take into account the share of revenue generated by these new technologies, as well as the environmental and social benefits enabled by the products.

KEY INDICATORS

- Share of revenue generated from, or investment in, efficiency enablers.
- Environmental/social performance enabled

Access to Development and Healthcare

Access to information, education and healthcare are powerful levers for development for all populations, especially in less favoured areas. ICT has an even more important role to play in this respect as the digital divide further widens the socio-economic gap between and within countries.

Smartphones have already proven their usefulness in supporting local economies, by providing access to a secure banking system. However, it is still often the only way to access the internet in these countries. Therefore, accessing other computer equipment (tablets and computers) is also an important lever, especially in the education field: more than half of Sub-Saharan African schools are without access to the internet and computers (UNSD, 2019).

Further, new technologies are emerging to support research and health. In recent years, "Medtech" (for "medical technologies") has established itself as an essential equipment provider in laboratories and care centres, but also as a provider of diagnostic/remote monitoring solutions.

We expect IT equipment companies to proactively position themselves on these solutions with high social impacts. This can be achieved in many ways: developing products dedicated to literacy and education, and setting an affordable price for products in emerging countries,

developing products dedicated to research and health, developing diagnostic solutions/remote medical follow-up for populations in regions with the least endowed health services (emerging countries, home monitoring of sensitive patients, etc.).

We will favor companies with significant part of activity positioned on access to ICT and education in emerging countries or generated by products dedicated to research and health.

KEY INDICATORS

- Part of revenue coming from (i) access to tech and education, or (ii) products dedicated to research and health.

Renewable Energy Support

Companies providing components and electronic devices play a key role in the development and deployment of renewable energies, which helps fight climate change.

Technology contribute directly and indirectly to supporting renewable energies. Electronic components are widely used in solar panels (semiconductors) but also in energy storage solutions, without which renewable energies could not become a reliable source. Electronic components are present well in the electric charging stations that are essential for the wide dissemination of these sustainable solutions.

We favor companies who devote a significant part of their activity to solutions for the production, storage and dissemination of renewable energies.

KEY INDICATORS

- Share of revenue generated from technologies for renewable energy support.

Exposure to Opportunities

	Indicator considered: % of revenue generated from efficiency solutions with S/E impact +% of revenue generated from solutions offering access to information and/or health care +% of revenue generated from technologies related to renewables	
High exposure	>50%	The company's ability to materialize the environmental and social performance of efficiency-enabling technologies complements the quantitative, revenue-based analysis.
Significant exposure	Between 10% and 50%	
Low or no exposure	<10%	
Negative exposure	No product or service in the ICT sector is currently considered as negatively impacting a sustainable development issue	

Environmental and Social Risk

Working Conditions and Environmental Risks in the Production Chain

Electronic equipment's' production chains, from semiconductor to finished product, often involve a large number of players and include low value-added manufacturing processes. Moreover, strong competition in the consumer IT markets is pushing players to regularly commercialize new generation of products while lowering costs. This implies the combination of several 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 hardware and components industry is therefore highly exposed to the risks of non-compliance with International Labour Organization conventions. Similarly, numerous chemicals are required for the production of electronic components. The risks they represent for health and biodiversity are seldom properly handled.

We encourage companies to implement comprehensive and transparent strategies both on their own sites and across their supply chain (ranks 1, 2, etc.). We base our analysis on the adequacy of the company's practices regarding this challenge: existence of a group policy with respect to fundamental rights and the management of environmental risks; transparency on supply chain structure; risk mapping and existence of incentives and deterrent mechanisms, particularly as far as suppliers are concerned; participation in local initiatives and, above all, the materialization of results obtained through these various measures.

KEY INDICATORS

- Environmental and social policy applicable to the production chain.
- Training/awareness campaigns for workers, regular audits, follow-up of corrective actions, performance monitoring indicators.
- Change in the number of non-compliance cases identified, compliance targets in the medium and long term.
- Participating in an, industry-wide initiative

Conflict Minerals and Rare Earths

The electronics industry is a heavy consumer of "conflict minerals," with gold, tin, tungsten and tantalum used extensively in semiconductors for their physico-chemical properties. However, these resources are often present in countries with a tense geopolitical situation, particularly in the Democratic Republic of the Congo, where approximately 40% of tantalum reserves are located (U.S.G.S., 2020) and where armed militias are taking advantages from revenues from extraction, thus maintaining conflicts. Therefore, companies in this sector risk financing armed groups indirectly, which endangers both the surrounding civilian populations and the democratic functioning of the country.

Hardware production is also based on rare earths. The rare earths are metals, which extraction, refining and waste involve pollution at such a level that most countries have stopped producing them. This production is responsible for vegetation destruction, soil degradation, water acidification, gaseous discharges, radioactivity, etc. 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 all the greater given that rare earth extraction is currently carried out mainly in China, where practices are insufficiently regulated.

We expect from companies using these resources that they develop appropriate policies and practices to ensure the traceability of their minerals in a transparent manner. We also encourage them to limit the use of these minerals from the design stage by giving priority to recycled materials.

KEY INDICATORS

- Implementation of a policy, audits and report on conflict minerals
- Share of certified smelters and refineries in the supply chain
- Use of recycled materials

Energy Efficiency

All energy uses required for the manufacture and use of products should be considered in a life cycle assessment (LCA). Consumer electronics' electricity consumption may seem marginal in the light of their heavy industrial production processes and the short charging time. However, all in all, and especially for equipment that operates without interruption such as smartphones or internet/TV decoders, electricity consumption during use is responsible for 65% of the overall energy footprint of these products.

Table 1—Primary energy consumption in LCA by the type of equipment

	Manufacturing	Use	Total
Individual equipment	30%	30%	60%
Grids	3%	20%	23%
Information technology centı	2%	15%	17%
Total	35%	65%	100%

Source: Mirova / (GREENIT, 2019)

It should be noted that in terms of carbon footprint, computer equipment is also an issue because of the quantity of plastic present in these products, on the one hand, and of the growing amount of data exchanged by connected objects, on the other hand. These impacts are all the more significant that the number of consumer electronic equipment increases as technologies grow, becoming more affordable, and further penetrate our daily lives. In 2019, computer equipment generated 1.4 Gt of greenhouse gases, i.e. 3.8% of global emissions. 66% of this carbon footprint is due to personal electronic equipment.

Table 2—Overall contribution to climate warming (GHGs)

	Manufacturing	Use	Total
Individual equipment	40%	26%	66%
Grids	3%	16%	19%
Information technology centı	1%	14%	15%
Total	44%	56%	100%

Source: Mirova / (GREENIT, 2019)

We expect companies to implement comprehensive strategies to control their energy and carbon footprints, covering both the production phase and the use phase of their equipment. These policies must be accompanied by steering tools and concrete measures. Sustained improvement must demonstrate the importance attached to this subject.

KEY INDICATORS

- Policy, indicators and quantified objectives regarding the product manufacturing and product use phases.
- Development of performance over recent years.

Harmful Components and Electronic Waste

The choice of materials contained in electronic equipment presents a risk to users throughout the product's life. Therefore, many substances are subject to regulatory restrictions, such as persistent and toxic pollutants (lead, mercury, cadmium, arsenic, lithium, etc.) and many phthalates with carcinogenic risks. Phthalates are present in PVC, which is widely used in electronic equipment cables, and can affect the recyclability of these cables.

Downstream, the ICT sector is directly responsible for one fifth of the waste produced worldwide by electrical and electronic equipment (Waste Electrical and Electronic Equipment, WEEE, e.g. screens, telephones, computers, etc.). WEEE contain heavy metals, persistent pollutants, as well as nanomaterials which concentration is beginning to attract regulator attention. In case of landfill storage or incineration of electronic waste, these pollutants as well as high greenhouse gases (PBDEs) are released. Moreover, WEEE are a source of societal risks due to precious metals contained (silver, gold, palladium, etc.), which leads to poorly regulated jobs in developing countries. At e-waste storage and processing sites, violations of fundamental rights are widespread (child labour, forced labour, etc.). Despite these risks, WEEE are still poorly controlled and inadequately handled. The majority of e-waste ends outside the recovery channels. Until recently, a large part of recovered e-waste was sent to the emerging countries channels (mainly Ghana, India, China, Nigeria and Pakistan), be it legally or in spite of the Basel Convention. Recently, some Asian countries have closed their borders to these exports, but the recycling problem is still present.

Measures must be taken throughout the product life cycle to address these risks. The first step would be to limit the presence of toxic substances right from the design stage. Commitments must also be made to establish efficient and virtuous systems for the recovery, refurbishment and recycling of products and their components. Companies must also take responsibility for raising awareness and educating users. Finally, companies must establish control mechanisms, communicate transparently and set demanding objectives regarding this issue.

KEY INDICATORS

- Upstream and downstream policy, quantified indicators and objectives, identification of compliant sectors.
- Measures for phasing out harmful components.
- User awareness campaigns, regular traceability and risk audits at recycling sites, performance monitoring.
- Development of performance over recent years.

Protection of Freedoms

Consumer electronic devices (smartphones, tablets, laptops, desktop computers, etc.), as well as connected objects in home automation or cars, collect large amounts of personal data related to their users . This data may be subject to cyberattacks leading to abusive use of data, but also to gathering of information 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-by-design" approach for their products through dedicated tools (hard disk encryption, cryptographic chip, etc.). It is also necessary for these companies to put in place policies and practices to prevent abusive use of their products by public authorities (rejection of backdoor installations, non-communication of encryption keys, etc.).

KEY INDICATORS

- Policy guaranteeing non-cooperation with public authorities wishing to retrieve personal data and bypassing international conventions.
- Implementing security-by-design solutions.
- Reporting on the performance of data security solutions and communication of data to public bodies.

Business Ethics

ICT companies are regularly marked by controversies related to business ethics. Electronic companies and component manufacturers are particularly concerned with issues of aggressive tax optimization, intellectual property fraud, or abusive sales methods.

It seems essential for the companies concerned to establish clear policies on the various ethical issues at stake, but also to report transparently on their tax strategy as well as on any ongoing ethical controversies.

KEY INDICATORS

- Significant controversies and company responses
- Annual country by country tax report

Sustainable Development Governance

The management of sustainable development issues by the company's own governance structure seems essential in an industry that can provide with real solutions, but also pose significant environmental and social risks.

We encourage companies to set up governance bodies dedicated to implementing corporate responsibility, integrating the interests of all stakeholders and aligning executive interests with the long-term development of the company.

KEY INDICATORS

- Integration of criteria and objectives regarding extra-financial performance in the annual report and the variable remuneration of executives.
- Presence of a director or a board committee in charge of CSR issues.

Risk Assessment

	Criteria
Positive	Not meeting the criteria for switching to "Risk", AND - Advanced policy and reporting on the respect for fundamental rights in the production chain, AND - Advanced policy to reduce the environmental impact of products, covering the production phase, the use phase and the end of life.
Neutral	All other cases
Risk	- Practices deemed insufficient and response deemed inappropriate to controversies related to fundamental rights of workers and/or users, OR - Practices deemed insufficient and response deemed inappropriate to controversies related to conflict minerals, OR - Practices deemed insufficient and response deemed inappropriate to controversies related to conflict minerals, OR - Responses to repeated ethical controversies that are deemed as insufficient or inappropriate

Conclusion

IT equipment is essential to the development and implementation of high-potential sustainability solutions across all other sectors. It is a key component for renewable energy and essential support for the socio-economic development of emerging countries. Players positioned on these markets with a policy of active support for these solutions are therefore encouraged as part of a responsible investment approach.

Companies are also assessed on the management of risks inherent to their activities. For the IT equipment and electronic components subsector, the assessment criteria include: respect for the fundamental rights of workers, reduction of the energy footprint of products over their entire life cycle, control of environmental risks related to the materials contained in these products, protection of users' fundamental freedoms and business ethics. In the "business as usual" activities (i.e. those not positioned on predefined key opportunities), good management of these risks, which guarantee the sustainability of activity, may represent a favorable differentiating criterion.

Conversely, a company presenting opportunities in its business portfolio, but also shortcomings in its management of material risks, may be excluded from our investments. Finally, a lack of public information on risk management will compel us to contact the company: engaging in a dialogue will allow us to obtain the information we lack for our analysis, or to encourage the company to be more transparent.

Our Approach to sustainability assessment

Acting as a responsible investor requires interpreting the economic world within its social and environmental context. This approach calls for understanding the interactions between different private-public players, small-medium-large companies, developed and developing economies to ensure that each player's growth is consistent with the balance of the rest of the system. It is a long-term approach that guarantees that today's choices will not lead to negative consequences for future generations. Understanding these complex relationships demands:

- Clear understanding of sustainable development issues facing our societies,
- Assessing the possible interactions between the assets of our investment strategies and these sustainability issues.

The SDGs as a Guide

Following the Millennium Development Goals created in 2000, the United Nations set out a new framework for sustainable development in 2015. It contains 17 Sustainable Development Goals (SDGs), broken down into 169 specific targets designed to address the main social and environmental issues between 2015 and 2030. In addition to having been adopted by all members of the United Nations, the SGDs offer several advantages.

First, they establish a comprehensive framework concerning environmental and social issues, applicable to all economies regardless of their level of development. Thus, while some issues such as ending hunger or ensuring access to water for all are often more relevant for low- and middle-income countries, other objectives such as fighting climate change or making cities safe, resilient and sustainable, are applicable at all levels of development.

Moreover, the SDGs can be considered as a frame of reference for sustainable development issues for a variety of actors, from governments to companies and investors. The private sphere is increasingly considering environmental and social issues, illustrating new forms of governance where subjects of general interest are no longer solely the prerogative of the public sphere. Considering the SDGs can help companies to think on how they create environmental, economic, and social value.

Finally, the SDGs help investors to question the long-term resilience of their assets and portfolios to the ongoing transformations. Then, investors can go even further by looking at their exposure to new solutions and economic models that will respond to long-term economic transformations. For example, the targets associated with the SDGs to significantly increase the share of renewable energy and to double energy efficiency by 2030 imply a profound transformation within the energy sector.

We consider the SDGs squarely in line with our mission. As a result, in 2016, Mirova decided to use this framework to define its responsible investment approach.

Figure 1: The 17 Sustainable Development Goals

	End poverty in all its forms everywhere		Reduce inequalities within and among countries
	End hunger, achieve food security and improved nutrition and promote sustainable agriculture		Make cities and human settlements inclusive, safe, resilient and sustainable
	Ensure healthy lives and promote well-being for all at all ages		Ensure sustainable consumption and production patterns
	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all		Take urgent measures to combat climate change and its impacts
	Achieve gender equality and empower all women and girls		Conserve and sustainably use the oceans, seas and marine resources for sustainable development
	Ensure availability and sustainable management of water and sanitation for all		Protect, restore and promote sustainable use of territorial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
	Ensure access to affordable, reliable, sustainable and modern energy for all		Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all		Strengthen the means of implementation and revitalize the global partnership for sustainable development
	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation		

Source: United Nations

Assessing Environmental and Social Quality by the SDGs

We believe that the SDGs will transform the economy as we know it. Acting as a responsible investor starts with taking a broader view of the way investors think about the environmental and social profile of the assets they finance. These interactions can be grouped into two categories:

- **Materiality**: how the current transitions are likely to affect the economic models of the assets financed either positively or negatively.
- **Impact:** how investors can play a role in the emergence of a more sustainable economy

We believe that these two approaches are closely linked. Our evaluation methodology thus seeks to capture the extent to which each asset contributes to the SDGs. From our perspective, this approach provides a relevant vision on both the “Materiality” and “Impact” aspects.

A Five-level Qualitative Analysis

Mirova has based its environmental and social evaluation method on four principles:

A RISK/OPPORTUNITY APPROACH

Achieving the SDGs requires taking two different dimensions into account that often go together.

- Capturing opportunities: when companies center their strategies on innovative business models and technologies focused on technological and societal transformation, they can often capture opportunities related to the SDGs.
- Managing risks: by proactively managing risks related to these transitions, companies can reduce and re-internalize their social and environmental externalities, which often takes the form of general management of sustainability issues.

This analysis structure gives equal importance to opportunities and risks. It is the first prism through which we analyze sustainable development issues.

A LIFE-CYCLE VISION

To identify the issues that could impact an asset, the analysis of environmental and social issues must consider the entire life cycle of products and services, from raw material extraction to end-of-life phase.

TARGETED AND DIFFERENTIATED ISSUES

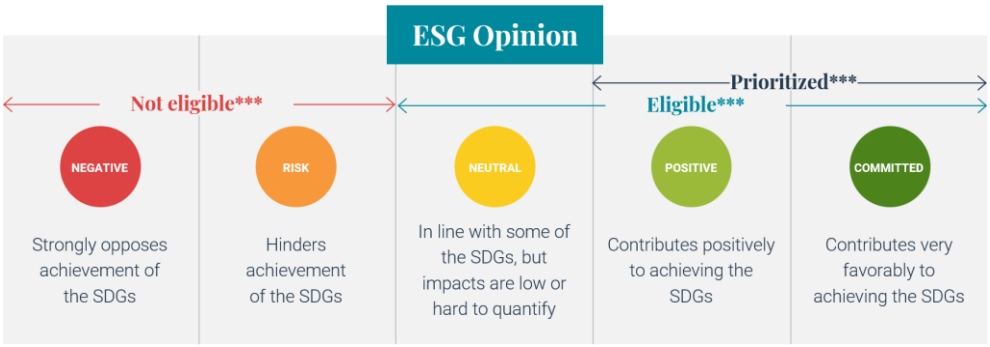
Our risk/opportunity analysis focuses on the elements most likely to have a real impact on the assets studied and on society in general. Additionally, the issues that economic players face

are very different depending on the sector, and can even vary within the same sector[1]. For example, it is important for us to focus on work conditions for suppliers in the textile industry, while for automobile manufacturers, the focus will be more on energy consumption during product use.

So, our analysis focuses on a limited number of issues adapted to the specificities of each asset.

A QUALITATIVE RATING SCALE

Our analyses are summarized through an overall qualitative opinion on five levels. This opinion assesses to what extent an asset contributes to the SDGs.



***[2]

This rating scale is based on the SDGs and their achievement. As a result, opinions are not assigned based on a distribution set in advance: we are not grading on a curve overall or by sector. Mirova does not exclude any industry on principle, and carries out a thorough analysis of the environmental and social impacts of any asset. For some sectors, this analysis may lead to the exclusion of all or some of its actors. For example, companies involved in fossil fuel extraction are considered “Risk” at best, while renewable energy companies are generally well rated.

An indicative grid provides some overall guidelines regarding the links between opportunities, risks and the overall sustainability opinion.

Sustainability Risks Review					
	Positive	Risk	Positive	Positive / Committed	Committed
	Neutral	Negative / Risk	Neutral	Neutral / Positive	Positive / Committed
	Risk	Negative	Negative / Risk	Risk	Risk
		Negative	Low or no	Significant	High
		Sustainability Opportunities Exposure			

1 For every sector, defining key issues is the subject of a specific study. This document is available on Mirova *website.* https://www.mirova.com/fr/recherche/comprendre#vision
2 *** For Mirova’s investments

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Non-contractual document written in March 2020 by Louise Schreiber.

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