

# INFRASTRUCTURE

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Key sector ESG aspects relevant to operations: Labour standards | Health, safety & security | Resource efficiency & pollution prevention | Land access, use & acquisition | Biodiversity & ecosystem services | Climate Change | 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 infrastructure 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.

The Sector Profile draws on internationally recognised good practice standards and guidance, particularly the [International Finance Corporation's \(IFC's\) 2012 Environmental and Social Performance Standards](#) and the [World Bank Group's Environmental, Health and Safety \(EHS\) Guidelines](#).

The Sector Profile identifies key standards that are generally applicable to each sector (refer to the '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.

All infrastructure development is likely to have required a detailed environmental and social Impact Assessment (ESIA) at initial design and construction (refer to [CDC Project Design and Construction Guide](#)). Based on the outcome of the ESIA, operators should have developed and implemented management systems and plans in accordance with a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimise, and, where residual impacts remain, compensate/offset for risks and impacts to the environment. These operational systems and plans should cover both E&S matters.

See also [CDC Environmental and Social Checklist](#) and [CDC Governance and Business Integrity Checklist](#), which provides questions that fund managers should consider when evaluating an infrastructure investment from an ESG perspective.

### 1.2 Scope of this Sector Profile

This Sector Profile covers the operation of:

- Ports, terminals and harbours.
- Railways, including operation and maintenance of rail infrastructure and rolling stock (e.g. locomotives and rail cars).
- Toll roads.

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

- Public-private partnerships in the operation of public infrastructure (e.g. toll roads).
- Use of infrastructure for recreation, as well as commercial, purposes (e.g. marinas as well as large-scale ports).
- Freight loading and storage facilities.
- Servicing of fixed and mobile infrastructure elements (e.g. maintenance of roads and harbours, including dredging, maintenance of rolling stock and ship repairs).

This Sector Profile does not cover:

- Shipping activities, including repair and maintenance of ships (unless the ships are operated by the port, terminal and/or harbours as part of a company's operation and maintenance activities). Refer to the [World Bank Group EHS Guidelines for Shipping](#).
- The manufacture of rolling stock (e.g. locomotives and rail cars). Refer to the [World Bank Group EHS Guidelines for Railways](#).

For additional information regarding ports, harbours and terminals handling oil or petroleum products, and specific risks arising from handling fuels, refer to [CDC Sector Profile: Oil and Gas](#).

Unless otherwise stated, this Sector Profile is only applicable to assets that are post commercial operations date (COD) – the date on which the independent engineer certifies that a facility has completed all required performance tests and/or is built to the specifications outlined in the engineering, procurement and construction (EPC) contract. Generic guidance on ESG risks, impacts and opportunities associated with Project design and construction of power generation, transmission and distribution facilities are discussed in the [CDC Project Design and Construction Profile 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 ESG 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.*

<b>Risks for the business</b>	<ul style="list-style-type: none"> <li>• Companies may face prosecution or fines (or have 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 morale, industrial action, high staff turnover and deterioration of employees' health (e.g. excessive working hours).</li> <li>• Increased costs to recruit and train new workers if turnover is high due to poor labour standards and working conditions.</li> </ul>
<b>Opportunities for the business</b>	<ul style="list-style-type: none"> <li>• Costs can be reduced and productivity enhanced by upholding good labour and working conditions. Businesses may also find it easier to attract and retain motivated and competent workers.</li> <li>• Improved access to markets and finance if labour and working conditions standards or certifications are achieved (e.g. <a href="#">SA8000</a>).</li> </ul>

**Wages:** The operation and maintenance of infrastructure of all kinds may involve the employment of low-paid unskilled labour, including temporary or contract labour, migrant workers, and workers who provide services via contracted services (e.g. yard work during operation, including freight handling, or toll collection and ticketing services). Workers should be paid at least the minimum statutory wage for the sector.

**Freedom of association and collective bargaining:** Relations with unions and the rights of workers to enter free and voluntary collective bargaining arrangements with management (and the rights to form unions and to strike) may be a sensitive subject and require careful exploration and resolution. Slower or stalled freight handling at port or rail terminals can have significant financial implications (e.g. perishable cargo, or alternative freight by air) where union relations or

wage negotiations falter. Adopting international good practice in this area can help to manage costs relating to recruitment, training and talent retention and maintain or enhance productivity.

**Equal opportunities and non-discrimination:** Employment opportunities for women are generally poor in this sector, but some international companies are trying to address this situation. 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, as well as to maintain or enhance productivity.

The infrastructure sector may rely on complex contractual labour arrangements and working practices (part-time and seasonal labour) and, often, multi-company ownership and operational structures. Companies will need to manage these issues. Specifically, they should assess risks across the development cycle and supply chain of a company or Project, even where there is no leverage to effect change, so that a company is fully aware of, and can try to reduce, risks associated with poor labour and employment practices over time (i.e. through shifting to contractors who have better practices).

For further general guidance on Good International Industry Practice (GIIP) relating to labour standards and working conditions, in line with the [International Labour Organization’s \(ILO’s\) Core Conventions](#), refer to [CDC E&S Briefing Note: Labour Standards](#), [IFC Performance Standard 2: Labor and Working Conditions](#) and [IFC Good Practice Note: 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 have their licences removed in extreme cases) if workers or contractors are injured or killed.</li> <li>• Damage to/loss of a company’s assets, loss of production, loss of clients/business, increased insurance premiums and legal claims (both in the short and long term) can result from poor OHS practices.</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 services delivered can be of low quality if workforce morale is low and staff turnover is high. This can also result in reputational damage.</li> <li>• Damage to reputation and impacts on 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, as well as improve their acceptance if new or significantly different from previous practices.</li> <li>• Quality of service can be improved and insurance premiums for workers’ and compensation payments can be reduced by the implementation of sound OHS practices.</li> </ul>

OHS is an important consideration for any business, regardless of sector, and all companies must have in place appropriate OHS and emergency preparedness and response management systems, commensurate with the 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 GIIP. Such measures should be covered in companies' OHS and emergency preparedness and response management systems.

### **a) Ports, harbours and terminals**

OHS risks arising from the operation and maintenance of ports, harbours and terminals can include those in connection with:

- Physical hazards (e.g. injury, drowning or death due to falls from height, diving and salvage operations, ship or boat transfers; hazards related to use of large-scale, fixed and mobile equipment such as cranes; hazards related to cargo handling and transportation of personnel and product both between land and sea and while at sea; work in confined spaces; use of high pressure equipment, including water jets).
- Air quality (e.g. exposure to toxic fumes when handling hazardous cargo, or large volumes of dust during loading/unloading between silos and ships).
- Exposure to noise and vibration from fixed (e.g. gantries and cranes) and mobile (e.g. forklifts) equipment while loading and unloading bulk cargo.
- Exposure to hazardous materials (e.g. ship cargo, ship wastewater or solid waste).
- Security (e.g. for the general security of passengers and personnel and to prevent cargo theft. 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 cargo storage or handling).

For further sector-specific guidance, refer to the [World Bank Group EHS Guidelines for Ports, Harbors and Terminals](#).

### **b) Railways**

OHS risks arising from the operation and maintenance of railways can include those in connection with:

- Physical hazards (e.g. injury, or death due to train/worker accidents; hazards related to use of large-scale, fixed and mobile equipment such as cranes and loading trucks; hazards related to cargo handling; and work in confined spaces such as wagons or silos).
- Air quality (e.g. exposure to diesel locomotive exhausts by crew and yard workers; exposure to toxic fumes when handling hazardous cargo; and large volumes of dust during loading/unloading between silos and wagons).
- Exposure to noise and vibration (e.g. rolling stock, loading equipment).
- Exposure to hazardous materials (e.g. in rail cargo, wagon maintenance or cleaning, or solid waste).
- Electrical hazards (e.g. from overhead wires or conductor rails for electric trains).
- Exposure to electromagnetic fields (e.g. from working close to electric power lines for electric trains).

- Fatigue (e.g. due to long and irregular working hours by crew members on long journeys).
- Security (e.g. for general security of passengers and personnel and to prevent cargo theft. Measures should be implemented to ensure that security forces are appropriately trained in the use of force and respect workers' rights).
- Fire and explosion risk (e.g. flammable cargo storage or handling).

For further sector-specific guidance, refer to the [World Bank Group EHS Guidelines for Railways](#).

### **c) Toll roads**

OHS risks arising from the operation and maintenance of toll roads can include those in connection with:

- Physical hazards (e.g. hazards related to working in proximity to volumes of traffic or operating equipment while a road is in use; or danger of injury/death from working at height such as on bridges or overpasses or during maintenance of road infrastructure such as lighting or signage. Other hazards arise from use of, or access to, roads by pedestrians or passengers at crossing points, bus stops, toll booths or informal markets where traffic management, signage and adequate space design should be incorporated and enforced in order to minimise risks to pedestrians).
- Air quality (e.g. exposure to exhaust from heavy machinery and from daily use of roads, or dust during road clearing, resurfacing or maintenance activities; or prolonged exposure to toxic fumes from repainting road markings or bitumen surfacing).
- Exposure to noise and vibration (e.g. heavy machinery used during maintenance operations and also prolonged use of roads by daily traffic).
- Electrical hazards (e.g. from overhead wires during installation or maintenance of road lighting or signage).

For further sector-specific guidance, refer to the [World Bank Group EHS Guidelines for Toll Roads](#).

For further general guidance on GIIP relating to OHS, refer to [CDC E&S 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 (dust, vehicle emissions including those from diesel locomotives, shipping and road transport) and hazardous materials/waste management.</li> <li>• Major fines and penalties and reputational risks due to the occurrence of accidents (e.g. major oil spills due to inadequate handling in ports or rail accidents involving the release of hazardous materials into the environment).</li> <li>• Excessive expenditure on energy and water supply.</li> <li>• Excessive expenditure on management of emissions, solid waste and wastewater quality.</li> <li>• Inadequate financial provision for emergency response and community protection measures to prevent road, rail and port accidents, including the spillage of hazardous cargo at an infrastructure terminal.</li> <li>• Inadequate financial provision for maintenance activities (e.g. where traffic volumes have been higher than anticipated, or original road or rail design/construction quality has been poor and additional maintenance or resurfacing is required) or raw materials sourcing for maintenance (e.g. gravel, cement).</li> </ul>
<p><b>Opportunities for the business</b></p>	<ul style="list-style-type: none"> <li>• Lower operating costs, a reduced environmental footprint and better preparedness for resource shortages can result from adopting energy, water efficiency, and cleaner production measures.</li> <li>• Preparedness for regulatory changes such as the implementation of a carbon tax, more stringent shipping and port docking emissions standards, as well as waste handling standards including bilge water, container and tanker residues.</li> <li>• Careful handling, storage and disposal of waste in cargo yards (to prevent on- or off-site pollution), including investigating additional processing of waste for use as raw materials in other industries in order to save on waste disposal costs.</li> </ul>

### a) Ports, harbours and terminals

**Energy efficiency and air emissions:** The major sources of air emissions arise from exhaust gases (from ships using the port or land-based vehicle engines and boilers), fugitive emissions from certain chemical or volatile cargoes (e.g. fuels, solvents, fertilisers etc.) and dust emissions from dry cargoes such as grains, minerals or coal.

Port and harbour operators should always consider energy efficiency measures as this could have a major positive impact on a company’s revenues by increasing the net energy conversion ratio (i.e. energy output per unit of energy/fuel input) and could potentially reduce emissions.

**Water management:** Significant quantities of water are required for cleaning purposes at ports and also for vessels to dock. Water effluents associated with port activities include sewage from

port operations and ships, wash water from port terminals and storage facilities as well as from vessels (bilge water), ballast water from large ships (e.g. oil tankers), and general storm water runoff. Runoff from hull cleaning operations is classified as trade effluent. All effluent flows may contain cargo residue (such as oil or chemicals), as well as dissolved solids, bacteria, invasive species and anti-fouling agents. All port operators will be governed by the requirements of the [International Convention for the Prevention of Pollution from Ships \(MARPOL\)](#) as well as national regulations, with regard to the collection, storage, transfer and treatment of wastewaters generated by vessels at port.

Care should be taken that any dust suppression or containment techniques (for certain dry cargoes) in ports, harbours or terminals do not pose additional strains on resource use (e.g. water use). Companies should therefore always explore opportunities to reduce water consumption (e.g. use of closed-loop water systems for ship or hull cleaning). This is particularly relevant when water consumption requirements are significant and/or water availability is restricted. Water use efficiency measures can reduce the amount of wastewater generated by ports and terminals, and resulting wastewater treatment costs and/or discharge fees.

**Hazardous materials management:** Hazardous materials at ports include potentially large volumes of hazardous cargo (e.g. chemicals, solvents, lubricants, oil and fuel), as well as substances used in the general maintenance and operation of the port. Spills or fires may occur due to accidents or poor operating or maintenance procedures. Thus, port operators must ensure sufficient and effective accident prevention and containment measures are in place. Where emergency response and spill containment or clean-up has occurred, care should be taken in the disposal of clean-up materials, which may also be classified as hazardous waste.

Even where relatively small volumes of potentially hazardous wastes are generated (e.g. the process wastes described above, as well as used machinery oils, lubricants, solvents, paints or cleaners and their used containers), the port operator must ensure that these are stored, handled, transported and disposed of according to GIIP, in a manner that prevents environmental contamination or danger to handling workers or communities nearby. Stringent regulations also apply for transboundary movement of hazardous waste by land or sea (refer to the [Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal](#)).

**Waste management:** Solid waste streams specific to port and harbour operations include dredged materials (which may be contaminated), used oils, spilled or remnant silo and warehouse cargoes, ballast tank sediments, and food and inert solid waste from ships or administrative functions. All of these wastes require specific care in disposal in order to prevent land and aquatic environmental contamination or community health risks. All marine ports are governed by the MARPOL regulations, which prohibit the discharge of solid waste from vessels while in port, and which also govern the collection, storage, and treatment of all wastewater generated by vessels at the port. All ports should provide adequate waste storage facilities with sufficient capacity to deal with high-volume traffic and potential seasonal variations in quantities and types of waste. Most countries even have specific regulatory requirements for the disposal of food waste originating from international ship arrivals in order to prevent cross-border contamination and spread of disease.

For further sector-specific guidance, refer to the [World Bank Group EHS Guidelines for Ports, Harbors and Terminals](#) in addition to the [International Convention for the Prevention of Pollution from Ships \(MARPOL\)](#).

## b) Railways

**Energy efficiency and air emissions:** Exhaust fumes from diesel locomotives are major sources of air emissions such as nitrogen oxides, carbon dioxide and soot. Other sources of emissions from railway operations include fugitive emissions from certain chemical or volatile cargoes (e.g. fuels, solvents, fertilisers etc.) and dust emissions from dry cargoes such as grains, minerals or coal.

Air emissions regulations are generally becoming more stringent across the globe. Companies should be mindful of this trend. Companies should also explore business opportunities associated with the use of cleaner technology and energy efficiency measures (e.g. investigating alternative fuel sources for transport elements, selling carbon emission reduction credits and/or accessing grants from international climate change funds).

Despite the fact this is not part of the operation and maintenance of railways, it should be noted that design and routing of highways should take into account the generation of emissions and the effects on surrounding communities. Design elements such as railway gradient can affect fuel use and emission generation.

**Water management:** Significant quantities of water are required for cleaning purposes at railway yards and cargo terminals. Water effluents associated with railway operations include sewage, storm water runoff and wash water from stations, terminals and storage facilities. All effluent flows may contain cargo residue (such as oil or chemicals), as well as dissolved solids.

Care should be taken that dust suppression or containment techniques (for certain dry cargoes) in terminals do not pose additional strains on resources (e.g. water use).

Companies should always explore opportunities to reduce water consumption (e.g. use of closed-loop water systems for tanker or rolling stock cleaning). This is particularly relevant when water consumption requirements are significant and/or water availability is restricted. Water use efficiency measures will potentially have a positive effect in terms of reducing the amount of wastewater generated by railway terminals, and hence, wastewater treatment costs and/or discharge fees.

**Hazardous materials management:** Hazardous materials encountered along railways and at rail stations and yards include potentially large volumes of hazardous cargo (e.g. chemicals, solvents, lubricants, oil and fuel), as well as substances used in, or deriving from, the general maintenance and operation of rolling stock and rail lines (e.g. used oils, polychlorinated biphenyls (PCBs) from older electrical equipment and coolants etc.). Rail operations with diesel locomotives depend on refuelling stations (with bulk fuel storage tanks) located at specific points along the rail network. Spills or fires may occur due to accidents, or poor operating or maintenance procedures. Thus, companies must ensure that sufficient and effective accident and spill prevention and containment measures are in place. Poor handling of hazardous materials could lead to soil and water contamination, as well as health and safety risks to the workforce and community. Where emergency response and spill containment or clean-up has occurred, care should be taken in the disposal of clean-up materials, which will also be classified as hazardous waste.

Where even relatively small volumes of potentially hazardous wastes are generated (e.g. process wastes described above, as well as used machinery oils, lubricants, solvents, paints or cleaners and their used containers), companies must ensure that these are stored, handled, transported

and disposed of according to GIIP, in a manner that prevents environmental contamination and danger to handling workers or communities nearby. Stringent regulations also apply for transboundary movement of hazardous waste by land or sea (refer to the [Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal](#)).

For further sector-specific guidance, refer to the [World Bank Group EHS Guidelines for Railways](#).

### c) Toll roads

**Energy efficiency and air emissions:** Exhaust fumes from vehicles using toll roads (rather than from the activities of the toll road operator) are major sources of air emissions such as carbon monoxide, sulphur dioxide, heavy metals, nitrous oxides and particulates. Companies should be mindful of this when operating or upgrading infrastructure elements, including toll stations, temporary detours, road routing and traffic calming measures. Any long-term maintenance or repair activities should take into account the generation of emissions and dust, and their effects on surrounding communities.

It should be noted that design and routing of toll roads should take into account the generation of emissions and their effects on surrounding communities. Design elements such as speed reduction techniques and road gradient can reduce fuel use and emissions generation.

**Water management:** Upgrading and widening or maintenance of surfaced roads result in increased volumes and speed of storm-water runoff and may contribute to flooding or erosion. Storm water may be contaminated with pollutants released by vehicles and de-icing chemicals, remnant maintenance substances (e.g. tar) or roadside litter. Road maintenance should include storm-water management to reduce the quantities and speed of runoff in order to prolong the life of the road surface. This should also prevent or minimise additional environmental or social risks or impacts arising from water flow (e.g. erosion or flooding) or quality (e.g. pollution of surface water bodies).

**Waste management:** Solid waste arising from the operation and maintenance of toll roads typically comprises road resurfacing and paint waste, solid debris from storm water drains, and roadside litter. Companies should explore adopting waste minimisation techniques in their road maintenance and resurfacing activities, such as recycling old road surface to use as base or aggregate. Timely and regular clearing of storm water channels and drains will prevent road shoulder erosion.

For further sector-specific guidance, refer to the [World Bank Group EHS Guidelines for Toll Roads](#).

For further general guidance on GIIP relating to resource efficiency and pollution prevention, refer to [CDC E&S Briefing Note: Resource Efficiency](#), [CDC E&S Briefing Note: Pollution Prevention](#), [IFC Performance Standard 3: Resource Efficiency and Pollution Prevention](#) and the [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 (e.g. pollution or health impacts locally, or issues associated with community safety due to the nature of cargo being stored or transported).</li> <li>• Reputational damage and significant management costs can be incurred to address social opposition and criticism due to conflicting or non-transparent expansion plans, land access practices, lack of clarity around revenue flows arising from tolling operations, or detour routing during maintenance.</li> </ul>
<p><b>Opportunities for the business</b></p>	<ul style="list-style-type: none"> <li>• Developing and maintaining good relations with local communities will help to manage their expectations and identify concerns (e.g. safety risks).</li> <li>• Building relationships with local communities can contribute to reducing security risks and may have other benefits in terms of infrastructure use (e.g. reducing theft or vandalism of road/rail signage or furniture) and infrastructure protection to the benefit of impacted communities (e.g. through keeping culverts clear to prevent flooding and maintaining corridor wayleaves).</li> </ul>

Community health, safety and security issues are a particularly important aspect in this sector. Risks and impacts associated with design, planning and construction are addressed in the [CDC Project Design and Construction Guide](#). Community health, safety and security risks and impacts associated with operation of infrastructure relate to:

**Emergency preparedness and response:** Companies must implement emergency preparedness and response systems for accidental and emergency situations associated with their activities 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:** Operations involving, or upgrading of, existing transport corridors or terminals will generally reduce air quality due to higher vehicle and transport-based exhaust emissions. Companies should ensure that transport routes and modes are operated and maintained in order to prevent, or at least contribute to the reduction of, health impacts to nearby communities.

**Safety:** All transport corridors, whether road, rail or sea, may pose physical safety risks to local communities through injury or death from collisions or derailments, or potential exposure to spills, fires and explosions arising from the use, transport or storage of fuels or hazardous cargoes. Road maintenance should include significant attention to community safety and protection of pedestrians and cyclists. In emerging markets particularly, the use of road shoulders as bus stops or informal markets, and the need for pedestrian or livestock crossing points, should be taken into account during maintenance or upgrade activities.

Operation of rail corridors should also focus on community protection from fire/explosion risks and on preventing underground leakage and surface spillage of fuel (from diesel locomotive fuelling stations) or other hazardous cargo, which could contaminate local water sources. Again, sufficient and safe rail crossing points for pedestrians and vehicles should be included with

adequate (and regularly maintained) signage taking into account local communities' needs. Some high-volume roads or rail lines may require fencing along route wayleaves to prevent pedestrian or animal crossings and restrict them to pre-assigned safe crossing points. The integrity of the fencing should be periodically checked and maintained.

Companies operating in the infrastructure sector must implement an Emergency Response Plan in order to ensure that unplanned events that could affect local communities (e.g. the derailment of rail engines transporting hazardous materials) are rapidly and effectively managed.

It may be advisable for infrastructure companies to appoint a community liaison officer to manage access limitation and exclusion zones, as well as to encourage the protection of road and rail furniture and infrastructure. In particular, the risk of rail infrastructure theft (signalling and copper wire) should be highlighted to local communities on an ongoing basis. At rail and harbour yards, emergency preparedness focussed on protecting local communities should be a priority as highlighted in [IFC Performance Standard 4: Community, Health, Safety and Security](#), as well as the [World Bank Group EHS General Guidelines](#).

**Security:** Some infrastructure terminals may be regarded as strategically important to a country (e.g. bulk fuel storage, or large-scale storage or strategic commodities) and may be considered critical national infrastructure (CNI). These terminals are typically heavily protected in order to prevent sabotage or terrorist attacks, particularly when there are specific national or regional security risks. In fact, most freight yards (railway, harbour and ports) are protected to some degree, in order to prevent theft or access by external parties for potential safety reasons. Companies should be guided by the principles of proportionality and good international practice regarding the hiring, rules of conduct, training, equipping and monitoring of security workers, as well as by applicable law. Particular attention should be paid to potential human rights violations from terrorism and sabotage, as well as the instigation of social conflict and unrest. 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:** Port and harbour operations, as well as rail yards, may generate significant noise and vibrations associated with cargo handling and loading, the use of heavy equipment and cranes, and train engines, all of which could affect local communities. Therefore noise and vibration prevention and control measures should be included in operational procedures (e.g. selecting equipment with lower sound power levels, siting yards as far away from community areas as possible and limiting loading activities to set times).

**Indirect impacts:** New road and railway corridors often open up previously remote areas, and their establishment and operation generally includes associated infrastructure such as access roads, waste disposal sites and fuel terminals. Opening up these previously remote areas can pose risks to local communities through exposure to communicable diseases, as well as to increased competition for natural resources (e.g. water, firewood and arable land for workforce food supply). The potential for conflict between local and immigrant populations also increases where there is a perceived lack of direct local economic benefit. Developing and maintaining good relations with local communities, through a community liaison officer, for example, will help to manage their expectations, identify any concerns, and respond to these appropriately.

For further sector-specific guidance, refer to the [World Bank Group EHS Guidelines for Ports, Harbors and Terminals](#), [Railways](#) and [Toll Roads](#).

For further general guidance on GIIP relating to community health, safety and security, refer to [CDC E&S 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](#), [Voluntary Principles on Security and Human Rights](#) and the [World Bank Group EHS General Guidelines](#).

If Indigenous Peoples are likely to be affected, Free, Prior and Informed Consent (FPIC) should be obtained as described in [CDC E&S Briefing Note: Indigenous Peoples](#) and [IFC Performance Standard 7: Indigenous Peoples](#).

## **2.7 Land access and acquisition**

The operation of infrastructure assets may be associated with ongoing land access requirements, and, in some cases, with additional land acquisition for maintenance or expansion activities (e.g. maintenance detours, new routing, or access to borrow pits). Hence, an expropriation process could be triggered (although generally companies and governments will seek to negotiate with affected communities before setting the process in motion).

Where land access and acquisition are the responsibility of the government, companies should engage and collaborate with the government, to the extent possible (refer to Business Integrity Considerations section below), to avoid longer-term negative impacts arising from poorly constructed compensation, relocation or expropriation terms. Where possible, companies should actively participate in the preparation, implementation and monitoring of the process in order to avoid impoverishment to local communities. In some cases, companies may need to supplement government-led efforts.

For further general guidance on GIIP relating to land access, use and acquisition, refer to [CDC Project Design and Construction Guide](#) and [CDC E&S Briefing Note: Land Acquisition and Involuntary Resettlement](#) and [IFC Performance Standards 5: Land Acquisition and Involuntary Resettlement](#).

## 2.8 Biodiversity conservation and ecosystem services

<p><b>Risks for the business</b></p>	<ul style="list-style-type: none"> <li>• Reputational risks associated with transport corridors that (directly or indirectly) adversely impact biodiversity (e.g. impacts on primary tropical forests made more accessible through improved roads, or ongoing disturbance to habitats through access to maintenance materials such as borrow pits.).</li> <li>• Delays and additional costs in operations/maintenance as a result of negative impacts on protected areas or species and/or critical habitats or endangered species (e.g. dredging operations at ports, or bridge maintenance or borrow pit access that affect water quality and natural aquatic 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 conservation of biodiversity.</li> <li>• Enhanced reputational benefits where ongoing proactive management of biodiversity aspects is evident (e.g. maintenance of wildlife crossing points such as tunnels or bridges and associated signage to alert transporters; or carefully planned dredging operations to minimise the disturbance of marine or aquatic habitats; or through ongoing incorporation of natural elements in infrastructure operations).</li> </ul>

Habitat alteration and fragmentation is one of the most significant threats to biodiversity associated with infrastructure corridor or terminal development. Depending on the type and location of the infrastructure element, varying degrees of land clearing, habitat disturbance and population in-migration will result, all of which may extend beyond the immediate footprint of the corridor. If significant impacts on biodiversity and/or ecosystem services are likely, companies should specifically assess these potential impacts and implement management systems and plans to manage biodiversity and ecosystem service risks in accordance with the mitigation hierarchy. Refer to [CDC Project Design and Construction Guide](#) for further information.

Where ongoing impacts on biodiversity and/or ecosystem services were identified as part of the ESIA, and management systems developed, these should be implemented during the operation of the infrastructure elements.

Issues specific to the operation and maintenance of different types of infrastructure include:

### a) Ports, harbours and terminals

Maintenance dredging, disposal of dredge spoil, ballast water release, hull cleaning, construction of piers, wharves, breakwaters, and other waterside structures, as well as erosion, may lead to significant impacts on aquatic and shoreline habitats. Direct impacts may include the physical removal or covering of sea floor, shore, or landside habitat, in addition to changes to water flow patterns and related sedimentation rates and patterns, and the introduction of foreign species. Indirect impacts may result from changes in water quality from sediment suspension or discharges of storm water, and port or vessel wastewater.

### b) Toll roads and railways

Maintenance of road and railway rights of way may result in continued habitat fragmentation and degradation. Vegetation clearing along rights of way may be by manual (e.g. mowing, clipping and tree felling) or chemical means (e.g. herbicides), and continual access along way leaves/rights-of-way may negatively impact existing habitats. Companies should ensure that the methods they use minimise negative biodiversity impacts arising from pollution and increased access, while maintaining the integrity of the transport corridor.

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

### 2.9 Climate change

<p><b>Risks for the business</b></p>	<ul style="list-style-type: none"> <li>• Damage and operational interruption (including interruption due to supply chain disruptions, particularly during construction) due to extreme weather events (e.g. flooding).</li> <li>• Reduction in the lifespan of asphalt on road surfaces and steel infrastructure (e.g. bridges) due to an increase in temperatures.</li> <li>• If the long-term implications of infrastructure in a low-carbon economy are not taken into account, there is a danger that it could become obsolete before it has paid back the original investment.</li> </ul>
<p><b>Opportunities for the business</b></p>	<ul style="list-style-type: none"> <li>• Taking climate risk into account in the specification and design of new infrastructure may reduce operating costs, maintenance and repair costs and the costs of retrofit.</li> <li>• Improved access to markets as companies with a reputation for providing well-informed advice on the resilience of infrastructure in the face of physical and regulatory climate risk may become preferred contractors for governments and others.</li> </ul>

As infrastructures have long operational lifetimes, they are sensitive not only to the existing climate at the time of their construction, but also to climate variations over the decades of their use. Climate change impacts include rising temperatures, changing rainfall patterns, rising sea levels, as well as potential increases in extreme weather events such as storms, floods and droughts. More specifically, the power sector may be exposed to the following risks:

- Increased frequency and intensity of extreme rainfall events may cause significant flood damage to infrastructure.
- Operational interruption (including interruption due to supply chain disruptions, particularly during construction) due to extreme weather events (e.g. flooding).
- Increased temperature and solar radiation could reduce the life of asphalt on road surfaces. Increased temperatures stress the steel in bridges and rail tracks as a result of expansion and increased movement.
- If the long-term implications of infrastructure in a low-carbon economy are not taken into account, there is a danger that the infrastructure could become obsolete before it has paid back the original investment.
- Certain materials (e.g. cement) are carbon-intensive and a rise in the price of carbon could have a material impact on input costs for some types of infrastructure.

Considering the above (and other risks), countries are developing strategies and regulations aimed at mitigating and increasing resilience to climate change risks. Resilience to climate change risks is particularly relevant in infrastructure. Companies should be aware of this. There may be higher costs associated with making infrastructure more climate-resilient, although these may be met by the reduced costs of repairs and retrofit at a later date. Increased temperature causes expansion of concrete joints, protective cladding, coatings and sealants on bridges and airport infrastructure. Infrastructure damage caused by extreme weather events could have a significant financial cost both in terms of repairs, and interruption to supply.

Furthermore, companies with a reputation for providing well-informed advice on the resilience of infrastructure in the face of physical and regulatory climate risk may become preferred contractors for governments and others.

### 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 the infrastructure sector

Infrastructure operation is a high-risk sector. In some countries, demands for small bribes or facilitation payments are notoriously common at toll roads, railways, and ports. However, the size and prevalence of such demands does not make them acceptable and companies must have strong systems in place to prevent the giving or receiving of corrupt payments.

Companies should have clear guidance and provide regular training for all employees on avoiding bribes and facilitation payments. There must also be strong oversight systems in place, including clear and secure whistleblowing procedures.

For further guidance refer to [DFID Combating corruption in infrastructure services: a tool-kit](#), and [Transparency International](#), which have published useful guidance in this area (e.g. [Countering Small Bribes: Principles and good practice guidance for dealing with small bribes including facilitation payments](#)).

## 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

The power sector intrinsically involves potentially complex and significant and diverse ESG risks and impacts that are likely to have material implications for long-term shareholder value. Therefore, addressing ESG matters should normally be a central element of due diligence, investment structuring and on-going ownership and monitoring. Fund managers should give serious consideration to using independent ESG experts to support them in transactions in this sector.

It should be noted that infrastructure is a sector associated with high corruption risks. Fund managers must ensure that adequate systems to mitigate such risks are implemented by companies.

### 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).
- **Contractors** whose operations present significant E&S issues which could have an impact on the business (e.g. land clearing, road or rail right-of-way maintenance, distribution companies such as trucking or road haulage operations, catering or supply services to passenger transport operations such as passenger rail or shipping, hazardous waste handling contractors from port or rail terminals).
- **Supply chains** where these could present significant E&S risks (e.g. quarries providing materials during construction). 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 situations in this sector requiring extra attention include:

- New Projects/expansions: Greenfield construction/major expansion Projects (refer to [CDC Project Design and Construction Guide](#)) as infrastructure development is frequently associated with high and diverse E&S risks and impacts.
- Local community Health, Safety and Security: Fund managers should take extra care when investing in infrastructures associated with past events affecting local communities and/or when investing in infrastructure which could present significant risks to local communities

(e.g. infrastructure handling/ transporting large volumes of hazardous materials near inhabited areas).

- Land acquisition: Land access and acquisition where this may be complex or where government led land expropriation may have resulted in misalignment with international standards. Fund managers should also assess whether actions taken in the past may have an impact on the company's operations (e.g. inadequate compensations may trigger social tension).
- Protected areas and Critical Habitats: Investment in infrastructure which could have an impact on protected areas and/or Critical Habitats. In these situations, biodiversity management plans should be designed and implemented with the support of a biodiversity specialist.
- Transactions/geographies with high business integrity risks. It should be noted that infrastructure is associated with high corruption risks.
- Any other activities/Projects involving involuntary economic and/or physical displacement of communities or significant adverse impacts on biodiversity or ecosystem services, Indigenous Peoples, cultural heritage or local communities.

## 5. STANDARDS, GUIDELINES AND OTHER RESOURCES

For authoritative guidance, fund managers should consult the applicable IFC Performance Standards and World Bank Group EHS Guidelines.

### 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 5: Land Acquisition and Involuntary Resettlement.](#)
- [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 investee 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 Ports, Harbors and Terminals.](#)
- [World Bank Group EHS Guidelines for Railways.](#)
- [World Bank Group EHS Guidelines for Toll Roads.](#)
- [World Bank Group Crude Oil and Petroleum Product Terminals.](#)

### 5.3 Additional references, standards and guidelines

Additional resources that may be valuable are:

- [International Maritime Organization \(IMO\) International Convention for the Prevention of Pollution from Ships \(MARPOL\).](#)
- [United Nations \(UN\) Code of Conduct for Law Enforcement Officials.](#)
- [United Nations \(UN\) Basic Principles on the Use of Force and Firearms by Law Enforcement Officials.](#)
- [International Labour Organization \(ILO\) Code of Practice for Safety and Health in Ports \(2005\).](#)
- [General Conference of the International ILO Convention concerning Occupational Safety and Health in Dock Work, C-152, \(1979\).](#)
- [DFID Combating corruption in infrastructure services: a tool-kit.](#)
- [Transparency International](#) has published useful guidance regarding anti-Corruption (e.g. [Countering Small Bribes: Principles and good practice guidance for dealing with small bribes including facilitation payments](#)).