

# MANUFACTURING

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**Key sector ESG aspects relevant to operations:**

**Labour conditions | Health, safety & security | Resource efficiency & pollution prevention | Biodiversity conservation & ecosystem services | Supply chains | Business integrity**

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## 1. APPLICABILITY

This Sector Profile is designed to help fund managers quickly familiarise themselves with the most frequent and important environmental, social and governance (ESG) aspects of investments in the manufacturing sector. It aims to be a starting point for thinking about ESG risks and opportunities, and not a detailed technical guidance document.

### 1.1 Using this Sector Profile

A company can be affected by non-sector specific issues such as impacts on Indigenous Peoples and cultural heritage. Therefore, each company must be carefully considered based on its specific characteristics and circumstances including scale of operation, location, technology utilised, management capacity, commitment and track record, and supply chains. Additionally, environmental and social (E&S) impacts, risks and opportunities in a particular company or sector can change over time for a number of reasons (e.g. changes in the applicable laws or expansion of a company's activities or assets). Fund managers should have systems in place to identify such changes and manage any associated risks and impacts and, where possible, capitalise on new opportunities.

This Sector Profile draws on internationally recognised good practice standards and guidance, particularly the [International Finance Corporation \(IFC\) Performance Standards](#) and the [World Bank Group Environmental, Health and Safety \(EHS\) Guideline](#). The profile identifies key standards that are generally applicable to the sector (refer to 'Standards, guidelines and other resources' section below). It is not a substitute for such standards, which should take precedence as authoritative sources and basic technical references. Applicable laws and regulations must be taken into account and compliance with them should be regarded as the minimum acceptable performance standard.

See [CDC Environmental and Social Checklist](#) and [CDC Governance and Business Integrity Checklist](#) for questions that fund managers should consider when evaluating an investment in manufacturing from an ESG perspective.

### 1.2 Scope of this Sector Profile

This Sector Profile covers:

- Refining and smelting of metals and manufacture of metal products.
- Glass manufacturing.
- Manufacture of fertilisers and chemicals including pesticides.
- Cement and lime manufacturing.
- Ceramic tile manufacturing.
- Manufacture of batteries.
- Pulp and paper mills.
- Plastic and rubber products manufacturing.
- Textile manufacturing.
- Tanning and leather finishing.
- Printing.
- Semi-conductor manufacturing.
- Wood-based product manufacturing.

Business activities that fall within the scope of this Sector Profile include:

- Manufacture of pig iron, steel and aluminium.
- Recycling of scrap metal using electric arc furnaces.
- Melting of silica for glass manufacture.
- Lime kilns for cement manufacture.
- Metal casting, welding and component manufacture.
- Thermoplastic and polymer manufacture.
- Textile manufacturing.
- Tanning and leather finishing.

This Sector Profile does not cover the extraction, cultivation or harvesting of raw materials, food and beverage processing and manufacturing (see [CDC Sector Profile: Food and Beverages](#)), pharmaceutical manufacture (see [CDC Sector Profile: Pharmaceuticals](#)), extraction, distribution and retailing of oil and gas products (see [CDC Sector Profile: Oil & Gas](#)) or sale and distribution of manufactured products (see [CDC Sector Profile: Retail](#)). See also CDC Sector Profiles for [Mining](#), [Forestry](#) and [Agribusiness](#).

Unless otherwise stated the risks, impacts and opportunities outlined below relate to the operational phase of business activities. Generic guidance on ESG risks, impacts and opportunities associated with Project design and construction are discussed in the [CDC Project Design and Construction Guide](#).

## 2. KEY ENVIRONMENTAL AND SOCIAL ASPECTS

This section outlines some of the specific risks and impacts that emerge from poor ESG practices. Weak management of these aspects may lead to reputational damage, have an impact on a company’s capacity to raise funding (debt and equity) and, more broadly, negatively impact a company’s financial performance. Conversely, sound E&S practices are likely to improve a company’s reputation, access to investors and overall performance.

### 2.1 Management commitment, capacity and track record (CCTR)

Companies need management’s commitment and sufficient capacity to ensure that the necessary resources are available for sound E&S management. Refer to [CDC Guidance: Assessing Companies’ Commitment, Capacity and Track Record](#).

### 2.2 Environmental and social management system (ESMS)

Companies should develop and implement an ESMS commensurate with the level of risks and impacts associated with its activities. For further advice refer to [CDC E&S Briefing Note: Environmental and Social Management Systems \(company-level\)](#).

### 2.3 Labour and working conditions

*Note – Occupational health and safety is covered separately below.*

<p><b>Risks for the business</b></p>	<ul style="list-style-type: none"> <li>• Companies may face prosecution or fines (or having their licences removed) if they fail to comply with labour laws and regulations.</li> <li>• Financial, reputational and legal risks, and lower production efficiency, product quality and profitability can result from poor employee morale, industrial action, high staff turnover and deterioration of employees’ health (e.g. due to excessive working hours).</li> <li>• Higher costs can be incurred to recruit and train new workers if turnover is high due to poor labour and working conditions.</li> </ul>
<p><b>Opportunities for the business</b></p>	<ul style="list-style-type: none"> <li>• Good working conditions can reduce costs and enhance productivity, making it easier for the company to attract and retain motivated and competent workers.</li> <li>• Market access can be enhanced if the business achieves certain standards and/or related certifications related to labour and working conditions (e.g. SA 8000).</li> </ul>

**Wages:** Manufacturing activities may involve the employment of low paid and unskilled labour, including temporary or contract labour, migrant workers and workers who provide services via supply chains (e.g. primary production of raw materials, component assembly or final packaging and distribution). The sector may rely on complex contractual labour arrangements and working practices (e.g. part-time, seasonal and migrant labour or the need for continuous 24 hour production using shift work) and sometimes multi-company ownership and operational structures. Thus, companies must ensure that policies are sufficiently robust to address labour risks across their supply chain, even where there is no leverage to effect change (e.g. through shifting to other contractors who have better practices).

Attention should also be paid to working hours. In some cases, companies may pay wages following a piece-rate pay scheme, which often results in excessive working hours in order to achieve minimum wage. Workers should be paid at least the minimum statutory wage for the sector and working hours should be in accordance with applicable laws and sector regulations/agreements. Companies should not use third party contractors as a means of exceeding working hour regulations or avoiding minimum wage payments.

Good practice in this area can help to manage costs relating to recruitment, training and talent retention and maintain or enhance customer service and build the manufacturing industry's reputation and overall business success.

**Freedom of association and collective bargaining:** The rights of workers to enter free and voluntary collective bargaining arrangements with management should always be respected. Failure to respect these rights and to establish a good relationship with unions could have negative impacts on a company (e.g. strikes). Collective bargaining can be a constructive forum for addressing working terms and conditions and to improve worker/employer relations. It is often more effective and more flexible than state regulation. It can help to anticipate potential problems and can advance peaceful mechanisms for dealing with such problems in a way that takes into account the priorities and needs of both employers and workers.

**Discrimination:** Employment opportunities for women vary in this sector, but companies should be encouraged to develop and implement non-discriminatory, transparent employment opportunities, policies and management practices with associated training requirements. Companies should be encouraged to develop and apply family-friendly employment policies. Good practice in this area can help to manage costs relating to recruitment, training and talent retention and maintain or enhance productivity.

**Child labour and bonded/forced labour:** Bonded and/or forced labour is a risk in many aspects of manufacturing. So-called 'sweatshops' have been identified in several industries, but are particularly associated with the textile manufacturing sector. In addition, child labour has been associated with several types of manufacturing including the pulp and paper industry, garment and textile industry, carpet manufacture, electronics, cosmetics and fast moving consumer goods. Non-compliance with [ILO Core Labour Conventions on Child Labour / Minimum Age and Forced Labour](#) is not acceptable under international standards. Measures to eradicate these forms of labour should be implemented as a matter of priority.

**Accommodation:** Where a company undertakes to provide (either directly or through contractors) worker accommodation (such as temporary camps or permanent dormitories), it should include the provision of basic services and take into account the principles of non-discrimination and equal opportunity. The company should develop and implement policies on the quality and management of the accommodation in accordance with the principles included in [IFC Performance Standard 2: Labor and Working Conditions](#) and [IFC and EBRD Guidance Note on Workers' Accommodation](#). Permanent housing provided as an employment benefit it is not considered 'workers' accommodation'.

**Supply chains:** Manufacturing companies are often part of complex supply chains and it is important to assess risks throughout this chain to protect a manufacturing company's brand and market. Companies should strive to reduce risks of poor labour and employment practices, even where there is no leverage to effect change. This can be accomplished by shifting to those suppliers with better practices or by engaging with poorer quality suppliers to enhance

employment and labour practices. This may require collaboration with other manufacturers, regulators and NGOs. Supply chain risks feature in all aspects of the manufacturing sector including supply of raw materials (risk of unsustainable extraction/harvesting methods or poor E&S practices in primary processing), component assembly, transportation of components or finished products etc. Companies should work towards applying sustainable sourcing principles. For further guidance on supply chains, refer to the [CDC Briefing Note: Supply Chains](#).

For sector specific guidance refer to the applicable [World Bank Group Industry Sector EHS Guidelines](#).

For further general guidance refer to the [ILO Core Conventions](#), [CDC E&S Briefing Note: Labour and Working Conditions: IFC Performance Standard 2: Labour and Working Conditions](#) and [IFC Good Practice Note on Non-Discrimination and Equal Opportunity](#).

## 2.4 Occupational health and safety (OHS)

<p><b>Risks for the business</b></p>	<ul style="list-style-type: none"> <li>• Companies may face prosecution or fines (or having their licenses removed in extreme cases) if workers or contractors are injured or killed.</li> <li>• Damage to/loss of the company’s assets, loss of production, loss of clients/ markets.</li> <li>• Legal costs and compensation claims, as well as increased insurance premiums.</li> <li>• Operating time can be lost with significant cost implications if effective fire safety and emergency response plans are not in place.</li> <li>• Additional training and recruitment costs can be incurred, and the quality of products/services reduced if workforce morale is low and staff turnover is high. This can also result in reputational damage.</li> <li>• Damage to reputation and operations can result from the use of security forces and personnel that are not carefully selected, trained and monitored.</li> </ul>
<p><b>Opportunities for the business</b></p>	<ul style="list-style-type: none"> <li>• Proactively involving workers and contractors in key decisions can help to identify and maintain good OHS practices, and improve their acceptance if new or significantly different to previous practices.</li> <li>• Productivity can be improved, and insurance premiums for workers and compensation payments can be reduced.</li> <li>• Market access can be enhanced where approved supplier or certification programs include OHS requirements (e.g. Cradle-to-Cradle certification).</li> </ul>

OHS is an important consideration for any business, regardless of sector. All companies must have in place appropriate OHS and emergency preparedness and response management systems commensurate with level of risks.

If contractors are involved in operation and maintenance activities, companies should implement measures to ensure contractors work in accordance with applicable regulations and Good

International Industry Practice (GIIP). Such measures should be covered in companies’ OHS and emergency preparedness and response management systems.

Specific OHS risks arising in some manufacturing activities can include:

- Physical hazards (e.g. use of saws and cutting equipment, heavy machinery and vehicles, manual handling, repetitive work, injury or death due to falls from height, strain injuries from heavy lifting, ergonomic stress, work in confined spaces and risk of confinement, use of high pressure equipment including water jets, flying metal particles, exposure to heat and hot liquids).
- Chemical hazards (e.g. handling of hazardous toxic, noxious chemical reagents or allergenic elements such as lead, nickel or chromium).
- Exposure to and potential inhalation of toxic fumes, particulate matter or polymeric dust.
- Biological hazards (e.g. legionella near cooling towers).
- Exposure to noise and vibration from fixed and mobile equipment mechanical equipment such as metal saws and formers, stone grinders (cement), fork lifts and cranes. Glass container manufacturing generates significant noise and poses risks to the workforce.
- Exposure to radiation (e.g. during welding or x-ray stations for monitoring product quality e.g. in steel manufacturing).
- Electric hazards (e.g. from overhead wires or power to manufacturing equipment).
- Security (e.g. production of high value processed metal goods). Measures should be implemented to ensure that security forces are appropriately trained in the use of force and respect workers’ rights.
- Fire and explosion risks (e.g. flammable or unstable material storage or handling or chemical reactions).

For sector specific guidance refer to the applicable [World Bank Group Industry Sector EHS Guidelines](#). Manufacturing industry specific OHS risk management is addressed in more detail in the ILO’s online [Encyclopaedia of Occupational Health and Safety](#).

For further general guidance on GIIP relating to OHS, refer to [CDC Briefing Note: Occupational Health and Safety](#), [IFC Performance Standard 2: Labor and Working Conditions](#), [World Bank Group General EHS Guidelines](#) and [CDC Good Practice: Preventing Fatalities and Serious Accidents](#).

**2.5 Resource efficiency and pollution prevention**

<p><b>Risks for the business</b></p>	<ul style="list-style-type: none"> <li>• Fines and penalties can be imposed for non-compliance with national pollution prevention standards, especially with respect to air emissions (process emissions are high in particulate matter and greenhouse gases) and effluent quality. In extreme cases, companies can have their license to operate revoked.</li> <li>• Major fines and penalties and reputational risks due to the occurrence of accidents (e.g. major chemical spills or accidents involving the release of hazardous materials to the environment). In extreme cases, companies can have their license to operate revoked.</li> <li>• Excessive expenditure on energy, water and/or other production inputs.</li> <li>• Excessive expenditure on management of emissions, solid waste</li> </ul>
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	and wastewater.
<b>Opportunities for the business</b>	<ul style="list-style-type: none"> <li>• Lower operating costs, reduced environmental footprint and better preparedness for resource shortages.</li> <li>• Preparedness for regulatory changes such as implementation of a carbon tax, more stringent emissions standards.</li> <li>• Cost savings or new revenue can be generated by careful handling, storage and disposal of waste, including investigating additional processing or reuse of waste for use as raw material in other industries.</li> </ul>

In addition to the risks and impacts arising from pollution prevention and resource use, community health, safety and security risks and impacts associated with this sector primarily relate to:

**Energy efficiency:** Where possible companies should seek to introduce energy efficiency measures as they can substantially reduce operating costs through improved net energy conservation ratio (i.e. energy output per unit of energy/fuel input). For example in glass manufacturing, energy efficiency should be a priority when designing, upgrading or retrofitting smelters, and in many heavy manufacturing industries, combustion processes and cooling air fans are items where energy efficiency measures can be implemented. See ‘Air emissions’ below.

**Air emissions:** This topic is often critical for companies in the manufacturing sector (particularly in heavy manufacturing including steel, glass and cement production). Major sources of air emissions arise from volatile organic compounds (VOCs), acid gases, particulate or dust emissions (including concentrations of mineral and metal oxides) and greenhouse gases (GHGs) such as ozone depleting compounds in large heating, ventilation and air conditioning (HVAC) and industrial process equipment. These are all of particular concern in older equipment. Moreover, air emissions regulations are generally becoming more stringent globally. Companies should be mindful of this trend.

Companies should consider the increasing business opportunities to use cleaner technology and/or energy efficiency measures (e.g. selling carbon emission reduction credits or accessing grants from international climate change funds). Where possible raw material use should be reduced or substituted for products with lower emissions capacities. Process design and maintenance should also focus on containment of emissions. This is particularly relevant for example, in steel manufacturing where coke oven plants and blast furnaces are a significant source of dust emissions both directly through combustion stacks and as fugitive emissions through oven doors, valves and seals.

In the case of existing plants or expansions or when sourcing pre-owned machinery, retrofitting equipment in order to achieve alignment with GIIP may require additional time and resources. Companies and their investors should set realistic timelines and give due consideration to how Best Available Techniques (BAT) for management of emissions may be applied. The European Integrated Pollution Prevention and Control Bureau (IPPC) offers guidance on BAT for emissions control through its Directive and the associated industry specific [BAT reference documents](#) (BREFs).

**Water management:** Wastewater streams from manufacturing may incorporate low pH (acidic), high total biological or chemical oxygen demand, oils, dissolved heavy metals and solvents,

pigments, paints and dyes, as well as high total levels of suspended solids. Effluent should be carefully disposed of to prevent pollution to underground or surface water sources, or endangering surrounding communities. Pre-treatment may be required. Other wastewater arising in the industry derives from sewerage plants, fire water and equipment cleaning water, which are also likely to contain manufacturing residues. Depending on the nature of manufacturing processes and the effluent generated, typical wastewater treatment steps may include grease traps, skimmers, oil water separators, filtration, sedimentation, biological treatment, chemical neutralisation, disinfection and dewatering to remove solid residues for separate disposal. Additional treatment may be required where effluent contains metals or excessive VOCs.

Companies should always explore opportunities to reduce water consumption (e.g. use of closed-loop water systems). This is particularly relevant when water consumption is significant and/or water availability may be restricted. Water use efficiency measures can reduce the amount of wastewater generated and reduce wastewater treatment costs and/or discharge fees.

**Resource use:** To minimise waste levels while maintaining the integrity of the product, companies should consider how to improve the ratio of raw material to finished product. For example, reusing materials or modifying the manufacturing processes, or investing in research and development (R&D) in the area.

**Waste management:** Some manufacturing activities (particularly heavy manufacturing) are characterised by a low ratio of finished product to raw material, resulting in a significant amount of waste. Solid waste streams may contain heavy metals, spent solvents and acids, inorganic salts or plastics. Additional wastes include packaging wastes, off-spec or below grade raw materials or collected particulate from air pollution control systems. All require specific care in disposal to prevent environmental contamination or community health risks. When emergency responses or spill containment/clean-ups have happened, care should be taken in the disposal of clean up materials, which may also be classified as hazardous waste.

Companies must ensure that even small volumes of potentially hazardous waste (e.g. machinery oils, lubricants, solvents, containers that housed these substances etc.) are stored, handled, transported and disposed of in accordance with GIIP and in a manner that prevents environmental contamination or danger to workers or nearby communities.

Companies should carefully record and manage hazardous materials, formalised through a written Hazardous Materials Management Plan with the aim of establishing preventive actions against future accidental releases of substances with environmental, social and worker risks.

For sector specific guidance refer to the applicable [World Bank Group Industry Sector EHS Guidelines](#) and to [Resource Efficient and Cleaner Production Guidelines and Principles](#).

For further general guidance on GIIP relating to resource efficiency and pollution prevention, refer to [CDC Briefing Note: Resource Efficiency](#), [CDC Briefing Note: Pollution Prevention](#), [IFC Performance Standard 3: Resource Efficiency and Pollution Prevention](#) and [World Bank Group General EHS Guidelines](#).

## 2.6 Community health, safety and security

<p><b>Risks for the business</b></p>	<ul style="list-style-type: none"> <li>• Social licence to operate can be put at risk if social impacts and/or community relations are not well managed.</li> <li>• Financial risks if surrounding communities are exposed to immediate or long-term health and safety risks from air emissions, waste generation, and/or pollution caused by manufacturing activities.</li> <li>• Financial risks due to competition for resources such as water and energy with surrounding communities.</li> <li>• The company’s license to operate can be put at risk if communities feel threatened by, for example pollution or health impacts or by company employed security forces.</li> <li>• Reputational damage and significant management costs can be incurred by non-transparent hiring practices, or the exclusion of locally sourced labour or operating hours that result in high levels of noise, traffic or dust for the local community.</li> </ul>
<p><b>Opportunities for the business</b></p>	<ul style="list-style-type: none"> <li>• Good community relations help to manage expectations and identify any concerns (e.g. health or safety risks) prior to these becoming risks for company.</li> <li>• Reduced security risks, which may indirectly yield other benefits such as improved health and safety of the workforce (if it is predominantly drawn from the local community).</li> <li>• Proactive and positive engagement or employment of local community members can also reduce risk in the company’s operations through, for example, increased of safe manufacturing procedures or road safety.</li> </ul>

The most significant community health and safety risks and impacts associated with the manufacturing sector arise from air emissions, solid and liquid waste handling, storage and disposal, and the potential for major accidents related to fires, explosions or accidental release of toxic substances.

**Emergency preparedness and response:** Companies must implement emergency preparedness and response systems to respond to emergencies associated with the company’s activities in a manner appropriate to prevent and mitigate any harm to people and/or the environment. Companies should develop these systems in collaboration with appropriate and relevant third parties (e.g. local authorities).

**Health:** Manufacturing operations typically generate significant emissions in the form of particulate or dust emissions including concentrations of mineral and metal oxides. GHGs arise from manufacturing processes and energy generation. The accumulation of, and exposure to, fine metal dust in surrounding communities poses a significant risk to long-term health. Deposition of metals such as cadmium, lead and other pollutants can also accumulate in surrounding vegetation (urban gardens or crops), surrounding water bodies and domestic livestock with resulting health impacts over time. Companies should ensure manufacturing operations prevent direct and indirect health impacts to nearby communities.

**Safety:** Manufacturing may pose physical safety risks to local communities through potential fires and explosions on site (e.g. from the management, storage and transport of hazardous materials). The use of large-scale heavy trucks on local roads (for raw material delivery and distribution of finished product) also poses traffic threats. Emergency preparedness focused on protecting local communities should be a priority.

**Security:** Some manufacturing plants employ or contract specialist security personnel in order to prevent access by external parties for potential safety, theft, sabotage and terrorism reasons. Companies should be guided by the principles of proportionality, GIIP and applicable law in relation to hiring, rules of conduct, training, equipping and monitoring of security personnel. Such principles include practices consistent with the [United Nation’s \(UN\) Code of Conduct for Law Enforcement Officials](#) and [UN Basic Principles on the Use of Force and Firearms by Law Enforcement Officials](#).

**Noise and vibrations:** Manufacturing operations may generate significant noise and vibrations associated with crushing or grinding of raw materials, energy or heat generation, cutting activities, operation of heavy machinery, vehicle and freight movements and certain processes such as glass container manufacturing. Noise/vibration prevention and control measures should be implemented to minimise or prevent impacts to local communities (e.g. selecting equipment with lower sound power levels and enclosing noise generating plants and siting away from community areas). Consideration should be given to the proximity of local residents to the manufacturing operation with regard to operating hours.

For sector specific guidance refer to the applicable [World Bank Group Industry Sector EHS Guidelines](#).

For further general guidance on GIIP relating to community health, safety and security refer to [CDC Briefing Note: Community Health, Safety and Security](#) and [IFC Performance Standard 4: Community Health, Safety and Security, UN Code of Conduct for Law Enforcement Officials, UN Basic Principles on the Use of Force and Firearms by Law Enforcement Officials](#) and the [Voluntary Principles on Security and Human Rights](#).

**2.7 Biodiversity and ecosystem services**

<p><b>Risks for the business</b></p>	<ul style="list-style-type: none"> <li>• Social license to operate can be put at risk if ecosystem services used by local communities are damaged.</li> <li>• Reputational risks exist if transport corridors directly or indirectly (i.e. through opening up access) negatively impact biodiversity (e.g. impacts on tropical forests).</li> <li>• Potential delays and additional costs in investments that affect protected areas or species and/or critical habitats.</li> </ul>
<p><b>Opportunities for the business</b></p>	<ul style="list-style-type: none"> <li>• Avoidance of potential financial risks or claims through proactive protection or conservation of biodiversity.</li> <li>• Enhanced reputational benefits where proactive management of biodiversity aspects is evident, including through engagement with up and downstream aspects of the supply chain.</li> </ul>

As global demand for resources increases, particularly in manufacturing, threats to biodiversity in increasingly remote areas are mounting. This may be of particular relevance in emerging markets where rural livelihoods are closely linked with the integrity of local biodiversity.

As with other E&S risks and impacts, companies should always adopt a mitigation hierarchy approach to environmental risks and impacts. This demands they first try to anticipate and avoid these risks and impacts, where this is not possible to minimise them, and where residual impacts remain, compensate or offset them. This hierarchy of conservation measures is typically best addressed during the initial design and siting of the manufacturing facility (refer to [CDC Project Design and Construction Profile](#)), and would aim to direct manufacturing sites to areas with the least biodiversity value. However, sometimes during operation, manufacturing businesses seek new or alternate suppliers of raw materials and in these cases the potential impact on biodiversity should be considered. Typically, impacts on areas with high biodiversity values (e.g. protected areas) will require additional permits, longer planning timelines and more expensive management measures. Therefore, avoiding impacts on such areas will reduce the costs associated with environmental management measures.

**Habitat degradation and destruction:** Direct impacts to biodiversity may arise where manufacturing operations are sited in rural or remote areas, away from urban or industrial zones. Manufacturing operations can impact the health and integrity of biodiversity through particulate or dust emissions including concentrations of mineral and metal oxides. The accumulation of, and exposure to, fine metal dust in the surrounding natural environment poses long-term risks to flora and fauna. Deposition of metals such as cadmium, lead and other pollutants can accumulate in surrounding vegetation, water bodies and wildlife with resulting impacts often only realised after a period of time. Companies should ensure manufacturing operations are conducted to prevent and at least minimise both direct and indirect health impacts to biodiversity through prevention or containment of air and liquid emissions to watercourses and land.

Habitat alteration is another threat to biodiversity that sometimes arises from manufacturing operations or the primary supply chain. Varying degrees of land clearing or habitat disturbance may be associated with raw material sourcing. Indirect impacts on biodiversity may also arise if there is immigration by third parties looking for work.

**Impacts on ecosystem services:** If impacts on biodiversity and/or ecosystem services may occur either directly or from the primary supply chain, the company should consider these. Companies should assess primary suppliers to ensure that biodiversity impacts are avoided, minimised or addressed in accordance with the standard mitigation hierarchy.

For further general guidance on GIIP relating to biodiversity conservation and ecosystem services refer to [CDC Briefing Note: Biodiversity and Ecosystems Services, IFC 2012](#) [Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources](#) and the [CDC Guide on Project Design and Construction](#).

### 3. BUSINESS INTEGRITY CONSIDERATIONS

Fund managers should ascertain and continue to ensure that every company (regardless of sector) complies with the fund's business integrity requirements. For further information see [Governance and Business Integrity](#).

#### 3.1 Business integrity issues specific to manufacturing

Manufacturing is a particularly high risk sector, although this varies across different industries and geographies. In addition to standard business integrity concerns, risks that are particularly relevant for the manufacturing sector include:

- Joint ventures with partners not following good international business integrity practice.
- Awarding of licenses or payments related to sales contracts.
- Export and import of goods.

In order to mitigate corruption risks in the manufacturing sector, fund managers should pay particular attention to the way companies negotiate government sales contracts and the import and export of goods. It is also important that manufacturing companies conduct thorough due diligence on any joint venture partners to prevent corrupt payments being made on their behalf.

## 4. ADVICE FOR FUND MANAGERS

See also [CDC Environmental and Social Checklist](#) and [CDC Governance and Business Integrity Checklist](#) and [ESG in the Investment Cycle](#).

### 4.1 Sector risk overview

Heavy manufacturing activities (e.g. cement, glass and steel manufacturing, pulp and paper mills) intrinsically involve potentially complex, significant and diverse ESG impacts, risks and opportunities that are likely to have material implications for long-term shareholder value. Therefore, ESG matters will normally be a significant element of due diligence, investment structuring and ongoing ownership and monitoring. Fund managers should give serious consideration to using independent ESG experts to support them in transactions in this sector.

In the case of light manufacturing activities (e.g. small-medium plastic, rubber or wood product manufacturing activities or printing companies), fund managers can expect to find that while ESG risks and impacts may be complex, they can usually be addressed by applying widely-used, proven techniques and management practices (although this will need to be assessed on case-by-case basis). External consultants may be engaged to advise on ESG matters, depending *inter alia* on the nature, scale and location of a company's operations, its track record and the fund manager's expertise and capacity to conduct appropriate E&S due diligence.

It should be noted that the manufacturing sector is linked to high business integrity risks, although this varies across different industries and geographies.

### 4.2 Scoping considerations

In addition to the aspects highlighted above linked to the company's assets, activities and workers, fund managers should take into account the following during the life of the investment, from screening to exit:

- **Associated facilities:** (e.g. access roads, transmission lines, potentially quarries for large glass and cement manufacturing plants).
- **Contractors:** Whose operations present significant E&S issues which could have an impact on the business (e.g. construction contractors, security services).
- **Supply chains:** Where these could present significant E&S risks (e.g. textile industry, raw materials for cement and glass manufacturing). For further guidance on supply chains, refer to [CDC E&S Briefing Note: Supply Chains](#).

### 4.3 Situations requiring extra attention

Extra attention, longer timescales and more intensive ESG due diligence may be required in more complex situations. This will ordinarily involve engaging consultants (see CDC Guidance: Working with Consultants) to conduct a gap analysis against the applicable local and international E&S standards (e.g. [IFC Performance Standards](#) and [World Bank Group EHS Guidelines](#)).

Examples of activities or Projects that may require this additional input include:

- New Projects/expansions: Greenfield construction or major expansion Projects where the scale of production has major pollution potential and/or where the site is in a sensitive location (e.g. close to housing or protected natural habitats). See also the [CDC Project Design and Construction Guide](#).
- Community health, safety and security: Situations/Projects involving significant risks to, or adverse impacts on, local communities.
- Protected/Critical Habitats: Situations where conversion of natural habitats or proximity to protected areas or Critical Habitats is evident or likely. Additionally where development may impact the area's ability to continue to provide ecosystem services (e.g. water and energy to local communities).
- Economic and physical displacement: Situations/Projects involving physical and/or economic displacement (e.g. resettlement).
- Ecosystems services: Projects adversely impacting ecosystems services (e.g. due to significant water abstraction or discharge).
- Cultural heritage: Situations/Projects involving impacts on cultural heritage (e.g. sacred sites).
- Indigenous Peoples: Companies/activities involving potential adverse impacts on Indigenous Peoples or other vulnerable groups, including restricted access to land, impacts on their customary rights or, more broadly, impacts on their livelihoods.
- Large workforce and history of poor labour and working conditions: Where there are large numbers of workers (including contractors' workers), or geographies where there is a record of child or forced labour in production or supply chains.
- Raw material sourcing: Where sourcing and supply of raw materials may have significant risks and/or impacts (e.g. child or forced labour, revenue transparency, land access or acquisition).
- Transactions/geographies with high business integrity risks: It should be noted that the manufacturing sector is frequently linked to business integrity risks.

## 5. STANDARDS, GUIDELINES AND OTHER RESOURCES

For authoritative guidance fund managers should consult the applicable IFC Performance Standards and World Bank Group EHS Guideline(s).

### 5.1 Applicable IFC Performance Standards

The IFC Performance Standards most commonly applicable to investments in this sector are:

- [IFC 2012 Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts.](#)
- [IFC 2012 Performance Standard 2: Labor and Working Conditions.](#)
- [IFC 2012 Performance Standard 3: Resource Efficiency and Pollution Prevention.](#)
- [IFC 2012 Performance Standard 4: Community Health, Safety and Security.](#)
- [IFC 2012 Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources.](#)

In addition, other IFC Performance Standards may be applicable depending on the specific characteristics and locations of the company's operations. The screening stage of the fund manager's ESG due diligence should always include a routine check for the potential presence of significant impacts covered by the IFC Performance Standards.

### 5.2 Applicable World Bank Group EHS Guidelines

The most relevant World Bank Group EHS Guidelines in this sector are:

- [World Bank Group General EHS Guidelines.](#)
- [World Bank Group EHS Guidelines for Board and Particle Based Products.](#)
- [World Bank Group EHS Guidelines for Sawmilling and Manufactured Wood Products.](#)
- [World Bank Group EHS Guidelines for Nitrogenous Fertilizer Manufacturing.](#)
- [World Bank Group EHS Guidelines for Phosphate Fertilizer Manufacturing.](#)
- [World Bank Group EHS Guidelines for Pesticides Formulation, manufacturing and packaging.](#)
- [World Bank Group EHS Guidelines for Cement and Lime Manufacturing.](#)
- [World Bank Group EHS Guidelines for Ceramic Tile and Sanitary Ware Manufacturing.](#)
- [World Bank Group EHS Guidelines for Glass Manufacturing.](#)
- [World Bank Group EHS Guidelines for Textiles Manufacturing.](#)
- [World Bank Group EHS Guidelines for Tanning and Leather Finishing.](#)
- [World Bank Group EHS Guidelines for Petroleum based polymer manufacturing.](#)
- [World Bank Group EHS Guidelines for Semi-conductors and Electronics Manufacturing.](#)
- [World Bank Group EHS Guidelines for Printing.](#)
- [World Bank Group EHS Guidelines for Foundries.](#)
- [World Bank Group EHS Guidelines for Integrated Steel Mills.](#)
- [World Bank Group EHS Guidelines for Base Metal Smelting and Refining.](#)
- [World Bank Group EHS Guidelines for Metal, Plastic and Rubber Products Manufacturing.](#)

### 5.3 Additional resources, standards and guidelines

Additional resources that may be valuable are:

- [The European Integrated Pollution Prevention and Control Bureau \(IPPC\) - BAT reference documents \(BREFs\).](#)
- [ILO's online Encyclopaedia of Occupational Health and Safety.](#)
- [Cleaner Production.](#)
- [International Institute for Sustainable Development Business Tools.](#)
- [Cradle-to-Cradle certification.](#)
- [Blue Angel certification.](#)