A Practical Reference for Chinese Enterprises on Environmental Information Disclosure and Social Management in Overseas Investment

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About This Practical Reference

This practical reference is intended primarily as a voluntary reference for overseas project managers and related management personnel in enterprises. It helps them identify and manage environmental and social risks across the principal stages of a project and strengthens their capacity to prevent and respond to such risks. In practice, we recommend starting with Chapter 1 to judge how disclosure and social management affect project returns and risk control; then, in light of the project's circumstances and the policies and regulations of the host country, using Chapter 2 to identify the financing-linked and disclosure standards that apply, while attending to applicable Chinese policy and regulatory requirements; then drawing on Chapters 3 and 4 to put in place life-cycle disclosure arrangements and social management documents; and finally applying the industry guidance and self-assessment checklist in Chapter 5 to meet industry-specific requirements.

This practical reference helps project managers identify and guard against potential environmental and social risks early in the project, thereby avoiding costly delays and community conflict. At the financing stage, a well-documented management system and a complete disclosure record allow projects to meet the due diligence requirements of international financial institutions and help lower financing costs. By applying the practical reference, Chinese enterprises can progressively build systematic overseas environmental and social management capabilities that support the sustainable operation of Belt and Road projects.

For readers in government and financial institutions, this practical reference offers a systematic review of international standards and good practice together with an operational perspective from enterprises, and can serve as a reference for policy formulation, environmental and social due diligence, and financing review.

It should be noted that the international standards, industry guidance, management tools, and good practices compiled in this practical reference are provided for voluntary use and reference. The requirements applicable to any specific project should be determined in light of the actual circumstances of the project, the relevant laws and regulations of China and the host country, the terms of the project financing documents, and the latest versions in force of the applicable standards. The international standards and management tools listed in this practical reference do not, in principle, create any new legal obligations for enterprises.

This practical reference reviews the latest international standards and good practice and connects Chinese policy and regulation with management on the ground. We hope it will help enterprises strengthen their capacity for sustainable overseas operations, put Chinese overseas investment and cooperation on a steadier footing, and contribute to high-quality Belt and Road cooperation.

Executive Summary

More than a decade after the Belt and Road Initiative was launched, China's cumulative investment and cooperation in BRI partner countries has exceeded US$1 trillion. Chinese overseas projects have moved from stand-alone engineering works toward cooperation across entire value chains. As investments have grown in scale and become more diverse, the environmental, social, and governance (ESG) performance of these projects has taken on increasing significance. In recent years, partner countries have generally tightened their legal regimes governing the environment, land rights, and labor protection, and international capital markets have sharpened their scrutiny of environmental and social risk. International expectations of Chinese companies operating abroad have likewise shifted from building projects on schedule to operating them well and delivering genuine benefits to host communities. Against this backdrop, environmental information disclosure and social management have become factors that directly shape financing terms, project costs, community relations, and long-term operations. For Chinese companies investing overseas, environmental disclosure needs to evolve from passive compliance-driven reporting into a value-creating process built around data and proactive risk communication with international investors. At the same time, social management needs to move beyond traditional community relations to become a strategic management framework that systematically identifies and mitigates local social risks while transforming them into opportunities, enabling companies to proactively earn and maintain their social licence to operate.

This practical reference is intended primarily for Chinese enterprises undertaking overseas investment projects. It sets out international requirements and operational methods for environmental information disclosure and social management, focuses on risk management at the level of the individual project, and links corporate ESG commitments at headquarters to execution on the ground. It is organized in three parts. First, it analyzes how disclosure and stakeholder engagement affect investment returns, social risk, and legal risk. Second, it reviews the standards of international financial institutions, other sustainability disclosure requirements, and China's own policy and regulatory framework. Third, it sets out disclosure and management requirements across the project life cycle, together with indicator frameworks and self-assessment checklists for five priority industries.

1. Environmental and social disclosure bears directly on investment returns and the lawful operation of projects

Environmental and social risk management and stakeholder engagement bear directly on investment returns and lawful operations. On the financing side, projects with sound environmental and social management systems are more likely to pass the review of international financial institutions and to secure more favorable financing terms; multilateral development banks such as the World Bank and the Asian Infrastructure Investment Bank commonly treat a project's environmental and social performance and the quality of its stakeholder engagement as core approval criteria, and transparent disclosure is a prerequisite for blended finance. On the social side, the Social License to Operate has become a precondition for large overseas projects to be implemented successfully and operated

sustainably: projects that engage in meaningful public consultation and ensure equitable benefit-sharing can draw on local community knowledge to improve project designs and resolve conflicts, whereas inadequate consultation and inequitable benefit-sharing can lead to construction disruptions, project delays, and cost overruns. Negative incidents, when amplified through public and media attention, can also damage a company's international reputation and ability to secure financing. On the legal side, many host countries have put in place relatively comprehensive legal frameworks for environmental protection and land rights. Inadequate information disclosure and insufficient stakeholder participation may give rise to environmental public interest litigation or even international investment arbitration. Such arbitration proceedings often take years to resolve, entail substantial costs, and do not necessarily result in outcomes favorable to investors.

2. International standards and Chinese policy form the baseline for project compliance

Chapter 2 helps project managers quickly identify the standards a project must observe and the management tools available. International standards for environmental and social risk management fall into three tiers by their binding force on projects and their influence. The first tier comprises financing-linked standards set by international financial institutions and commercial banks; failure to comply means no financing. Their core requirements cover systematic risk assessment and continuous management, pollution prevention and biodiversity protection, labor rights and occupational health and safety, land acquisition and involuntary resettlement, Indigenous Peoples' rights, and information disclosure, stakeholder engagement, and grievance mechanisms. The second tier comprises market-driven standards, principally the European Sustainability Reporting Standards (ESRS), the standards of the International Sustainability Standards Board (ISSB), and the Global Reporting Initiative (GRI) standards. These are not prerequisites for financing, but they materially affect financing costs and investor confidence, and companies should determine which standards are applicable based on the geographic location of their projects, market positioning, and investor requirements. The third tier comprises voluntary reference standards, which offer methods and tools for building management systems and demonstrating responsible commitment.

At the policy level, China has progressively built an outbound investment policy and regulatory framework centered on green development. From the 2013 Guidelines for Environmental Protection in Foreign Investment and Cooperation and the 2022 Guidelines for Ecological and Environmental Protection in Foreign Investment and Cooperation Construction Projects, which extend management requirements across the project life cycle, to the 2023 Guiding Opinions on Promoting Green Development of the Belt and Road, these instruments have provided continuous guidance for companies participating in green Belt and Road cooperation. The Guide on Green Development of Belt and Road Projects issued by International Green Development Coalition for the Belt and Road Regions (IGDC) introduced a traffic-light (red-yellow-green) classification system for projects that effectively helps

enterprises steer clear of high-pollution, high-risk fields. In 2026, the State Council Provisions on Outbound Investment came into force, further strengthening institutional requirements for compliant overseas operations. It is important to note that major international disclosure standards have undergone frequent updates, so companies should establish a dynamic tracking mechanism and assess their applicable obligations based on the latest version in effect.

3. The project life cycle is the basic framework for disclosure and management

Environmental and social information disclosure is an integral component of the environmental and social risk management systems of international financial institutions. Disclosure policies rest on four core principles: timeliness, meaning that information is disclosed before key decision points so that stakeholders have time to study it and respond; completeness, meaning that all relevant assessment documents and management plans are disclosed, with no selective disclosure or concealment of material information; accessibility, meaning that affected communities can obtain information conveniently; and intelligibility, meaning that plain-language, non-technical summaries are provided so that non-specialists can understand a project's environmental and social impacts.

To help enterprises identify the material topics within diverse and complex landscape of standards, this practical reference provides a list of environmental and social topics common across industries, together with management requirements for key social topics. Enterprises can use this list as a reference when preparing their disclosures, taking into account project-specific characteristics, geographic context, and stakeholder priorities, thereby reducing the cost of collecting and interpreting information.

This practical reference also sets out environmental disclosure and social management requirements for each stage of the project life cycle. In general, disclosure runs through the entire life cycle, with content and emphasis varying by stage. During screening and classification, the public should be informed of the nature, scale, location, and potential risk rating of the project. During preparation, a draft environmental and social impact assessment should be disclosed in-country and public consultation should conducted. During appraisal, the financial institution should disclose the final environmental and social documents together with a review summary, allowing the public to review and provide feedback before the project is considered by the board. During implementation and operation, monitoring and performance reports should be disclosed on a regular basis. During closure and exit, decommissioning plans, environmental remediation and restoration, labor arrangements, and the management of community impacts should be disclosed to ensure an orderly and responsible project exit.

4. Priority industries differ in their risk profiles and management priorities

Building on the general requirements, this practical reference reviews the industry-specific requirements of five types of projects, namely solar photovoltaic (PV) power, wind power, highway

construction, mining, and waste-to-energy (WTE) plants, each accompanied by an indicator framework and a self-assessment checklist. Risk profiles and management priorities differ markedly across these industries. For **solar PV projects**, the priorities include land use and livelihood impacts, human rights due diligence in the supply chain, and the retirement and recycling of modules. For **wind power projects**, priorities include biodiversity impacts, community acceptance in the face of noise and visual effects, and blade recycling. **Highway projects** may bring linear, spatially dispersed impacts, and the severance of ecological corridors, soil erosion, and involuntary resettlement are among the principal management concerns. **Mining projects** can have wide-ranging and long-lasting environmental impacts. Key issues include tailings storage facility management, free, prior, and informed consent (FPIC), and closure and post-closure liabilities. **WTE projects** commonly face not-in-my-backyard (NIMBY) concerns, making pollution control, the safe disposal of fly ash, and ongoing public disclosure of information particularly important.

The industry-specific guidance, indicator frameworks, and checklists for the five industries are set out in Chapter 5. Enterprises can use these resources, together with the general requirements, to conduct industry-specific self-assessments.



Glossary

Abbreviation	Full name
ADB	Asian Development Bank
AfDB	African Development Bank
AIIB	Asian Infrastructure Investment Bank
CCCMC	China Chamber of Commerce of Metals, Minerals & Chemicals Importers & Exporters
CSCEC	China State Construction Engineering Corporation
EBRD	European Bank for Reconstruction and Development
GWEC	Global Wind Energy Council
GWO	Global Wind Organisation
ICMM	International Council on Mining and Metals
IDB	Inter-American Development Bank
IFC	International Finance Corporation
ILO	International Labour Organization
NDB	New Development Bank
NGO	Non-Governmental Organization
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organization
BBOP	Business and Biodiversity Offsets Programme
BREF	Best Available Techniques Reference Document
CSRD	Corporate Sustainability Reporting Directive
EITI	Extractive Industries Transparency Initiative
EMAS	Eco-Management and Audit Scheme
ESF	Environmental and Social Framework
ESRS	European Sustainability Reporting Standards
ESS	Environmental and Social Standards
GISTM	Global Industry Standard on Tailings Management
GRI	Global Reporting Initiative
ISO	International Organization for Standardization
ISSB	International Sustainability Standards Board

Abbreviation	Full name
PRI	Principles for Responsible Investment
RMAP	Responsible Minerals Assurance Process
RMI	Responsible Minerals Initiative
RoHS	Restriction of Hazardous Substances
TCFD	Task Force on Climate-related Financial Disclosures
TNFD	Taskforce on Nature-related Financial Disclosures
UNCLOS	United Nations Convention on the Law of the Sea
UNGPs	United Nations Guiding Principles on Business and Human Rights
VPs	Voluntary Principles on Security and Human Rights
WEEE	Waste Electrical and Electronic Equipment
3TG	Tin, Tantalum, Tungsten, and Gold
ASM	Artisanal and Small-scale Mining
BOD	Biochemical Oxygen Demand
CDM	Clean Development Mechanism
CEMP	Construction Environmental Management Plan
EHS	Environment, Health and Safety
EMP	Environmental Management Plan
EPC	Engineering, Procurement, and Construction
ESCP	Environmental and Social Commitment Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
FPIC	Free, Prior and Informed Consent
GHG	Greenhouse Gas
IPDP	Indigenous Peoples Development Plan
NOx	Nitrogen Oxides
RAP	Resettlement Action Plan
SO2	Sulfur Dioxide
VOCs	Volatile Organic Compounds

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Chapter 1

Risks and Opportunities of Disclosure and Stakeholder Engagement in Overseas Investment



Chinese overseas investment has expanded steadily in the more than ten years since the Belt and Road Initiative was launched. By early 2024, China's cumulative investment and cooperation in BRI partner countries had reached roughly US$1 trillion, with projects across the globe.[1] As investment has grown, project types have diversified, and differences in investment climates have become more pronounced, the environmental, social, and governance risks facing Chinese enterprises have increased. At the same time, host country regulatory requirements, international sustainability standards, and the attention of global investors and other stakeholders to corporate responsibility performance have all continued to rise. In this context, ESG risk management and information disclosure have evolved from a matter of regulatory compliance into a core strategic instrument for gaining competitive advantage, improving investment returns, and ensuring the long-term success of projects. Facing an increasingly complex international investment environment and rising sustainability expectations, Chinese enterprises need to reexamine and deepen their understanding of disclosure and stakeholder engagement, and embed both in the whole-of-life management of their overseas investments.

1. Investment returns: the economic value of disclosure and stakeholder engagement

In today's global investment environment, systematic environmental and social risk management and meaningful stakeholder engagement are no longer optional; they are decisive in protecting and enhancing returns. Experience with international project finance shows that projects with sound environmental and social risk management systems enjoy a clear advantage in financing negotiations. Such projects pass banks' internal ESG review more readily and obtain better financing terms, including lower interest rates and longer tenors. According to research by the International Finance Corporation (IFC), infrastructure projects with a well-implemented environmental and social management system (ESMS) pay an average of 15 to 25 basis points less in financing costs than comparable projects.[2]

Blended finance, an innovative model that combines public development funds with private commercial capital, plays an increasingly important role in Belt and Road projects, and transparent information disclosure is a precondition for obtaining it. When the World Bank, the Asian Infrastructure Investment Bank (AIIB), and other multilateral development banks provide development assistance or concessional loans, they commonly treat a project's ESG performance and the quality of its stakeholder engagement as core approval criteria.[3] In addition, sound environmental and social management helps build communication and mutual trust between the company and the host government, communities, and other stakeholders, creating favorable conditions for lawful, compliant, and stable project operations.

1 Green Finance & Development Center (2025). China Belt and Road Initiative (BRI) Investment Report 2024. https://greenfdc.org/china-belt-and-road-initiative-bri-investment-report-2024/

2 International Finance Corporation (IFC). (n.d.). Environmental and Social Management System Implementation Handbook.

3 World Bank Group. (2023). Blended Finance for Infrastructure and Climate. https://www.worldbank.org/en/topic/publicprivatepartnerships/brief/blended-finance-for-infrastructure-and-climate

2. Social risk: the benefits and costs of public participation

The Social License to Operate has become a necessary condition for the success of large overseas investments, and deep stakeholder engagement is the foundation on which projects are implemented and operated sustainably in host countries. Local communities, Indigenous Peoples, workers, government agencies, and non-governmental organizations (NGOs) all hold valuable Local Knowledge about the ecology, social fabric, and cultural practices of the project area. Tapping this knowledge helps optimize project design and avoid costly mismatches with local conditions. Fair and reasonable benefit-sharing mechanisms, such as employment and skills training, investment in community public facilities, and revenue-sharing schemes, ensure that project benefits reach local communities and can turn potential opponents into supporters and partners.

Conversely, inadequate or absent public consultation exposes a project to multiple risks. First, the enterprise forfeits the opportunity to draw on local knowledge to improve its plans, and may adopt decisions that are detached from local realities and difficult to implement. Second, if potential adverse impacts are not identified and mitigated in advance, problems can escalate rapidly once construction begins, provoking strong community opposition, work stoppages, schedule delays, and cost overruns. In a highly connected world, news of environmental damage and community conflict spreads quickly, inflicting serious damage on a company's global brand and, by extension, on its business and ability to raise capital in other markets.[4]

3. Legal risk: the possibility of disputes and litigation

In the complex legal environment of overseas investment, gaps in disclosure and insufficient stakeholder engagement can lead directly to costly legal disputes. As global environmental and human rights awareness has grown, many developing countries have enacted relatively complete environmental protection, land rights, and labor legislation and have granted citizens and civil society organizations standing to bring environmental public interest litigation. When a Chinese enterprise's project is perceived to have damaged the local environment or infringed the lawful rights of local residents, the affected community or an NGO is likely to bring the company before local courts.

Once such litigation is under way, the company faces protracted and complex proceedings, and the process itself weighs on normal operations and corporate reputation regardless of the outcome. More seriously, when a dispute between the enterprise and the host government cannot be resolved through consultation, it may end up in international investment arbitration. A typical arbitration takes years, and legal fees can run to millions or even tens of millions of US dollars. In recent years, tribunals have paid growing attention to the environmental and social responsibilities of investors, and arbitral outcomes do not always favor the investor.[5]

4 Green Finance Committee of China Society for Finance and Banking, and the City of London. (2020). Handbook on Stakeholder Engagement for Financial Institutions in Belt and Road Investments. Beijing: Green Finance Committee of China Society for Finance and Banking.

5 Business & Human Rights Resource Centre. (2023). China's Belt and Road Initiative: Tracking impacts on the ground. https://www.business-humanrights.org/en/from-us/briefings/chinas-belt-and-road-initiative-tracking-impacts-on-the-ground/

Table 1–1 Risks and opportunities of disclosure and stakeholder engagement in overseas investment

Core area	Opportunities (positive effects)	Risks (negative effects)
Investment and finance	1. Lower financing costs: passing ESG review can reduce financing costs by 15 to 25 basis points. 2. Access to blended finance: attracting multilateral development banks and public funds. 3. Higher investment returns: one percent of project expenditure devoted to early risk prevention can avoid ten percent of downstream losses. 4. Long-term opportunities: a good reputation brings new projects and preferential policies.	1. Financing difficulties: non-compliance with ESG standards leads to exclusion from green finance. 2. Stranded assets: high-carbon or high-pollution projects face the risk of sharp value impairment. 3. Cost overruns: community conflict or legal disputes cause serious delays and overspending. 4. Reputational damage: adverse coverage harms the global brand and market access.
Society and operations	1. Securing the social license to operate: earning public trust to ensure smooth implementation and stable operation. 2. Better project design: drawing fully on local knowledge to avoid flawed decisions. 3. Defusing social conflict: equitable benefit-sharing turns potential opponents into partners. 4. Improving the supply chain: advancing sustainability across the value chain and strengthening product competitiveness.	1. Greater project resistance: opaque decision-making provokes sustained community opposition and adverse media coverage. 2. Loss of local insight: ignoring community views degrades project quality and complicates operations. 3. Escalating community conflict: inequitable benefit distribution or poor communication can trigger protests and even violence. 4. Political risk: provoking adverse intervention by the host government.
Law and compliance	1. Stronger compliance: proactive disclosure and communication that meets host country regulations. 2. Fewer legal disputes: legal risks identified and mitigated early. 3. Consolidated partnerships: mutual trust with government and communities reduces the likelihood of disputes.	1. Community litigation: local communities or NGOs sue over environmental or rights issues. 2. International arbitration: disputes with the host government escalate into costly investment arbitration. 3. Regulatory penalties: violations of host country disclosure or environmental rules bring heavy fines. 4. Project suspension: courts may issue injunctions halting operations or ordering environmental remediation.

Chapter 2

International Best Practice



The purpose of this chapter is to help project managers quickly identify the standards a project must observe, become familiar with the mature management tools of international financial institutions and other organizations, and allocate management resources in line with project characteristics. Unlike compliance guidance framed at the corporate level, this chapter concentrates on risk management for the individual project and offers targeted, actionable guidance. International standards for environmental and social risk management fall into three tiers by their binding force on projects and their influence: first, financing-linked standards, which emanate from international financial institutions and commercial banks and must be met to secure financing; second, market-driven standards governing environmental and social disclosure, which are not prerequisites for financing but materially affect financing costs and investor confidence; and third, voluntary reference standards, which offer methods and tools for building management systems and demonstrating responsible commitment.

1. Standards of international financial institutions

The standards of international financial institutions pair management and disclosure requirements for environmental and social risk with corresponding risk management tools. This section identifies and reviews the standards these institutions commonly apply in overseas financing, clarifies the floor requirements and compliance essentials of each, and compiles the accompanying management tools. It distills common features to help enterprises select suitable tools and raise the quality of management and compliance.

International financial institutions treat environmental and social risk management as a basic condition of project finance and impose broadly consistent core requirements on enterprises: first, systematic assessment of environmental and social risks and a continuous management mechanism; second, pollution prevention, resource efficiency, biodiversity protection, and climate risk management; third, protection of labor rights, occupational health and safety, and community health and safety; fourth, proper management of land acquisition and involuntary resettlement, with compensation and livelihood restoration; fifth, respect for the rights of Indigenous Peoples and vulnerable groups; and sixth, orderly information disclosure, stakeholder engagement, and grievance handling. Table 2–1 summarizes the environmental and social risk management and disclosure requirements in the standards of the major institutions.

Table 2–1 Standards of international financial institutions and their environmental and social risk management and disclosure requirements

Institution	Instrument	Environmental risk management and disclosure requirements	Social risk management and disclosure requirements
World Bank	Environmental and Social Framework (ESF)	- Assess, manage, and monitor environmental risks and impacts at every stage of the project - Resource efficiency and pollution prevention (air, water, and land pollution) - Biodiversity protection and maintenance of ecological functions - Protection of cultural heritage - Transparent disclosure and continuous stakeholder engagement	- Fair treatment of workers and safe and healthy working conditions - Management of community health, safety, and security risks - Avoiding or minimizing involuntary resettlement and compensating affected people - Respect for the human rights, dignity, culture, and livelihoods of Indigenous Peoples - Open and transparent stakeholder engagement and disclosure, with a grievance mechanism
International Finance Corporation (IFC)	Environmental and Social Sustainability Performance Standards	- Identify, assess, and manage environmental risks and update assessments regularly - Prevent pollution, improve resource efficiency, and implement an ESMS - Protect endangered species, maintain ecosystem functions, and use natural resources sustainably - Avoid significant adverse impacts on cultural heritage, including intangible heritage - Require stakeholder engagement and disclosure by clients	- Ensure fair wages, adequate facilities, and health and safety protection, and prevent discrimination and harassment - Adopt policies, procedures, and plans to prevent or mitigate community health and safety impacts - Avoid or minimize adverse impacts on communities (including displacement and loss of livelihoods) and provide adequate compensation - Respect the rights of Indigenous Peoples, consult in a culturally appropriate manner, and obtain free, prior, and informed consent (FPIC) - Require early stakeholder engagement and transparent disclosure
Asian Development Bank (ADB)	Safeguard Policy Statement (SPS) / Environmental and Social Framework (ESF)	- Environmental impact assessment and management - Avoiding or minimizing adverse environmental impacts - Pollution prevention and resource efficiency - Biodiversity protection - Stakeholder engagement and disclosure	- Avoiding or minimizing involuntary resettlement - Ensuring adequate compensation and livelihood restoration for affected people - Respect for the rights and cultures of Indigenous Peoples - Protection of labor rights and working conditions - Community health and safety

Table 2–1 Standards of international financial institutions and their environmental and social risk management and disclosure requirements (cont'd)

Institution	Instrument	Environmental risk management and disclosure requirements	Social risk management and disclosure requirements
Inter-American Development Bank (IDB)	Environmental and Social Policy Framework (ESPF)	- Assessment and management of environmental and social risks and impacts - Resource efficiency and pollution prevention - Biodiversity protection and sustainable natural resource management - Protection of cultural heritage - Climate change mitigation and adaptation - Transparent disclosure and stakeholder engagement	- Respect for human rights, including labor rights - Gender equality and non-discrimination - Labor rights and working conditions - Community health, safety, and security - Land acquisition and involuntary resettlement - Protection of the rights of Indigenous Peoples - Stakeholder engagement and grievance mechanisms
African Development Bank (AfDB)	Integrated Safeguards System (ISS)	- Environmental and social impact assessment and management - Biodiversity protection and maintenance of ecosystem services - Pollution prevention, control, and resource efficiency - Climate change risk assessment - Disclosure and stakeholder engagement	- Avoiding or minimizing involuntary resettlement, with compensation and livelihood restoration - Labor rights, working conditions, and occupational health and safety - Community health and safety - Gender equality and social inclusion - Grievance mechanisms and stakeholder engagement
Asian Infrastructure Investment Bank (AIIB)	Environmental and Social Framework (ESF)	- Environmental impact assessment, management, and monitoring - Pollution prevention and resource efficiency - Protection of biodiversity and ecosystems - Climate change risk management - Disclosure and stakeholder engagement	- Labor rights and working conditions; community health and safety; cultural heritage protection - Avoiding or minimizing involuntary resettlement, with compensation and livelihood restoration - Respect for the rights, cultures, and FPIC of Indigenous Peoples - Gender equality and social inclusion - Grievance mechanisms

Table 2–1 Standards of international financial institutions and their environmental and social risk management and disclosure requirements (cont'd)

Institution	Instrument	Environmental risk management and disclosure requirements	Social risk management and disclosure requirements
European Bank for Reconstruction and Development (EBRD)	Environmental and Social Policy (ESP)	- Assessment and management of environmental and social risks and impacts - Resource efficiency, pollution prevention, and control - Biodiversity protection and sustainable natural resource management - Protection of cultural heritage - Stakeholder engagement and disclosure	- Labor rights and working conditions - Health, safety, and security - Land acquisition, restrictions on land use, and involuntary resettlement - Protection of the rights of Indigenous Peoples - Stakeholder engagement mechanisms
New Development Bank (NDB)	Environmental and Social Framework (ESF)	- Environmental impact assessment and management - Pollution prevention and control - Resource efficiency and climate change - Protection of biodiversity and ecosystem services - Disclosure and stakeholder engagement	- Labor rights and working conditions - Community health and safety - Land acquisition and involuntary resettlement - Protection of Indigenous Peoples and vulnerable groups - Grievance mechanisms and stakeholder engagement
Export-Import Bank of China	White Paper on Green Finance and Social Responsibility; Environmental and Social Framework (joint projects with AIIB)	- Compliance with Chinese and host country environmental regulations - Environmental impact assessment - Priority support for clean energy and clean transport - Energy conservation, environmental protection, and resource recycling - Response to climate change	- Fulfillment of social responsibility - Promotion of economic development and poverty reduction - Compliance with labor standards - Community participation and stakeholder communication

Alongside their management and disclosure requirements, all of these institutions provide mature tools for managing environmental and social risk (see Annex 1). A systematic review shows that the tools of all international financial institutions share six core features. Table 2–2 summarizes these features and their value for projects.

Table 2–2 Core common features of international financial institution tools

Common feature	Description	Value for projects
Whole-of-life management	A complete cycle from screening, assessment, and management plans to monitoring and reporting	Ensures that risks are managed systematically at every stage
Risk-based classification	Differentiated measures based on risk category (A/B/C)	Concentrates resources on high-risk projects and improves efficiency
Reference to good international industry practice	The IFC Environmental, Health and Safety (EHS) Guidelines are the leading expression of good international industry practice (GIIP)	Provides direct technical benchmarks and keeps projects at international standards
Stakeholder engagement and grievance mechanisms	The core of all social management tools	Prevents and defuses social conflict and secures the social license to operate
Standardization and templating	Standard templates for environmental management plans (EMPs), resettlement action plans (RAPs), stakeholder engagement plans (SEPs), and so on	Lowers the difficulty of preparation and ensures quality and completeness
Alignment with international conventions	Reference to ILO conventions, the UN Guiding Principles on Business and Human Rights (UNGPs), the Convention on Biological Diversity, and other international norms	Ensures the authority and broad applicability of the tools

By referring to these standards and tools, enterprises can put in place a complete, structured environmental and social risk management system and avoid the familiar shortcomings of fragmented management, shallow assessment, absent community communication, missing content, and disconnect from international norms. Compliance, transparency, and predictability improve markedly, and environmental, reputational, and operational risks decline accordingly.

2. Other sustainability disclosure requirements

The second tier of standards concerns environmental and social disclosure. Unlike the first tier, which centers on management tools, it emphasizes transparency, reporting, and communication with stakeholders. These standards require projects to disclose environmental and social performance data on a regular basis, explain how environmental and social risks are managed, and respond to the concerns of investors and the public. The tier includes the European Sustainability Reporting Standards (ESRS), the sustainability disclosure standards of the International Sustainability Standards Board (ISSB), the Global Reporting Initiative (GRI) standards, the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD), the Carbon Disclosure Project (CDP), and the FAST-Infra sustainable infrastructure label. Because the triggers differ across standards, enterprises must determine which apply according to where a project operates, its market positioning, and the requirements of its investors. Table 2–3 summarizes the applicable scenarios and the environmental and social management and disclosure requirements of each standard.

Table 2–3 Second-tier standards: applicable scenarios and environmental and social risk management and disclosure requirements

Standard	Applicable scenarios	Environmental risk management and disclosure requirements	Social risk management and disclosure requirements
ESRS (European Sustainability Reporting Standards)	Projects operating in the EU; EU-listed companies; EU subsidiaries of large non-EU enterprises	- Climate change - Pollution - Water and marine resources - Biodiversity and ecosystems - Resource use and circular economy - Double materiality: impact plus financial - Third-party assurance	- Own workforce - Workers in the value chain - Affected communities - Consumers and end users - Covers working conditions, diversity, remuneration, human rights, and health and safety
ISSB standards (IFRS S1/S2)	Listed companies; projects seeking financing in international capital markets	- Climate-related disclosures (governance, strategy, risk management, metrics and targets) - Disclosure of Scope 1, 2, and 3 greenhouse gas emissions - Built on the TCFD framework and the principle of financial materiality	- Disclosure of all material sustainability-related financial risks and opportunities - Covers social issues relevant to investor decisions, such as human rights and labor practices

Table 2–3 Second-tier standards: applicable scenarios and environmental and social risk management and disclosure requirements (cont'd)

Standard	Applicable scenarios	Environmental risk management and disclosure requirements	Social risk management and disclosure requirements
GRI standards	Projects publishing sustainability reports; multi-stakeholder audiences	- GRI 300 series: materials, energy, water, biodiversity, emissions, waste, and supplier environmental assessment - Impact materiality principle	- GRI 400 series: employment, labor relations, occupational health and safety, training, diversity, non-discrimination, human rights (child labor, forced labor, and so on), communities, supplier social assessment, and customer privacy
TCFD recommendations	Projects with substantial climate risk exposure	- Disclosure of climate-related risks (physical and transition) and opportunities - Four pillars: governance, strategy, risk management, metrics and targets - Scope 1, 2, and 3 greenhouse gas emissions - Climate-related financial risk disclosure and scenario analysis (now incorporated into ISSB and ESRS)	- Focused mainly on climate; indirectly covers just transition and impacts on workers and communities
CDP	Projects requested by investors to participate in CDP disclosure	- Climate change: Scope 1, 2, and 3 emissions, risks and opportunities, and reduction targets - Forests: deforestation risk - Water security: water management and risk	- Focused mainly on the environment; indirectly covers supply chain management and just transition
FAST-Infra label	Large infrastructure projects; projects seeking sustainable infrastructure certification	- Climate change mitigation - Climate resilience assessment - Biodiversity protection - Pollution prevention and resource efficiency - Water management - Circular economy	- Community and stakeholder engagement - Human rights and labor standards - Social inclusion and gender equality - Health and safety - Cultural heritage protection
UN Global Compact	All projects wishing to demonstrate international responsibility commitments	- A precautionary approach to environmental challenges - Promoting environmental responsibility - Encouraging environmentally friendly technologies	- Human rights - Labor standards (freedom of association, elimination of forced labor, abolition of child labor, non-discrimination)

Table 2–3 Second-tier standards: applicable scenarios and environmental and social risk management and disclosure requirements (cont'd)

Standard	Applicable scenarios	Environmental risk management and disclosure requirements	Social risk management and disclosure requirements
ISO 26000	All projects wishing to systematize social responsibility management	- Pollution prevention - Sustainable resource use - Climate change mitigation and adaptation - Environmental protection, biodiversity, and habitat restoration - A systematic framework of seven core subjects	- Human rights due diligence - Labor practices - Fair operating practices - Consumer issues - Community involvement and development
OECD Guidelines for Multinational Enterprises	Projects operating in OECD member or adherent countries	- Environmental impact assessment and management systems - Climate change and biodiversity - Pollution prevention and resource efficiency - Environmental disclosure	- Human rights due diligence - Employment and industrial relations - Consumer interests - Stakeholder engagement and grievance mechanisms
TNFD recommendations	Projects highly dependent on natural resources	- Disclosure of nature-related dependencies, impacts, risks, and opportunities - Built on the four TCFD pillars, focused on biodiversity and ecosystems - The LEAP approach (Locate, Evaluate, Assess, Prepare)	- Focused mainly on nature; indirectly covers Indigenous Peoples' rights and community livelihoods
SASB standards	Projects benchmarking ESG performance against international peers	- Environmental dimension: greenhouse gas emissions, air quality, energy management, water management, waste management, and ecological impacts (materiality identified by industry across 77 industries)	- Social capital: human rights, community relations, customer privacy, and data security. Human capital: labor practices, employee health and safety, and diversity and inclusion (materiality identified by industry)
IRIS+ system	Projects seeking impact investment	- Environmental metrics on climate, energy, land, oceans, pollution, water, and waste, used to measure environmental impact	- Social metrics on education, employment, financial services, health, housing, infrastructure, and diversity, used to measure social impact
PRI	Projects of investors that are PRI signatories	- Incorporate ESG issues into investment analysis and decision-making - Seek disclosure on ESG issues by investee entities - Report on progress in implementing the principles	- Incorporate ESG issues into investment analysis and decision-making - Act as active owners, embedding ESG issues in ownership policies and practices - Report on progress in implementing the principles

In cross-border operations and project investment, enterprises should select and observe the applicable sustainability standards deliberately, based on geography, industry, investor priorities, and the ecological sensitivity of the project area.

For projects operating in or across the EU, the priority is to meet the requirements of ESRS, the ISSB standards, TCFD, and CDP, and to disclose systematically on climate change (Scopes 1, 2, and 3), pollution, water, biodiversity, and resource circularity, while attending to employee rights, labor conditions in the supply chain, community impacts, and consumer rights. Where a sustainability report is required or the project benchmarks itself against international peers, GRI, SASB, and IRIS+ provide comprehensive frameworks for measuring and disclosing environmental and social impacts. For projects involving major infrastructure or high dependence on natural resources, the FAST-Infra label and the TNFD recommendations direct attention to climate resilience, biodiversity protection, pollution control, and resource efficiency, together with community engagement, human rights, and gender equality. Multinational enterprises and investment institutions should combine the UN Global Compact, ISO 26000, the OECD Guidelines for Multinational Enterprises, and the PRI to build management systems for environmental assessment, climate governance, human rights due diligence, labor relations, community engagement, and grievance handling.

Enterprises should weigh financial and impact materiality together, incorporate third-party assurance and international practice, and form a complete framework for environmental and social risk management and disclosure in support of compliance, financing, and sustainability objectives for their overseas projects. Note that the principal disclosure standards have been updated rapidly in recent years: the ISSB standards (IFRS S1/S2) were issued in June 2023 and take effect for annual reporting periods beginning on or after January 1, 2024, with several jurisdictions having launched adoption or convergence processes; the SASB standards have been maintained by the ISSB under the IFRS Foundation since 2022; and in 2025 the EU adopted a simplification omnibus that narrows the scope of the Corporate Sustainability Reporting Directive (CSRD) to companies with more than 1,000 employees and net turnover above EUR 450 million, defers reporting obligations for the second and third waves by two years, and streamlines the ESRS datapoints. Enterprises should maintain a dynamic tracking mechanism and determine their obligations against the latest version in force.

3. China's policy and regulatory framework provides clear guidance for overseas investment

In recent years, to promote high-quality and sustainable Belt and Road cooperation, China has progressively built and refined a policy and regulatory framework centered on green development. The framework covers both macro-level guidance for overseas investment projects and market-based incentives and constraints that use green finance as a lever. The evolution of these policies has provided Chinese enterprises, central state-owned enterprises (SOEs) in particular, with clear green guidance and systematic risk management tools, and continues to shape their strategies and practices in environmental disclosure and social management. Figure 2–1 traces the chronology of the key policies and their core requirements for the environmental and social management of overseas investment.

Release Time	Document / Principles Name	Issuing Authority	Environmental Information Disclosure	Strengthened Requirements for Social Management
2013	"Guidelines for Environmental Protection in Foreign Investment and Cooperation"	Ministry of Commerce (MOFCOM); Ministry of Environmental Protection (MEP)	**Initial Guidance.** First encouraged environmental impact assessments and environmental information disclosure to relevant stakeholders, laying the groundwork for environmental disclosure in overseas investment.	**Foundational Requirements.** Called on enterprises to respect host-country cultures and customs and protect workers' rights, laying the foundation for more specific social responsibility requirements.
Aug. 2016	"Guidelines for Establishing the Green Financial System"	People's Bank of China (PBOC) and six other government agencies	**Linkage to Finance.** Linked environmental disclosure to financial activities for the first time, proposing a disclosure system for listed companies and bond issuers and laying the groundwork for subsequent regulation.	**Risk Management.** Required financial institutions to assess project-related social risks, encouraging enterprises to consider social impacts when seeking financing.
Nov. 2018	"Green Investment Principles for the Belt and Road" (GIP)	China Green Finance Committee; City of London	**Alignment with International Standards.** Called on signatories to disclose the environmental impacts of their investments, including carbon emissions and water use, in line with international recommendations such as those of the TCFD.	**Systematic Management.** Called for sustainability to be integrated into corporate governance, conflict resolution mechanisms to be established, and engagement with diverse stakeholders, including local communities, environmental organizations and the media, to be strengthened.
2020	"Guidelines for Green Development of the Belt and Road Initiative" (GDG)	International Green Development Coalition for the Belt and Road Regions (IGDC)	**Project Classification and Negative List.** Established a red-yellow-green project classification system, identified new coal-fired power projects among prohibited investments, and required environmental risk classification before investment decisions.	**Full-Lifecycle Engagement.** Provided operational guidance on social impact assessments, stakeholder engagement and grievance mechanisms throughout the project lifecycle, calling for institutionalized social risk management.
2021	"Guidelines for Green Development in Foreign Investment and Cooperation"	Ministry of Commerce (MOFCOM); Ministry of Ecology and Environment (MEE)	**Stronger Requirements.** Strengthened guidance on low-carbon operations overseas and encouraged more detailed disclosure of green investment and operational practices.	**Encouraging Higher Standards.** Encouraged enterprises to adopt higher international or Chinese environmental and social standards, in addition to complying with local laws, to improve their social responsibility practices.
Jan. 2022	"Guidelines on Ecological and Environmental Protection for Foreign Investment and Cooperation Construction Projects"	Ministry of Ecology and Environment (MEE); Ministry of Commerce (MOFCOM)	**Full-Process Refinement.** Specified environmental management and recordkeeping requirements from project siting and construction through operation, making disclosure more comprehensive and process-oriented.	**Detailed Risk Management.** Translated social risk management into requirements for different project stages, including detailed community engagement and impact mitigation plans.
Mar. 2022	"Opinions on Promoting Green Development of the Belt and Road"	National Development and Reform Commission (NDRC) and other government departments	**Top-Level Policy Endorsement.** Reaffirmed green development and information transparency at the national strategic level, elevating the strategic importance of corporate environmental disclosure.	**Capacity Building.** Called for stronger green development training and capacity building, encouraging enterprises to strengthen sustainability capabilities among local communities and partners as well as within their own operations.
Jun. 2022	"Green Finance Guidelines for Banking and Insurance Sectors"	China Banking and Insurance Regulatory Commission (CBIRC)	**Stronger Financing Constraints.** Elevated environmental risk assessment from an encouraged practice to a prerequisite for financing decisions, requiring banks to assess relevant environmental risks before extending credit.	**End-to-End Responsibility.** Required project owners and their main contractors and suppliers to follow international good practices, extending social responsibility management across the supply chain.
Feb. 2025	"Implementation Plan for High-Quality Development of Green Finance in Banking and Insurance Sectors"	National Financial Regulatory Administration (NFRA); People's Bank of China (PBOC)	**Stronger Mandatory Requirements.** Further strengthened environmental disclosure requirements, signaling a shift from soft guidance toward more binding regulatory obligations, with potential implications for financing.	**Deeper Accountability.** More closely linked corporate social responsibility performance to financial institutions' risk assessments and credit decisions, encouraging enterprises to integrate social management into core business strategies.

Figure 2–1 How Chinese regulation shapes the environmental and social management of overseas investment

(1) Clear green guidance and risk management tools

From the guidance of the 2013 Guidelines for Environmental Protection in Foreign Investment and Cooperation to the traffic-light (red-yellow-green) project classification introduced in the 2020 baseline study of IGDC, policy has drawn clear red lines and negative lists for investment decisions, effectively helping enterprises avoid high-pollution, high-risk fields. In particular, the 2022 Guidelines on Ecological and Environmental Protection for Foreign Investment and Cooperation Construction Projects and related documents extend environmental and social risk management across the whole life cycle of site selection, construction, and operation, and provide standardized operating procedures. Under this framework, enterprises have shifted from reactive responses to planned, rule-based environmental and social management, which materially reduces the legal, reputational, and financial risks arising from environmental problems or community conflict and safeguards overseas assets and the sustainable operation of projects.

(2) Moving from rule-following to standard-setting

Initiatives such as the GIP, launched in 2018, deliberately benchmark against mainstream international frameworks such as the TCFD recommendations and guide enterprises to align their environmental disclosure with international best practice. Transparency at this standard is not only a forceful answer to external doubts but also the key to winning the trust of international capital markets, rating agencies, and partners. Policy has also repeatedly stressed communication with diverse stakeholders, including local communities and NGOs, and the establishment of grievance and conflict resolution mechanisms. These requirements push enterprises to evolve from pure project builders into responsible community participants: by earning the social license to operate, they lay a solid social foundation for long-term project success and build a responsible, trustworthy image for Chinese enterprises in global competition.

(3) Strong market-based incentives and constraints

Since the Guidelines for Establishing a Green Finance System were issued in 2016, and especially following the 2022 Guidelines for Green Finance in the Banking and Insurance Sectors and the 2025 Implementation Plan for High-Quality Development of Green Finance in Banking and Insurance Sectors, the weight of environmental and social risk management and related disclosure in green finance and international project finance has risen steadily, and in some financed projects it has become a principal basis for environmental and social due diligence and credit decisions. Through the allocation of financial resources and the discipline of financing terms, green finance guides enterprises to incorporate environmental and social risks into their operational management and decision systems, and pushes management requirements downstream to contractors, suppliers, and other links in the value chain, gradually forming a virtuous cycle in which risk identification, management, disclosure, and financing decisions reinforce one another and support steadier, more sustainable development of overseas projects. In 2026, China's legal framework for outbound investment and ecological governance advanced

further. In June, the fifth National Human Rights Action Plan (2026–2030) was released, calling on enterprises to follow the UN Guiding Principles on Business and Human Rights and to strengthen human rights due diligence. In July, the State Council Provisions on Outbound Investment (Decree No. 837) came into force, establishing for the first time, at the level of administrative regulation, a whole-of-process regulatory framework for outbound investment. In August, the Environmental Code of the People's Republic of China took effect, codifying the dual control of carbon emissions, the carbon emissions trading system, and the carbon footprint management of products. Over the same period, the National Development and Reform Commission released a draft revision of the Measures for the Administration of Outbound Investment for public comment, further refining requirements for compliant overseas operations and social responsibility. These instruments align closely with the whole-of-life environmental and social management approach advocated in this practical reference and together constitute the legal underpinning for Chinese enterprises going global.

Taken together, China's policy and regulatory framework imposes requirements on overseas investment at three levels: green red lines drawn through project classification and whole-of-life management; improved disclosure and management through benchmarking against international standards and stronger stakeholder communication; and external constraints formed by green finance incentives and outbound investment regulation. Enterprises should translate these requirements into concrete arrangements at the project level and adjust them as policy evolves.



Chapter 3

Environmental Information Disclosure Requirements Across the Project Life Cycle



Environmental and social information disclosure is an integral component of the environmental and social risk management systems of international financial institutions. Transparent disclosure is not only a financing compliance requirement; it is also a key mechanism for securing the social license to operate, preventing and defusing conflict, and improving project sustainability. This chapter sets out the disclosure requirements of international financial institutions for each stage of a project and offers practical guidance to project managers.

1. Core principles and cross-cutting topics of disclosure

The disclosure policies of international financial institutions rest on four core principles. Timeliness requires that relevant information be disclosed before key decision points, giving stakeholders adequate time to study the project and respond. Completeness requires that all relevant environmental and social assessment documents and management plans be disclosed, with no selective disclosure or concealment of material information. Accessibility requires that affected communities be able to obtain information conveniently, including through disclosure points in their localities and local-language versions. Intelligibility requires non-technical summaries in plain language, so that non-specialists can understand the environmental and social impacts of a project.

In selecting disclosure topics for a given project, enterprises can start from the disclosure requirements for cross-cutting topics and then refine them in light of project characteristics, location, and stakeholder concerns. These topics cover the central environmental and social issues: climate change, biodiversity, pollutant emissions, energy consumption, water use, land management, supply chain practices, and community development. Whatever the industry or project size, the cross-cutting topics offer a reference framework for disclosure that helps enterprises present potential impacts and management measures systematically and transparently, while meeting stakeholders' rights to information and participation. Table 3–1 sets out the cross-cutting environmental topics and their disclosure requirements and bases.

Table 3–1 Cross-cutting environmental topics: disclosure requirements and bases

No.	Environmental topic	Trigger	Core disclosure requirements	Principal reference standards
1	Greenhouse gas emissions and climate change	All projects	- Whole-of-life greenhouse gas emissions of the project (Scopes 1, 2, and 3) - Results of physical climate risk assessment (extreme weather, sea level rise, water scarcity, and so on) - Results of transition risk assessment (carbon pricing, policy shifts, technology substitution) - Emission reduction measures and targets - Adaptation measures and resilience plans	IFC Performance Standard 3; TCFD framework; EU CSRD (ESRS E1); GHG Protocol; ISO 14064

Table 3–1 Cross-cutting environmental topics: disclosure requirements and bases (cont'd)

No.	Environmental topic	Trigger	Core disclosure requirements	Principal reference standards
2	Energy use and energy efficiency	All projects	- Total energy consumption by type - (fossil fuels, renewables, purchased power, and so on) - Energy intensity indicators (energy per unit of output) - Share and targets for renewable energy use - Efficiency measures and technologies deployed - Status of energy management systems - Water withdrawal by source (surface water, groundwater, municipal supply, seawater, and so on)	IFC Performance Standard 3; IFC General EHS Guidelines; ISO 50001; EU Energy Efficiency Directive; World Bank ESS3
3	Water use and management	All projects	- Water stress assessment (whether located in water-scarce areas) - Efficiency indicators and water-saving measures - Volume, destination, and quality compliance of wastewater discharge - Water recycling rates and rainwater harvesting	IFC Performance Standard 3; IFC General EHS Guidelines; EU CSRD (ESRS E3); CDP Water; World Bank ESS3
4	Pollutant emissions and management	All projects	- Air pollutant emissions (particulates, SO2, NOx, VOCs, and so on) and compliance status - Water pollutant emissions (COD, BOD, ammonia nitrogen, heavy metals, and so on) and compliance status - Solid waste generation (by type: general and hazardous) and disposal methods - Noise levels and control measures - Operation and performance of pollution control facilities	IFC Performance Standard 3; IFC General and industry EHS Guidelines; EU Industrial Emissions Directive; World Bank ESS3; host country environmental standards
5	Biodiversity and ecosystems	Projects located in or affecting ecologically sensitive areas (protected areas, World Heritage sites, critical habitats, important wetlands, and so on)	- Assessment of project impacts on biodiversity and ecosystems - Identification and protection of critical habitats - Protection measures for endangered species - Biodiversity offsets and restoration plans (following the mitigation hierarchy: avoid, minimize, restore, offset) - Monitoring plans and results - Consultations with protected area management authorities	IFC Performance Standard 6; World Bank ESS6; EU CSRD (ESRS E4); TNFD framework; Convention on Biological Diversity

Table 3–1 Cross-cutting environmental topics: disclosure requirements and bases (cont'd)

No.	Environmental topic	Trigger	Core disclosure requirements	Principal reference standards
6	Resource use and circular economy	All projects	- Raw material consumption by type - Resource efficiency indicators - Share of recycled materials used - Waste recycling rates - Life cycle environmental assessment of products - Circular economy measures and targets	IFC Performance Standard 3; EU CSRD (ESRS E5); EU Circular Economy Action Plan; ISO 14040 life cycle assessment
7	Land use and soil protection	Projects involving land acquisition, land use change, or soil contamination risk	- Project footprint and changes in land use type - Soil contamination risk assessment - Soil protection and remediation measures - Land reclamation and ecological restoration plans - Food security assessment for the conversion of farmland	IFC Performance Standards 3 and 6; World Bank ESS3 and ESS5; EU Soil Protection Strategy; FAO land degradation assessment
8	Hazardous substances and chemicals management	Projects producing, storing, transporting, or using hazardous chemicals	- Inventory of hazardous chemicals (names, quantities, hazard characteristics) - Safe storage and use measures - Leak emergency plans and drills - Environmental and health risk assessment of chemicals - Whole-of-process management of hazardous waste generation, storage, transfer, and disposal	IFC Performance Standard 3; IFC General EHS Guidelines; GHS (globally harmonized classification and labeling); Basel Convention; Stockholm Convention
9	Environmental management system	All Category A and B projects	- Status of the environmental management system (structure, responsibilities, procedures) - Certification (ISO 14001 and so on) - Training plans and implementation - Monitoring plans and frequency - Performance indicators and target completion - Audits and improvement measures	IFC Performance Standard 1; World Bank ESS1; ISO 14001; EU EMAS
10	Environmental emergency management	All projects	- Identification and assessment of environmental risks - Emergency response plans (pollution incidents, natural disasters, and so on) - Emergency facilities and supplies - Drill plans and records - Reporting and handling of environmental incidents - Coordination mechanisms with local government and communities	IFC Performance Standards 1 and 3; World Bank ESS1 and ESS4; ISO 14001; OECD chemical accident guidance

2. Disclosure timing requirements

Disclosure timing requirements differ by project risk category. Table 3–2 summarizes the timing requirements of the principal international financial institutions.

Table 3–2 Disclosure timing requirements of international financial institutions

Institution	Category A (high risk)	Category B (medium risk)	Category C (low risk)	Notes
IFC	60 days before board consideration	30 days before board consideration	No mandatory disclosure	Early disclosure encouraged
World Bank	Draft disclosed before appraisal; final documents disclosed before board consideration	Same as Category A	Simplified disclosure	Drafts are used for public consultation; final documents go to the board
ADB	Draft disclosed before appraisal; final documents disclosed before board consideration	Same as Category A	Simplified disclosure	Draft disclosure serves public consultation
AIIB	Disclosure before board consideration	Disclosure before board consideration	Simplified disclosure	No specific timing prescribed
EBRD	Disclosure before board consideration	Disclosure before board consideration	Simplified disclosure	A minimum lead time applies
Equator Principles banks	Following IFC requirements	Following IFC requirements	Following IFC requirements	Implemented by each bank

IFC has the most explicit timing requirements. The investment summary of proposed investment and the environmental and social review summary for Category A projects must be disclosed 60 days before board consideration, and 30 days for Category B projects. These deadlines are minimums, and IFC encourages clients to begin disclosing information early in project preparation. The World Bank and ADB require draft environmental and social documents to be disclosed before project appraisal for public consultation, with public comments reflected in the final documents, which are disclosed before board consideration so that the public has had the opportunity to learn about the project and express views before the board decides.

(1) Disclosure content by project stage

Environmental and social disclosure runs through the project life cycle, with content and emphasis varying by stage. During screening and classification, disclosure informs the public of the nature, scale, location, and potential environmental and social risk rating of the project, laying the groundwork for later engagement. During preparation, a draft environmental and social impact assessment must be disclosed in-country and public consultation conducted. Consultation is the core of the assessment process, and disclosure documents must be available for at least 30 days before consultation meetings are held. During appraisal, the financial institution discloses the final environmental and social documents and the environmental and social review summary on its website; the summary is the institution's independent assessment of the project's environmental and social risks, enabling the public to understand the institution's judgment and comment before board consideration. During implementation and operation, monitoring reports and performance reports are disclosed regularly, showing implementation of management plans, monitoring data, performance indicators, and grievance handling; this is both a financing contract requirement and an important mechanism for maintaining the project's social license. During closure and exit, the project should withdraw from operation in an orderly and responsible manner, disclosing decommissioning plans, environmental remediation and restoration measures, labor arrangements, and the management of community impacts; disclosure obligations continue until decommissioning and for a defined period after closure. Figure 3–1 shows the principal disclosure content for each stage.



	Key Documents	Purpose of Disclosure	Timing of Disclosure
Screening and Categorization	Basic project information and environmental and social risk classification	Inform the public about the project and its risk level	As soon as possible after project identification
Preparation Stage	• Draft Environmental and Social Impact Assessment (ESIA) • Stakeholder Engagement Plan (SEP) • Draft Resettlement Action Plan (RAP) • Draft Indigenous Peoples Plan (IPP) • Environmental Management Plan (EMP), specifying measures for pollution control, ecological protection and resource recycling	Solicit public feedback and facilitate public consultation	At least 30 days before public consultation
Appraisal Stage	• Final Environmental and Social Impact Assessment (ESIA) • Environmental and Social Management Plan (ESMP) • Final Resettlement Action Plan (RAP) • Environmental and Social Review Summary (ESRS) • Environmental and Social Commitment Plan (ESCP)	Demonstrate how public feedback has been addressed, specify environmental and social management measures, and enable review by financial institutions and the public	30–60 days before Board consideration
Implementation Stage	• Environmental and social monitoring reports • Annual environmental and social performance reports • Grievance mechanism implementation updates • Reports on major environmental and social incidents	Report on implementation of management plans and environmental and social performance, and address stakeholder concerns	Periodically (annually or semi-annually); major incidents reported promptly
Operational Stage	• Ongoing environmental and social monitoring data • Annual environmental and social performance reports • Grievance resolution updates • Sustainability reports	Demonstrate long-term environmental and social performance and fulfill ongoing disclosure commitments	Periodically (typically annually)
Closure Stage	Decommissioning plans, environmental remediation and restoration measures, workforce resettlement arrangements, and community impact management information	Ensure a safe, orderly transition and responsible transition from operations to project closure	Periodically, continuing through decommissioning and for a specified period after closure

Figure 3–1 Environmental and social information disclosure content by project stage

(2) Disclosure channels and methods

Effective disclosure requires channels and methods that allow the target audience to obtain the information. Figure 3–2 shows the main channels and their characteristics.

Environmental and Social Information Disclosure Channels

Disclosure Channel / Content	Applicable Stage(s)	Advantages	Considerations
Financial Institution Website Investment Summary Information (SII) Environmental and Social Review Summary (ESRS) Links to environmental and social documents	**Appraisal & Implementation**	Globally accessible; searchable and available for long-term access	Requires internet access; content may be available only in English
Project Website All environmental and social documents Monitoring reports Grievance mechanism information	**Entire project lifecycle**	Project-specific, customizable and multilingual	Requires development, maintenance and promotion
Local Disclosure Points Hard copies of environmental and social documents; Non-technical summaries; Consultation records	**Preparation & Implementation**	No internet required; accessible to local communities; consultations can be provided	Requires setup and management; opening hours must be appropriate
Public Consultation Meetings Project overview; Environmental and social impact management measures; Q&A	**Preparation & Implementation**	Face-to-face communication, immediate responses and trust-building	Requires careful organization and comprehensive recordkeeping
Community Outreach Visits Targeted information Concerns of vulnerable groups	**Preparation & Implementation**	Reaches remote communities and addresses the needs of vulnerable groups	Time-intensive; training required
Online Platforms Project updates Monitoring data Online consultations	**Implementation & Operation**	Real-time updates and strong interactivity	Digital divide; ongoing management required

Figure 3–2 Channels for environmental and social information disclosure

The financial institution website is one of the most important channels: it is globally accessible, retains documents long term, and is searchable, but it requires internet access and is mostly in English. To remedy this, project websites can provide project-specific environmental and social information with tailored content, multilingual versions, and regular updates, and they are an effective way to demonstrate transparency and responsibility. Disclosure points should be located to ensure that affected communities can access information, for example in community centers, libraries, or project offices, with clear signage and reasonable opening hours. Public consultation meetings remain the traditional and most important mode of disclosure and participation. They should be held at least 30 days after documents are disclosed, at times and places convenient for community participation, in local languages, with complete minutes published after the event.

(3) Language and format requirements for disclosure documents

To ensure that disclosure is effective, international financial institutions set explicit language and format requirements for disclosure documents. Table 3–3 summarizes them.

Table 3–3 Language and format requirements for disclosure documents

Requirement	Specific requirements	Purpose	Applicable documents
Language	- International language: English (or the working language of the financial institution) - Local language: the official language of the host country - Community languages: languages used by affected communities (where applicable)	Ensure that financial institutions, government, and communities can all understand the documents	All environmental and social documents
Non-technical summary	- A plain-language summary of the project's environmental and social impacts and management measures, typically 5 to 10 pages	Enable non-specialists to understand the project	Major documents such as the ESIA and RAP
Format	- Electronic: searchable PDF or web format - Printed: clearly printed and easy to read	Facilitate access and use	All disclosure documents
Completeness	- All relevant annexes, maps, and data tables included; referenced documents made accessible	Ensure information is complete	All environmental and social documents
Accessibility	- Accommodate people with visual impairments, low literacy, and other special needs through oral briefings, illustrated explanations, and similar means	Ensure that all groups can access information	Community disclosure in particular

All major environmental and social documents should be available in English for review by financial institutions and in the official language of the host country for review by government and the public. In multilingual countries or ethnic minority areas, versions in the languages used by affected communities should also be provided. The non-technical summary is the key to intelligibility: it should present the core information in plain language, avoid jargon, use charts and photographs liberally, and run to roughly 5 to 10 pages. Format requirements protect accessibility: electronic versions should be searchable PDFs or web pages, printed versions clearly printed in sufficiently large type, and alternative formats such as oral briefings, audio versions, or illustrated explanations provided for groups with special needs.

(4) Organizing and recording public consultation

Public consultation extends disclosure and is the core of stakeholder engagement. Table 3–4 summarizes the organizational requirements.

Table 3–4 Organizational requirements for public consultation

Requirement	Category A projects	Category B projects	Specific requirements
Rounds of consultation	At least two	At least one	First round early in the project to introduce the concept; second round after the ESIA draft is completed, to solicit comments
Timing	At least 30 days after document disclosure	At least 30 days after document disclosure	Ensure the public has time to review the documents
Venues	Locations easily reached by affected communities	Same	Avoid remote or hard-to-reach places
Methods	Public meetings, focus groups, household visits, online consultation, written comments	Same	Use multiple methods to reach different groups
Language	Local and community languages, with interpretation as needed	Same	Ensure community members can understand and express themselves
Vulnerable groups	Dedicated consultations with women, older people, persons with disabilities, and others	Same	Ensure vulnerable voices are heard
Records	List of participants; views and concerns raised; the company's responses; how comments were incorporated	Same	Records should be complete, accurate, and public

Category A projects require at least two rounds of public consultation: an early round to introduce the project concept, its potential impacts, and alternatives to the community, and a second round after the draft environmental and social impact assessment is complete, to present detailed assessment results and mitigation measures. The rounds should be spaced far enough apart for the first round's comments to be reflected in the assessment. Consultation should take place at least 30 days after document disclosure, at venues easily reached by affected communities and at times convenient for community members. Methods should be varied enough to cover different groups: public meetings suit presenting the project to large audiences, focus groups allow deeper exploration of specific concerns, and household visits reach remote communities and people with limited mobility. Dedicated consultations with vulnerable groups are an important measure for social inclusion. Records should capture participants, the views and concerns raised, the company's responses, and how comments were incorporated, and should be published as annexes to the environmental and social impact assessment.

(5) Continuing disclosure during implementation and operation

Disclosure does not end with project preparation and appraisal; it continues during implementation and operation. Table 3–5 summarizes the requirements.

Table 3–5 Disclosure requirements during implementation and operation

Disclosure content	Frequency	Channels	Purpose
Environmental and social monitoring reports	Quarterly or semi-annually	Project website; financial institution website	Show implementation of the environmental and social management plan
Annual environmental and social performance report	Annually	Project website; financial institution website; sustainability reports	Summarize annual environmental and social performance and improvements
Grievance mechanism performance	Annually	Project website	Show how grievances are received, handled, and resolved
Reports on major environmental and social incidents	Promptly after the incident	Project website; financial institution website; local government	Provide timely notice of major incidents and responses
Environmental monitoring data	Continuous or periodic	Project website; online platforms	Show environmental quality and emissions data
Stakeholder engagement activities	Promptly after each activity	Project website	Show continuing communication with communities

Environmental and social monitoring reports are the most important disclosure documents of the implementation phase. Prepared quarterly or semi-annually, they should cover implementation of the environmental and social management plan, environmental and social monitoring data, problems identified, and corrective measures taken, and should be posted promptly on the project and financial institution websites. The annual environmental and social performance report summarizes the year's work, usually as part of the project's annual report or the company's sustainability report, and should review the year's main achievements and challenges, stakeholder feedback, and the improvement plan for the following year. Timely disclosure of major environmental and social incidents is essential to maintaining the project's social license: when a major incident occurs, the company should notify the financial institution, local government, and affected communities within 24 to 48 hours, explaining the nature, cause, and scope of the incident and the response measures. Prompt, transparent disclosure helps contain the impact and rebuild trust.

(6) Recommendations for enterprises

Enterprises should take a systematic approach to meeting their disclosure obligations. Table 3–6 offers practical recommendations.

Table 3–6 Practical recommendations for meeting disclosure requirements

Category of advice	Specific measures	Expected effect
Build a disclosure calendar	Work backward from the financier's requirements to set disclosure milestones; allow ample time for preparation, translation, and review; account for public consultation and responses to comments	Disclose on time and avoid financing delays
Establish disclosure channels	Create a project website or dedicated disclosure page; set up disclosure points where the project is located; prepare multilingual versions	Ensure information is accessible and meets the needs of different groups
Ensure disclosure quality	Disclose every required document in full; provide non-technical summaries; ensure translation quality	Meet compliance requirements and build stakeholder trust
Document the disclosure process	Record versions, dates, and channels of disclosure documents; keep complete consultation records; record responses to public comments	Provide evidence for financial institution review and guard against potential disputes
Disclose continuously	Disclose beyond the financing stage throughout operation; update environmental and social performance data regularly; report major incidents promptly	Maintain the project's social license and demonstrate a long-term commitment
Train and build capacity	Train the project team on disclosure requirements; establish information collection and reporting systems; engage specialist advisers where needed	Improve the efficiency and quality of disclosure

Enterprises should work backward from the financier's requirements to set disclosure milestones and allow ample preparation time. If IFC requires disclosure 60 days before board consideration, for example, the company should begin preparing at least 90 days ahead, and must also allow time for consultation and responses to comments. Disclosure quality is both a compliance requirement and the basis of trust: disclose every document the financier requires, keep non-technical summaries in plain language, and engage professional translators with review by community representatives.

Documenting the disclosure process means recording document versions, dates, and channels, and keeping consultation records and responses to comments on file. Continuing disclosure demonstrates a long-term commitment: establish a regular disclosure mechanism, keep disclosing during implementation and operation, and report major incidents promptly and transparently. Training and capacity building underpin efficiency and quality: train the project team on disclosure requirements, establish information collection and reporting systems with clear division of responsibilities, and where experience is lacking, engage advisers with international project experience to raise disclosure quality and avoid delays and rework.



Chapter 4

Social Risk Management Requirements Across the Project Life Cycle



International financial institutions set explicit requirements for the social risk management of overseas investment projects. These requirements are not merely prerequisites for financing approval; they also determine whether a project can win community support and operate sustainably over the long term. From an implementation perspective, this chapter sets out the core principles of social risk management, stage-by-stage requirements, the management of key topics, and the responses available to enterprises.

1. Core principles and cross-cutting topics of social risk management

(1) Core principles of social risk management

The social risk management of international financial institutions follows six core principles that run through the project life cycle.

First, avoidance and minimization. By optimizing site selection, adjusting engineering designs, and improving construction plans, adverse impacts on communities are avoided or reduced at the source.

Second, compensation and restoration. Where impacts cannot be avoided, affected people must receive fair and reasonable compensation, and measures must be taken to help them restore, and ideally improve, their livelihoods and living standards.

Third, participation and consultation. Meaningful consultation with stakeholders must take place throughout the project life cycle, ensuring that their views can influence project decisions, rather than one-way disclosure of information.

Fourth, protection of vulnerable groups. Women, children, older people, persons with disabilities, ethnic minorities, people living in poverty, and other vulnerable groups must be identified and protected so that the project does not leave them worse off.

Fifth, cultural appropriateness. Local cultural traditions, religious beliefs, and social customs must be respected, and social management conducted in culturally appropriate ways.

Sixth, grievance and remedy. An effective grievance mechanism must provide affected people with a formal channel to raise concerns and seek redress, ensuring that problems are handled promptly and fairly.

(2) Key cross-cutting topics of social risk management

International financial institutions set explicit management requirements for seven key social topics. Enterprises must judge which topics apply to their project and take the corresponding management measures.

Table 4–1 Management requirements for key social topics

Social topic	Trigger	Core management requirements
Land acquisition and resettlement	The project requires land acquisition or causes physical relocation	1.Optimize design to avoid or reduce land acquisition 2.Provide housing and supporting facilities based on replacement cost 3.Implement livelihood restoration measures
Indigenous Peoples' rights	The project is located in Indigenous Peoples' territory or affects their land and resources	1.Identify Indigenous communities and obtain FPIC (free, prior, and informed consent) 2.Ensure Indigenous Peoples share in project benefits 3.Protect cultural heritage and traditional knowledge
Labor rights and working conditions	The project employs workers (directly, through contractors, or in the supply chain)	1.Comply with international labor standards and prohibit forced labor and child labor 2.Eliminate discrimination in employment and occupation Ensure occupational health and safety 3.Respect freedom of association and the right to collective bargaining
Community health and safety	The project may affect community health and safety	1.Assess health and safety risks 2.Prevent the spread of disease 3.Ensure traffic safety 4.Manage the conduct of security personnel
Cultural heritage protection	The project may affect cultural relics or traditional culture	1.Identify tangible and intangible cultural heritage 2.Redirect the project away from critical cultural heritage 3.Establish chance-find procedures and protection measures agreed with communities
Stakeholder engagement	All projects	1.Identify all stakeholders and consult meaningfully 2.Pay particular attention to the participation of vulnerable groups and give timely feedback on how views were taken into account
Grievance mechanism	All projects	1.Establish project-level grievance channels and ensure accessibility and fairness 2.Handle grievances promptly and protect complainants

Land acquisition and resettlement is the most common social risk in overseas investment. The essentials of management are: minimizing the scale of land acquisition through design optimization; setting compensation based on replacement cost rather than market value, so that affected people can purchase or build housing and land of equivalent quality; providing resettlement housing with adequate facilities; and implementing livelihood restoration measures such as vocational training, start-up loans, and priority employment, with the goal of restoring or improving the living standards of affected people.

The protection of Indigenous Peoples' rights is an area to which international financial institutions attach great importance. Indigenous Peoples have deep cultural and spiritual ties to their land, and the occupation of that land can fundamentally affect their cultural identity and livelihoods. The core of management is obtaining FPIC, that is, consent that is free (free of coercion), prior (before decisions are made), and informed (based on full information). The consultation process must respect Indigenous decision-making traditions and timetables and proceed through representative institutions. Even with consent obtained, Indigenous Peoples must share equitably in project benefits and their cultural heritage must be protected.

The management of labor rights and working conditions rests on the core conventions of the International Labour Organization (ILO). Projects must comply with host country labor law and with the more demanding of the applicable international labor standards. The core standards are the prohibition of forced labor and child labor, the elimination of discrimination, and respect for freedom of association and collective bargaining. Labor management procedures must cover the whole chain: recruitment, contracts, wages, working hours, occupational health and safety, and labor grievances. Large projects should prioritize hiring local workers and provide skills training. Labor management in the supply chain is increasingly important, and the labor practices of major suppliers should be assessed.

Community health and safety management requires assessing the health and safety risks a project may pose to communities, including the health effects of air, water, and noise pollution; the traffic safety effects of project vehicles; the spread of infectious diseases associated with an influx of workers; and conflict arising from interactions between security personnel and communities. For projects in conflict-affected or high-risk areas, security management is especially important, and security personnel, whether public or private, must respect human rights and use force proportionately.

Cultural heritage protection requires identifying tangible heritage (archaeological sites, historic buildings) and intangible heritage (traditional knowledge, rituals, languages). Critical cultural heritage, such as World Heritage sites and nationally protected relics, must be avoided. For other heritage, protective measures such as archaeological excavation, building preservation, and cultural documentation are required. Chance-find procedures ensure that work stops immediately and the relevant authorities are notified when relics are discovered during construction. Protection measures must be agreed with communities and cultural heritage experts.

Stakeholder engagement underpins all social management work. Meaningful consultation means engaging early (at the design stage, not after decisions are made), providing full information, communicating in both directions (listening and responding), and influencing decisions (incorporating views into the project). All stakeholders must be identified, and engagement methods tailored to each group. Vulnerable groups need dedicated measures, such as women-only consultations, oral briefings for those with low literacy, and home visits for people with mobility constraints.

A grievance mechanism gives affected people a formal channel to voice grievances and seek redress. An effective mechanism meets the eight effectiveness criteria of the UN Guiding Principles on Business and Human Rights: legitimacy, accessibility, predictability, equitability, transparency, rights compatibility, continuous learning, and a basis in engagement and dialogue. Grievance channels should be diverse (suggestion boxes, hotlines, email, community meetings, and so on), guarantee anonymity and confidentiality, and protect complainants from retaliation. Handling should follow clear procedures and deadlines, with every grievance registered, triaged, addressed, and answered.

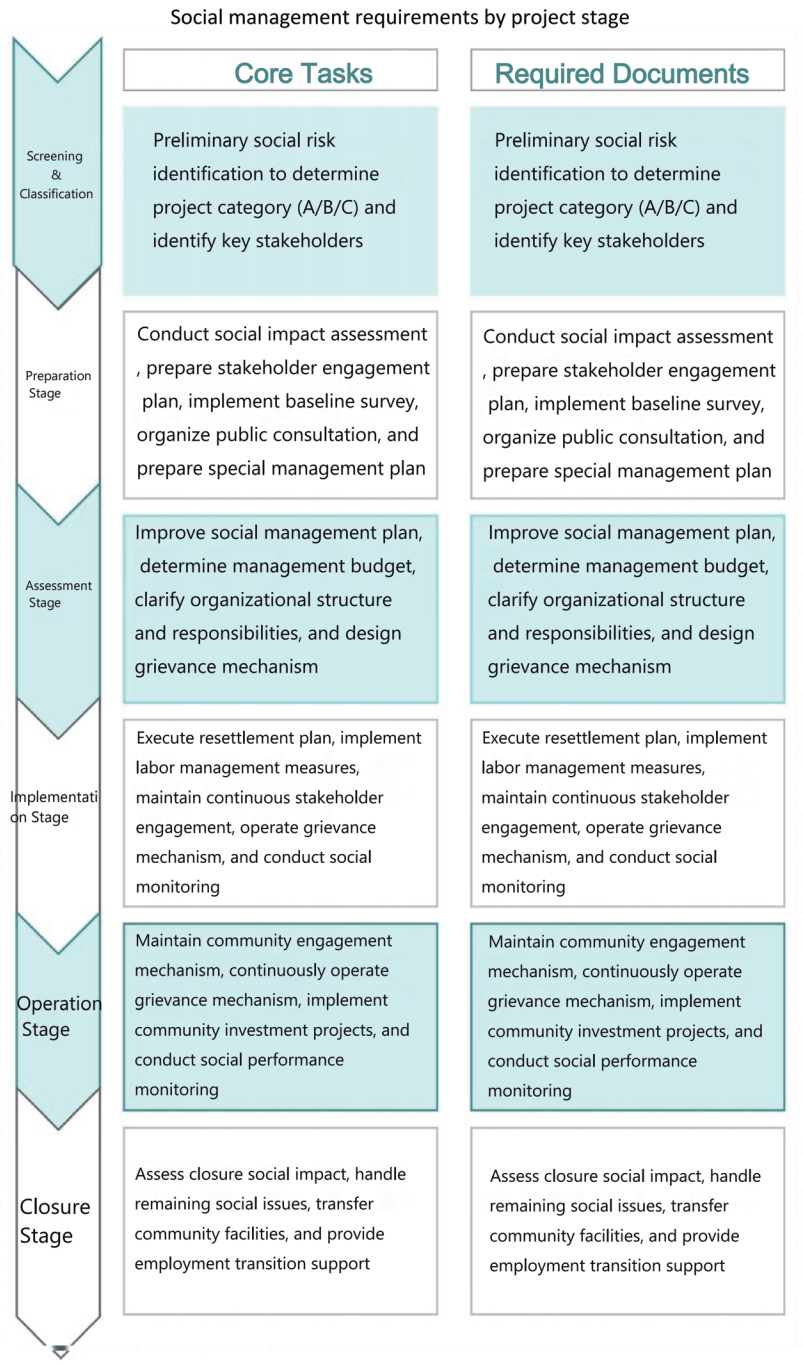


Figure 4–1 Social management requirements by project stage

2. Social risk management requirements

(1) Social management requirements by project stage

Social risk management runs through screening, preparation, appraisal, implementation, operation, and closure. Figure 4–1 shows the management focus and document requirements for each stage.

During screening and classification, the priority is to determine rapidly the main social risks a project may involve, including land acquisition, resettlement, Indigenous Peoples, large-scale labor recruitment, and cultural heritage. Based on the risk assessment, the financial institution classifies the project as Category A (high risk), Category B (medium risk), or Category C (low risk), each carrying different management requirements and review procedures. The core task of the preparation stage is the social impact assessment (SIA). The assessment must rest on thorough baseline surveys, identify the full range of positive and negative impacts on local communities, and formulate mitigation measures on the basis of extensive public consultation. For projects involving land acquisition, Indigenous Peoples, or large-scale labor recruitment, dedicated management plans must be prepared.

During appraisal, the plans developed in preparation are refined and finalized. In particular, the social management budget must be sufficient to cover compensation, resettlement, livelihood restoration, capacity building, monitoring and evaluation, and all other necessary expenditure. The organizational structure must assign social management responsibilities to each department and individual, with a professionally competent social management team in place. During implementation, the key is delivering on commitments to affected communities on schedule: compensation payments, resettlement housing, and livelihood restoration measures must proceed as planned; local employment should be prioritized; and wages, benefits, and working conditions must meet international standards. Sustained community communication and effective grievance handling are important means of preventing social conflict.

During operation, the emphasis shifts from managing adverse impacts to creating shared value. Community investment programs support local education, health care, and infrastructure and help communities build capacity for sustainable development. Continued community engagement and the functioning of the grievance mechanism remain important to maintaining the project's social license.

During closure, the impacts of shutdown on the community must be assessed, especially on employment and the local economy. For communities heavily dependent on project employment, transition support such as vocational training and start-up assistance should be provided. Community facilities built by the project should be handed over properly so that they remain in service.

(2) Guidance for preparing social management documents

The quality of social management documents directly affects financing approval and implementation. The following are the preparation essentials for the principal documents.

Table 4–2 Preparation essentials for the principal social management documents

Document	Prepared when	Core content	Quality requirements	Typical length
Social impact assessment (SIA)	Project preparation	Baseline surveys; impact identification and assessment; analysis of affected people; mitigation measures; consultation records	Prepared by qualified social specialists; based on field surveys and first-hand data; extensive public consultation; analysis of positive and negative impacts	50–200 pages
Stakeholder engagement plan (SEP)	Project preparation, updated continuously	Stakeholder identification and analysis; engagement methods and timetable; disclosure arrangements; consultation plans; feedback mechanisms	Identify all stakeholders; tailor engagement methods to each group; pay particular attention to vulnerable groups; extend across the whole life cycle	20–50 pages
Resettlement action plan (RAP)	Project preparation	Census of affected people; asset inventory; compensation standards; resettlement options; livelihood restoration measures; implementation schedule and budget; organizational structure; monitoring and evaluation	Prepared by resettlement specialists; detailed census and asset inventory; compensation based on replacement cost; livelihood restoration beyond one-off compensation; extensive public consultation; adequate budget	50–150 pages
Indigenous Peoples plan (IPP/IPDP)	Project preparation	Indigenous community baseline; impact assessment; record of the FPIC process; culturally appropriate mitigation measures; benefit-sharing mechanisms; grievance mechanisms	Prepared by specialists with Indigenous Peoples experience; respect for Indigenous cultures and decision-making traditions; FPIC obtained; Indigenous Peoples benefit from the project	30–100 pages
Labor management procedure (LMP)	Project preparation	Labor risk assessment; comparison of national law with international standards; recruitment procedures; working conditions management; occupational health and safety; labor grievance mechanisms; supply chain labor management	Compliance with international labor standards; prohibition of forced labor and child labor; elimination of discrimination; respect for freedom of association; occupational health and safety ensured	20–50 pages
Grievance mechanism procedure	Project preparation, established before implementation	Channels for receiving grievances; handling procedures; deadlines; confidentiality protections; records and reporting; escalation procedures	Consistent with the UNGPs effectiveness criteria; accessible, fair, and transparent; complainants protected; prompt handling	10–20 pages

The Social Impact Assessment must be prepared by qualified specialists with backgrounds in sociology, anthropology, or economics. Baseline surveys should cover the local population, livelihoods, incomes, social organization, culture, and vulnerability. Impact identification must cover the full range of negative impacts (land acquisition, job losses, relocation, cultural impacts) and positive impacts (employment, improved infrastructure, skills development). The analysis of affected people should distinguish groups and assess differential impacts. Mitigation measures should follow the hierarchy of avoid, minimize, and compensate. Public consultation should run through the assessment, and consultation records form an integral part of it.

The Stakeholder Engagement Plan must identify stakeholders comprehensively, including directly and indirectly affected communities, government, civil society organizations, academic institutions, and the media. Stakeholder analysis should assess each group's interests, influence, and willingness to engage, and identify key stakeholders and vulnerable groups. Engagement methods should be varied, including public meetings, focus groups, household visits, and online consultation. The timetable should cover the whole life cycle, with intensive engagement at key decision points. The feedback mechanism should explain how stakeholder views are collected, analyzed, and answered.

The Resettlement Action Plan must be prepared by specialists with resettlement experience. The census must identify all affected people, including those with legal land rights, those without legal title but with use rights, tenants, and temporary users. The asset inventory must record all affected assets in detail. Compensation standards must be based on replacement cost rather than market value. Resettlement options should offer choices (cash compensation, land for land, resettlement housing) that affected people select themselves. Livelihood restoration is the core, encompassing vocational training, start-up support, and priority employment, with the goal of restoring or improving livelihoods and living standards. The budget must be sufficient to cover all necessary expenditure.

The Indigenous Peoples Plan must be prepared by specialists with experience working with Indigenous Peoples and endorsed by the affected communities. Baseline surveys should cover population, livelihoods, land use, cultural traditions, social organization, and vulnerability. The impact assessment should pay particular attention to impacts on Indigenous land, resources, and cultural heritage. The FPIC process should document information disclosure, consultation, Indigenous decision-making, and the agreements reached. Mitigation measures must be culturally appropriate and respect Indigenous values and traditions. Benefit-sharing mechanisms must ensure that Indigenous Peoples share fairly in project benefits.

The Labor Management Procedure should cover all workers on the project, whether directly employed, engaged through contractors, or in the supply chain. The labor risk assessment identifies the main risks. A comparison of national labor law with international labor standards identifies gaps, and the project observes the more demanding of the two. Recruitment should be transparent and fair, prioritize local workers, and eliminate discrimination. Working conditions management covers contracts, wages, working hours, and accommodation. Occupational health and safety management identifies and controls

workplace risks. The labor grievance mechanism should be independent of management. Supply chain labor management assesses the labor practices of major suppliers.

The grievance mechanism procedure should meet the effectiveness criteria of the UN Guiding Principles on Business and Human Rights. Receiving channels should be diverse, ensuring that all affected people can submit grievances conveniently. Handling procedures should be clear, covering receipt, registration, triage, investigation, resolution, feedback, and closure. Deadlines should be explicit, for example 15 days for simple grievances and 30 days for complex ones. Confidentiality and protection measures must keep complainants' identities secure and shield them from retaliation. Records and reports should document the receipt, handling, and outcomes of all grievances. Escalation procedures should explain how complainants can appeal if dissatisfied with the outcome.

(3) Strategies for enterprises

Effective social risk management requires enterprises to be prepared in terms of organization, capability, and process. The following are the key strategies.

Table 4–3 Corporate strategies for social risk management

Strategy area	Specific measures	Expected effect
Risk identification	Screen social risks early in the project and identify key topics (resettlement, Indigenous Peoples, labor); rate risks and formulate response strategies	Avoid discovering major risks late and derailing the project; reserve sufficient time and budget for social management
Specialist capacity	Engage social specialists with international project experience; assemble multidisciplinary teams (sociology, anthropology, economics); engage Indigenous specialists where Indigenous Peoples are involved	Raise the quality of social management documents; meet financial institution review requirements; avoid rework and delay
Baseline surveys	Invest sufficient resources in detailed baseline surveys; collect first-hand data on population, livelihoods, incomes, and culture; build a reliable data foundation	Assess impacts accurately; tailor measures; provide a baseline for monitoring and evaluation
Public participation	Begin communicating with communities early; consult in culturally appropriate ways; listen genuinely and respond to concerns; incorporate views into project design	Build the project's social license; identify and resolve potential conflicts early; improve design; build community trust

Table 4–3 Corporate strategies for social risk management (cont'd)

Strategy area	Specific measures	Expected effect
Budget planning	Reserve ample budgets for resettlement, community development, and capacity building; include social management costs in the total project budget; set contingency funds for unforeseen problems	Ensure social management measures can be implemented effectively; avoid broken promises that damage corporate credibility
Organizational capacity	Assign dedicated social management staff; provide training to raise team capability; clarify the social management responsibilities of each department and individual	Raise the professionalism and efficiency of social management; ensure measures are executed effectively
Grievance management	Establish the grievance mechanism before implementation; publicize channels widely; handle grievances promptly and fairly; learn and improve from grievances	Give communities a channel to voice concerns; stop small problems becoming major conflicts; maintain the project's social license
Continuing communication	Maintain communication with communities throughout the life cycle; report project progress regularly; listen to community views and concerns	Maintain good relations; understand and respond to concerns in time; build long-term partnerships
Delivering commitments	Pay compensation in full and on time; complete resettlement housing as scheduled; implement livelihood restoration measures; honor employment and community development commitments	Build corporate credibility; maintain the project's social license; avoid protests and social conflict
Monitoring and improvement	Establish a social monitoring system; collect and analyze social performance data regularly; identify and correct problems; learn from experience and improve continuously	Ensure measures are effective; detect and resolve problems in time; keep raising management standards

Enterprises should embed social risk management in the whole-of-life management system of the project rather than treat it as a financing compliance requirement. Effective social risk management not only satisfies the review of international financial institutions but also builds the project's social license, creates shared value, and underwrites long-term sustainability. It is an important expression of corporate social responsibility and a core capability for overseas investment in a globalized economy.

Chapter 5

Indicator Frameworks and Self-Assessment Checklists for Priority Industries

1. Industry guidance for overseas investment in solar PV projects

Solar PV has grown rapidly in recent years. Compared with conventional energy projects, PV projects have smaller environmental impacts during operation, but their extensive land take, globalized supply chains, and module life cycle management give them distinct characteristics in environmental disclosure and social management. This section describes the industry-specific requirements that overseas PV investment must address, in five dimensions.

(1) Industry-specific environmental disclosure requirements and standards

The environmental disclosure requirements of PV projects stem from what makes the technology distinctive: extensive land take, globalized supply chains, and module life cycle management. Table 5–1 summarizes six characteristic environmental topics and their disclosure requirements.

Table 5–1 Characteristic environmental disclosure requirements of PV projects

Environmental topic	Disclosure content	Standard requirements	Disclosure stage
Greenhouse gas emissions and abatement benefits	- Whole-of-life carbon footprint of the project - Annual accounting of emission reductions - Comparison against fossil fuel baselines	- SSI ESG Standard: greenhouse gas emissions management - IFC EHS Guidelines: carbon benefits accounting - GCF climate benefits methodology	Appraisal stage Annual reporting during operation
Land use and ecological impacts	- Footprint and land types - Impacts on agricultural land - Loss of ecosystem services - Biodiversity impact assessment - Water consumption for module cleaning	- SSI ESG Standard: biodiversity management - IFC Performance Standard 6: biodiversity protection - World Bank ESS6: biodiversity	ESIA at appraisal stage Monitoring reports during implementation
Water use	- Water sources and sustainability - Wastewater treatment and discharge	- SSI ESG Standard: water management - IFC EHS Guidelines: water efficiency	Appraisal stage Monitoring during operation
Hazardous substances management	- Toxic substances in modules (lead, cadmium, and so on) - Chemicals in manufacturing - End-of-life module disposal	- SSI ESG Standard: pollution management - EU RoHS Directive - EU WEEE Directive	Appraisal stage Operation and exit stages
Circular economy and module recycling	- Module recycling plans - Material recovery rate targets - Environmental management at exit	- SSI ESG Standard: circular economy - IRENA guidance on PV module recycling - IFC circular economy principles	Commitments at appraisal stage Implementation at exit stage
Visual impact and landscape	- Project impacts on landscape - Light pollution assessment - Visual impact mitigation measures	- IFC EHS Guidelines: visual impacts - Local planning regulations	ESIA at appraisal stage Design stage

Of these topics, greenhouse gas abatement benefits and the circular economy have attracted rapidly rising attention in recent years. Abatement benefits are the core environmental value of PV projects and an important basis for climate finance. During appraisal, the project must account in detail for its whole-of-life carbon footprint, covering emissions from module manufacturing, transport, installation, operation, and decommissioning, as well as the emissions avoided by displacing fossil fuels during operation. The SSI ESG Standard requires GHG emissions management using scientifically grounded methods, and the IFC and the Green Climate Fund (GCF) provide specific accounting methodologies.

The salience of land use varies widely by region. In land-scarce Asia, agrivoltaics have become the mainstream solution; in the land-abundant Middle East and Africa, ecological protection is the primary concern. IFC Performance Standard 6 and World Bank ESS6 require biodiversity impact assessment, and projects located in or near ecologically sensitive areas must prepare biodiversity management plans.

The circular economy and module recycling are an emerging challenge for the industry. PV modules are designed for 25 to 30 years of service, and the first large installations are approaching retirement. Under the EU WEEE Directive, which has applied since August 15, 2018, no less than 85 percent of PV modules must be recovered and no less than 80 percent reused and recycled, with producers bearing recovery responsibility. Joint research by the International Renewable Energy Agency (IRENA) and the IEA Photovoltaic Power Systems Programme projects that by 2050 the cumulative global stock of decommissioned modules will reach 60 to 78 million tonnes, with recovered materials worth more than US$15 billion; industrialization of module recycling and the supporting policies are advancing rapidly in major markets. The SSI ESG Standard requires recyclability to be considered at the design stage and a recycling plan implemented at exit.

(2) Industry-specific initiatives, standards, and conventions

The rapid growth of the solar industry has produced a set of industry-specific standards. In addition to the cross-industry international standards described in Chapter 2, PV projects must attend to industry-specific initiatives, standards, and conventions. Table 5–2 summarizes the seven most important.

Table 5–2 Industry-specific standards and initiatives for solar PV

Standard / initiative	Initiator	Core content	Scope of application	Binding force
SSI ESG Standard	SolarPower Europe; Solar Energy UK	- 14 ESG principles: governance (5), environment (6), human rights and labor (3) - Supply chain sustainability assurance - Site-level ESG assessment	Global PV supply chain, module manufacturing, project development	Voluntary (but European market expectations are rising)
IRENA solar supply chain technology and ESG standards	International Renewable Energy Agency	- Quality infrastructure standards; ESG standards; market integration guidance	Global PV supply chain	Voluntary (industry reference)
IFC EHS Guidelines for Solar Power Facilities	International Finance Corporation	- Environmental, health, and safety requirements - Management during construction and operation - Community health and safety	PV projects financed by IFC	Mandatory (condition of financing)
EU RoHS Directive	European Union	- Restrictions on hazardous substances in electrical and electronic equipment - Limit values for lead, mercury, cadmium, and other substances	PV modules exported to the EU	Mandatory (legal requirement)
EU WEEE Directive	European Union	- Recycling of waste electrical and electronic equipment - Extended producer responsibility - Recovery rate targets	PV modules in the EU market	Mandatory (legal requirement)
SEIA environmental and social responsibility commitment	Solar Energy Industries Association (United States)	- Industry self-regulation initiative - Promotion of environmental and social responsibility	US solar industry	Voluntary (industry initiative)
Responsible Minerals Initiative (RMI)	Responsible Minerals Initiative	- Conflict minerals due diligence - Supply chain transparency - Applies to minerals in PV modules (silicon, silver, copper, and so on)	Global PV supply chain	Partially mandatory (US and EU legislation)

The SSI ESG Standard is the most significant development in this field. Published in October 2023, it is the first authoritative standard devoted to the sustainability of the PV supply chain. It covers 14 ESG principles in three clusters: governance and business ethics (5), environment (6), and human rights and labor rights (3). SSI requires members to complete ESG assessments of two production sites within 12 months, conducted by independent bodies with results published. Although the SSI standard is currently voluntary, practice in the European market shows it is shifting from a differentiator to an entry requirement.

For Chinese PV companies, GHG emissions management and human rights protection are the most challenging of the 14 SSI principles. GHG management requires accounting for all Scope 1, 2, and 3 emissions. For module manufacturers, the energy intensity of polysilicon production is the largest emission source, accounting for 60 to 70 percent of whole-of-life emissions.

By contrast, the EU RoHS and WEEE directives are more direct legal requirements: RoHS restricts the content of lead, mercury, cadmium, and other hazardous substances in PV modules, while WEEE makes producers responsible for module recovery. The Responsible Minerals Initiative addresses the sourcing of minerals used in PV modules, and the United States and EU have legislated conflict minerals due diligence.

In 2026, China issued a cluster of mandatory national and industry standards for PV. The State Administration for Market Regulation issued GB 47834-2026 (Minimum allowable values and energy efficiency grades for crystalline silicon PV modules and inverters), GB 47835-2026 (Energy consumption limits per unit product for monocrystalline silicon), and GB 29447-2026 (Energy consumption limits per unit product for polysilicon and germanium), establishing whole-chain mandatory controls over module efficiency and silicon energy consumption, effective January 1, 2027. The National Energy Administration issued 13 industry standards, including NB/T 12012-2026 (Design guide for the retrofit and decommissioning of PV power projects), filling a gap in standards for PV retirement. Together these provide domestic technical reference points for module selection, carbon footprint accounting, and decommissioning management in overseas projects.

(3) Life cycle environmental disclosure requirements

Environmental disclosure for PV projects runs through the whole life cycle, though the emphasis differs by stage. Table 5–3 summarizes the characteristic disclosure content for the six project stages.

Table 5–3 Life cycle environmental disclosure for PV projects

Project stage	Characteristic disclosure content	Disclosure focus	Reference standards
Planning and siting	- Comparison of alternatives (technology and siting options) - Land use type assessment - Ecological sensitivity screening - Climate resource assessment	- Prioritize wasteland, derelict land, and rooftops - Avoid high-quality farmland - Avoid ecological protection zones and migratory bird routes	- IFC Performance Standard 6 (biodiversity) - World Bank ESS6 - SSI biodiversity management
Design	- Environmental considerations in module selection (efficiency, toxicity, recyclability) - Land use optimization - Eco-friendly design (agrivoltaics, fishery-PV integration) - Water demand and water-saving design	- Select high-efficiency, low-toxicity, recyclable modules - Minimize land take - Explore combinations with agriculture and fisheries	- SSI circular economy principles - EU RoHS Directive - IFC resource efficiency
Procurement	- ESG due diligence on module suppliers - Supply chain carbon footprint disclosure - Conflict minerals due diligence - Suppliers' SSI certification status	- Require ESG reports from suppliers - Account for supply chain emissions - Ensure mineral sourcing compliance	- SSI ESG Standard - Responsible Minerals Initiative - IFC supply chain management
Construction	- Environmental monitoring during construction (dust, noise, soil erosion) - Implementation of ecological protection measures - Construction waste management - Restoration of temporarily occupied land	- Control construction impacts - Protect ecology in work areas - Sort, treat, and recycle waste	- IFC EHS Guidelines - World Bank ESS3 (pollution prevention)
Operation	- Annual accounting and disclosure of GHG abatement - Module cleaning water use and saving measures - Ecological restoration and monitoring (vegetation, wildlife) - Module performance degradation and replacement	- Quantify climate benefits - Report water use efficiency - Demonstrate ecological protection results	- SSI GHG management - GCF climate benefits accounting - IFC Performance Standard 6
Exit	- Decommissioning plan and environmental impact assessment - Module recycling scheme and recovery rates - Land restoration plan - Community engagement at exit	- Plan decommissioning early (typically after 20–25 years of operation) - Achieve high recovery rates (at least 85 percent under EU requirements) - Restore land to its original or better use	- SSI circular economy - EU WEEE Directive - IRENA module recycling guidance

Comparison of alternatives at the planning and siting stage is the starting point of environmental disclosure for PV projects. Unlike other energy projects, PV offers considerable siting flexibility: ground-mounted plants, rooftop installations, floating installations, and other forms are all possible. Alternatives must be compared across environmental, economic, and social dimensions. Environmental comparison focuses on land use type and ecological sensitivity, prioritizing wasteland, derelict land, industrial land, and building rooftops, and avoiding high-quality farmland and ecologically sensitive areas.

At the design stage, disclosure centers on module selection and eco-friendly design. Module selection should weigh power generation efficiency, toxic substance content, and recyclability together. Eco-friendly design is an innovation frontier: agrivoltaics grow crops or graze livestock beneath the panels, and fishery-PV integration mounts panels over water while maintaining aquaculture.

Supply chain management at the procurement stage is both the priority and the difficulty of PV environmental disclosure. The PV supply chain is highly globalized, and a single module may involve raw materials and components from more than a dozen countries. Project developers must conduct ESG due diligence on module suppliers and require ESG reports and carbon footprint data. Supply chain carbon accounting is especially demanding, requiring traceability back through polysilicon production, wafer processing, cell manufacturing, and module assembly. Conflict minerals due diligence requires a complete traceability chain from mine to factory.

Environmental disclosure at the exit stage is a distinctive requirement for PV projects and an emerging challenge for the industry. Since modules are designed for 25 to 30 years of service, projects must plan decommissioning arrangements during appraisal. The EU WEEE Directive requires recovery of at least 85 percent of modules and reuse and recycling of at least 80 percent. Land restoration must return land to its original or better use, consistent with commitments made early in the project and with local planning requirements.

(4) Life cycle social management requirements

The social management needs of PV projects are closely tied to their land-intensive character. Large ground-mounted plants typically occupy hundreds or even thousands of hectares, directly affecting local land use and livelihoods. Table 5–4 summarizes the characteristic social management content for the six project stages.

Table 5–4 Life cycle social management for PV projects

Project stage	Characteristic social management content	Management focus	Reference standards
Planning and siting	- Land tenure due diligence - Identification of affected people - Livelihood impact assessment (especially farmers and herders) - Early community engagement	- Verify land ownership and use rights - Identify all affected groups - Assess impacts on farming and herding	- IFC Performance Standard 5 (land acquisition) - World Bank ESS5 - SSI stakeholder engagement
Design	- Design of livelihood restoration schemes (agrivoltaics, employment opportunities) - Design of shared value for communities - Gender impact assessment - Protection measures for vulnerable groups	- Design livelihood alternatives - Explore win-win models for project and community - Attend to women, older people, and other vulnerable groups	- IFC Performance Standard 5 (livelihood restoration) - World Bank ESS5 - ADB gender equality approach
Procurement	- Supply chain labor rights due diligence - Conflict minerals and forced labor risks - Review of supplier human rights policies	- Ensure no forced labor or child labor in the supply chain - Attend to labor and human rights risks in key segments such as polysilicon - Require human rights policy commitments from suppliers	- SSI human rights and labor rights - UNGPs - ILO core labor standards
Construction	- Local hiring and training - Code of conduct for construction personnel - Management of community impacts during construction (traffic, noise, safety) - Operation of the grievance mechanism	- Prioritize local hiring - Train construction personnel to respect communities - Manage construction disturbance	- IFC Performance Standard 2 (labor) - World Bank ESS2 - SSI labor rights
Operation	- Long-term employment (operations and maintenance posts) - Community development investment (education, health care, infrastructure) - Land rent or benefit sharing - Continuing community engagement	- Provide stable O&M jobs - Deliver community development commitments - Pay land rent on time	- IFC Performance Standard 1 (stakeholder engagement) - World Bank ESS10 - SSI community engagement
Exit	- Management of decommissioning impacts on employment - Land return and livelihood restoration - Community consultation at exit - Post-decommissioning community support	- Notify early and help staff find new jobs - Return land as agreed and restore productivity - Consult communities on decommissioning arrangements	- IFC Performance Standard 5 (livelihood restoration) - World Bank ESS5

Land tenure is where PV projects most easily run into disputes. In Africa and Latin America, legal ownership and customary use rights often diverge; in Asia, the relationships among collective, state-owned, and private land are complex. Land tenure due diligence at the planning and siting stage therefore cannot stop at legal documents: it must go into communities to understand actual use and identify all affected people.

Livelihood impact assessment is the core of PV social management. Extensive land take directly affects the livelihoods of farmers and herders, and even when land rent or compensation is paid, it may not fully offset livelihood losses. IFC Performance Standard 5 and World Bank ESS5 require projects not merely to compensate economic losses but to restore or improve the living standards of affected people.

Supply chain labor rights management at the procurement stage is a sensitive issue for the PV industry. Supply chain transparency is hard to achieve: the chain involves hundreds of companies, and polysilicon may pass through multiple transactions and processing stages, making traceability difficult. Some companies use blockchain to record supply chain information, some require third-party audit reports from suppliers, and some source polysilicon from less sensitive regions. The core is a credible traceability mechanism ensuring that the supply chain is free of forced labor, child labor, and other human rights abuses.

Social management during construction and operation is relatively conventional, but PV retains distinctive features. During construction, local hiring should be prioritized; this is required by international standards and is also an important route to community support. Employment during operation is comparatively limited: a 100 MW plant typically maintains 20 to 30 operations and maintenance posts, but these are long-term, stable jobs and should go preferentially to local residents.

Community development investment is an important way for PV projects to create shared value. Projects can invest in community education, health care, and infrastructure to improve local wellbeing. Some projects adopt a community power model, offering discounted or free electricity to neighboring communities. Land rent and benefit sharing are other common arrangements; these should be agreed with communities early in the project and honored strictly during operation.

(5) Case example

Case example: Red Sea New City solar PV and storage project, Saudi Arabia

The Red Sea New City public infrastructure project is a flagship of Saudi Arabia's Vision 2030, designed to create the world's largest green, low-carbon, off-grid energy-storage community. It was built under an EPC contract by PowerChina (as contractor, not investor). Its core distinction is the world's largest 1.3 GWh off-grid battery storage system, paired with a large-scale PV plant, with the aim of supplying all project energy from renewables and setting a new benchmark for sustainable tourism.

The central challenge was to build a purely renewable energy system that operates stably and reliably in extreme desert conditions with complete independence from the national grid. This placed demanding requirements on energy supply, storage efficiency, and environmental adaptability.

In environmental and energy management, the project team planned and designed with precision. The paired PV plant and 1.3 GWh battery storage system smooth the intermittency of solar generation and guarantee continuous day-and-night supply, drawing on China's mature storage and smart microgrid technologies.

In supply chain and social responsibility, the project delivered on its localization commitments. Construction created substantial local employment, and systematic skills training developed a new generation of Saudi green energy workers. The project applied international environmental and social standards strictly, taking measures for desert ecological protection and water recycling to reduce impacts on a fragile ecosystem.

The project shows that Chinese enterprises can integrate advanced technology under EPC contracting to deliver large green infrastructure projects, offering a replicable green solution for BRI partner countries.

2. Industry guidance for overseas investment in wind power projects

Global wind capacity has grown continuously in recent years. Compared with PV projects, wind projects are harder to manage on noise, visual impact, and decommissioning, and their requirements for biodiversity, community relations, and decommissioning are more specific. Following the same analytical framework as the PV section, this section describes the industry-specific guidance for overseas wind investment across five dimensions.

(1) Industry-specific environmental disclosure requirements and standards

The core of environmental disclosure for wind projects lies in their occupation of space: not only land or sea area, but also the sky and the acoustic environment. Their environmental issues therefore concentrate on biodiversity, noise, and visual impact. Table 5–5 summarizes six characteristic environmental topics and their disclosure requirements.

Table 5–5 Characteristic environmental disclosure requirements of wind projects

Environmental topic	Disclosure content	Standard requirements	Disclosure stage
Biodiversity impacts	- Bird and bat collision risk assessment - Impacts on marine mammals and seabirds (offshore) - Assessment of habitat loss and fragmentation	- IFC Performance Standard 6: biodiversity protection - World Bank ESS6: biodiversity - Avian-Wind joint guidance	ESIA at appraisal stage Monitoring reports during operation
Noise and shadow flicker	- Noise contour mapping and receptor impact assessment - Prediction of shadow flicker zones and duration - Low-frequency noise and health effects	- IFC EHS Guidelines for Wind Energy - WHO environmental noise guidelines - National noise emission standards	ESIA at appraisal stage Monitoring and grievance handling during operation
Visual and landscape impacts	- Assessment of the scope and severity of visual impacts - Effects on natural landscapes and heritage sites - Effects of night-time aviation warning lights	- IFC EHS Guidelines for Wind Energy - Local landscape protection regulations	ESIA at appraisal stage Design stage

Table 5–5 Characteristic environmental disclosure requirements of wind projects (cont'd)

Environmental topic	Disclosure content	Standard requirements	Disclosure stage
Marine ecology and fisheries (offshore wind)	- Impacts of seabed construction on benthic organisms - Effects of underwater noise on marine mammals - Effects on fishing grounds and shipping	- IFC EHS Guidelines for Wind Energy - UN Convention on the Law of the Sea (UNCLOS) - National marine spatial planning and fisheries regulations	Marine EIA at appraisal stage Monitoring during construction and operation
Decommissioning and blade recycling	- Whole-of-life decommissioning plan - Blade recycling scheme and technology route - Land or seabed restoration plan	- EU Waste Framework Directive - US state decommissioning bond requirements - Industry initiatives (WindEurope and others)	Commitments at appraisal stage Detailed plan five years before decommissioning
Greenhouse gas abatement benefits	- Whole-of-life carbon footprint of the project - Annual accounting of emission reductions - Comparison against fossil fuel baselines	- GCF climate benefits methodology - UNFCCC Clean Development Mechanism (CDM) methodologies	Appraisal stage Annual reporting during operation
Health and safety	- Control of electromagnetic field (EMF) exposure for workers and the public	- IFC EHS Guidelines for Transmission and Distribution - ICNIRP guidelines on EMF exposure limits	Appraisal stage Monitoring and grievance handling during operation

Biodiversity is the most contested environmental issue in wind project management. For onshore wind, the main risk is collision mortality of birds and bats. During appraisal, the developer must conduct at least one year of ecological baseline surveys to establish the species, abundance, and activity patterns of birds (especially raptors and migratory species) and bats in the area, and use the results to fine-tune turbine siting. Offshore wind is more complex: pile-driving noise during construction can disturb or even injure the sonar systems of whales and dolphins, and turbine foundations during operation can create artificial reef effects that alter local marine ecosystems.

Decommissioning, and blade recycling in particular, remains an unsolved problem for the wind industry. PV module recycling has developed a relatively mature industrial chain, but wind blades are made of composite materials such as fiberglass, carbon fiber, and resin, whose stable physical and chemical properties make them extremely hard to recycle. Industry estimates suggest that roughly 90 percent of retired blades worldwide are still landfilled. Although chemical decomposition, pyrolysis, and other

recycling technologies have emerged, they remain costly and far from large-scale commercialization. International financial institutions and host governments therefore increasingly require developers to present credible decommissioning plans and financial security at the start of a project.

(2) Industry-specific initiatives, standards, and conventions

The risk profile of the wind industry has produced a set of highly specialized standards and initiatives, particularly in safety and quality. Table 5–6 summarizes seven key industry-specific standards.

Table 5–6 Industry-specific standards and initiatives for wind power

Standard / initiative	Initiator	Core content	Scope of application	Binding force
IFC EHS Guidelines for Wind Energy	International Finance Corporation	- Cover biodiversity, noise, visual impacts, community health and safety, and more - Distinguish onshore and offshore requirements	Projects financed by IFC and other IFIs	Mandatory (condition of financing)
Global Wind Energy Council (GWEC)	Industry association	- Publishes global wind reports, policy initiatives, and best practice - Promotes global wind market development	Global wind industry	Voluntary (industry authority)
Global Wind Organisation (GWO)	Turbine manufacturers and owners	- Sets safety training standards for wind industry personnel (work at height, sea survival, and so on)	Global wind industry	Quasi-mandatory (widely adopted by leading companies)
APQP4Wind	Industry association	- Supply chain quality management standard for the wind industry - Aims to reduce risk and optimize cost	Global wind supply chain	Voluntary (supply chain quality requirement)
IEC 61400 series	International Electrotechnical Commission	- Technical standards for the design, testing, and certification of wind turbines	Global turbine manufacturing and certification	Quasi-mandatory (market access requirement for equipment)
Avian-Wind joint guidance	American Bird Conservancy and others	- Best practice for bird risk assessment and mitigation	United States (widely drawn on internationally)	Voluntary (industry best practice)
Helsinki and OSPAR Conventions	Regional maritime organizations	- Protect the marine environment of the Baltic Sea and the Northeast Atlantic - Impose requirements on offshore wind development	European regional offshore wind projects	Mandatory (regional international law)

Wind power is a classic high-risk working environment, particularly for operations and maintenance personnel, involving work at height, electrical operations, and marine transport. The Global Wind Organisation (GWO) emerged in response: founded by leading manufacturers and developers such as Vestas, Siemens Gamesa, and Orsted, it establishes globally consistent standards for safety training and emergency procedures. GWO certification has become an international passport for wind industry personnel, especially O&M staff, and an important way for developers to demonstrate safety management capability to financial institutions and insurers.

Where the PV industry's SSI standard focuses on human rights in the supply chain, the wind industry's specific standards concentrate on operational safety (GWO) and product quality (APQP4Wind, IEC 61400). This reflects a fundamental difference in where the two industries carry their risks: PV's risks lie mostly in the environmental and social footprint of manufacturing, while wind's lie mostly in construction and operation at the project site.

For Chinese wind companies planning to go global, meeting the IEC technical standards for turbines is not enough: they must also build safety management systems that meet GWO requirements and impose APQP4Wind quality requirements on supply chain partners. This is necessary not only to satisfy financing and insurance conditions but also as the foundation of a reliable reputation in international markets.

In 2026, China upgraded its wind power standards in quick succession. The State Administration for Market Regulation issued four new national standards, among which GB/T 47555-2026 (General technical specifications for the green dismantling of wind turbine systems) provides the first national standard for decommissioning management. The National Energy Administration issued four industry standards for offshore wind engineering design (covering turbine foundation design and offshore substations, among others) and issued the Action Plan for Power Production Safety in the 15th Five-Year Period, placing offshore wind under a key safety control program. These standards echo this practical reference's approach to decommissioning management, marine ecological protection, and whole-of-life safety, and serve as domestic technical reference points.

(3) Life cycle environmental disclosure requirements

The environmental impacts of wind projects vary dynamically across the life cycle: ecological avoidance dominates siting, construction impacts are concentrated but short-lived, operational impacts persist over the long term, and exit centers on dismantling and site restoration. Table 5–7 summarizes the characteristic disclosure content for each stage.

Table 5–7 Life cycle environmental disclosure for wind projects

Project stage	Characteristic disclosure content	Disclosure focus	Reference standards
Planning and siting	- At least 12 months of bird and bat baseline surveys - Overlay analysis of wind resources with noise and visual impacts - Coordination with military, civil aviation, and radar authorities	- Avoid migratory bird corridors, raptor foraging areas, and bat breeding sites - Maintain an adequate community safety distance (typically over 500 meters)	- IFC Performance Standard 6 - Avian-Wind joint guidance - National aviation and military regulations
Design	- Turbine layout optimization (micro-siting) - Noise reduction design and noise-reduction-on-demand operating modes - Bird- and bat-friendly design (painted blades, acoustic deterrents, and so on)	- Leave safe flight corridors for birds between turbines - Commit to curtailment or shutdown during specific periods (night, migration seasons)	- IFC EHS Guidelines for Wind Energy - Industry best practice
Procurement	- Environmental considerations in turbine specifications (noise levels, materials) - Recyclability declarations for blades and other key components - Supplier quality and safety management certification (ISO, GWO)	- Select low-noise turbines meeting IEC standards - Prefer blades made of readily recyclable materials such as thermoplastic resins	- IEC 61400 - APQP4Wind
Construction	- Onshore: haul route planning for large equipment; vegetation clearance and restoration - Offshore: pile-driving noise monitoring and mitigation (bubble curtains); vessel pollution prevention	- Minimize disruption to traffic and communities - Suspend piling when marine mammals approach	- IFC EHS Guidelines for Wind Energy - World Bank ESS3
Operation	- Monitoring of bird and bat collision mortality - Handling of community noise and shadow flicker complaints - Blade erosion and maintenance - Offshore: seabed scour monitoring; coordination with fishing activity	- Establish adaptive management (for example, shutdown on demand) - Establish and effectively operate a community grievance mechanism	- IFC Performance Standards 6 and 1
Exit	- On-site blade cutting and transport plan - Composite recycling technology route and partners - Decommissioning cost estimates and financial security (bonds, insurance)	- Ensure the decommissioning plan is technically feasible and economically sound - Demonstrate to regulators and financiers that funding is secured	- EU Waste Framework Directive - Local regulations

Ecological baseline surveys at the planning and siting stage decide whether wind project environmental management succeeds. Where PV siting centers on land use type, wind siting centers on avoidance, both of ecologically sensitive areas and of communities. Bird and bat surveys lasting a year or more are designed to build a complete understanding of the ecosystem in and around the project area, and their conclusions are the fundamental basis for deciding whether the project can proceed and how it should be laid out. Any oversight or data gap at this stage can leave the project deadlocked in later approval or financing.

Adaptive Management during operation is the feature that most distinguishes wind projects from other energy projects. Because ecological phenomena such as bird movements are complex and uncertain, pre-construction assessment cannot fully predict all impacts. Projects therefore need a continuous cycle of monitoring, evaluation, and response. When radar or observer monitoring detects large flocks of migratory birds approaching, for example, some or all turbines can be shut down temporarily, known as shutdown on demand. This flexibility demands high professional capability and managerial commitment from the developer.

Blade disposal at exit also affects the credibility of the industry as a whole. A typical 100 MW wind farm leaves behind over a thousand tonnes of blade waste at decommissioning. If that waste ends up in landfills, the green credentials of wind power suffer. Developers must therefore do more than promise recycling in the environmental assessment: they must specify how recycling will happen, which technology will be used, which recycling partner is engaged, and how it will be funded. What was once a distant commitment is becoming a near-term hard requirement for project financing and permitting.

(4) Life cycle social management requirements

The social risks of wind projects stem mainly from their continuous effect on residents' senses: turbines are visually massive and generate constant noise. Community acceptance is therefore a harder and more widespread challenge than land acquisition. Table 5–8 summarizes the characteristic social management content for each stage.

Table 5–8 Life cycle social management for wind projects

Project stage	Characteristic disclosure content	Management focus	Reference standards
Planning and siting	- Early communication on community noise and visual impacts - Assessment of effects on local tourism and property values - Identifying and engaging anti-wind organizations or individuals	- Communicate potential negative impacts transparently and candidly - Understand community attachments to landscape and quiet	- IFC Performance Standard 1 - World Bank ESS10
Design	- Turbine layout optimization with community participation - Fair benefit-sharing mechanisms (land rent, community funds) - Targeted protection for vulnerable groups (for example, low-income households near turbines)	- Incorporate community views into design - Ensure benefit-sharing is transparent, fair, and sustainable	- IFC Performance Standard 1 - World Bank ESS10
Procurement	- Supply chain labor rights due diligence (lower risk than PV) - Commitments on local procurement and employment	- Review labor policies of major equipment suppliers - Specify localization requirements in contracts	- IFC Performance Standard 2 - World Bank ESS2
Construction	- Local hiring and training (especially skilled posts) - Management of heavy-haul traffic impacts on communities - Code of conduct for construction personnel; separation from communities	- Maximize local employment and provide skills training - Consult communities on haul times and routes	- IFC Performance Standards 2 and 4
Operation	- Effective operation of the community grievance mechanism (noise and flicker complaints) - Delivery of community development and benefit-sharing commitments - Localization of O&M posts - Offshore: continuing communication with and compensation to fishing communities	- Respond to and resolve community complaints quickly and fairly - Ensure communities genuinely feel the project's benefits	- IFC Performance Standards 1 and 2
Exit	- Management of decommissioning impacts on local employment - Consultation on future land or sea area use - Community information disclosure at exit	- Plan staff redeployment or re-employment early - Decide the final land restoration objective with the community	- IFC Performance Standards 2 and 5

Unlike the concentrated, localized disputes that PV land acquisition creates with a small number of landholders, the noise and visual effects of wind projects are diffuse and can affect every resident within several kilometers. Experience shows that community opposition to wind projects is often driven less by economics than by the fear that quality of life (quiet, views) will be permanently altered. Early, candid communication is therefore essential. Rather than avoiding the negative impacts, developers should use visual simulations and credible noise predictions to help communities form realistic expectations, and only then discuss mitigation and compensation.

An effective community grievance mechanism is the highest priority of social management during operation. When residents complain about excessive night-time noise or shadow flicker causing dizziness, the developer must have standardized procedures to receive, investigate, respond to, and resolve the problem. This may include on-site noise monitoring, adjusting turbine operating modes, or providing soundproof windows or blackout curtains to the worst-affected residents. A grievance that is ignored or mishandled can easily escalate into major community confrontation.

Benefit-sharing is an effective way to defuse community tensions and build a community of shared interests. Beyond land rents paid to direct landholders, a growing number of projects establish community development funds that channel part of annual generation revenue into local education, health care, or infrastructure, so that the wider community benefits from the project. The key is that community representatives participate substantively in decisions on how the fund is managed and spent, to ensure fairness and transparency.

By comparison, labor risks in the wind supply chain, though real, are far less sensitive than in the PV industry. Turbine manufacturing does not involve the region-specific human rights controversies of polysilicon production, and supply chain management focuses on occupational health and safety and conventional labor rights protection.

(5) Case example

Case example: Palmeira 648 MW onshore wind project, Brazil

The Palmeira onshore wind project is the largest greenfield wind investment China Three Gorges Corporation has built overseas. Located in the state of Paraiba in northeastern Brazil, it has an installed capacity of 648 MW and generates enough power annually to supply roughly 1.5 million households, providing a reference in environmental and social management for large renewable energy investment by Chinese enterprises in Latin America.

The central challenges were biodiversity protection and community relations. The site lies within the Caatinga, a distinctive dry forest ecosystem of northeastern Brazil rich in endemic species and long used as traditional grazing land by local herders.

For biodiversity, the project team spent two years on ecological baseline surveys during planning, precisely mapping the movements of more than 150 bird species and multiple bat species. On that basis, turbine layouts were optimized dozens of times, avoiding major bird flight corridors and bat foraging areas, with a commitment to shutdown on demand for specific turbines during migration peaks. The project also set up a dedicated fund to protect Caatinga vegetation in the surrounding area.

On community relations, the project did not rely on a single acquire-and-compensate approach. Instead, it negotiated a wind-plus-grazing arrangement with local herder communities: only turbine foundations and construction roads are fenced, and more than 95 percent of the project area remains open for grazing. The project also built dams, clinics, and schools for local communities and channels part of its generation revenue into a community development fund. Construction created more than 2,000 jobs, with systematic skills training for local workers.

Palmeira's approach is to move environmental and social management forward into the planning stage and reduce ecological and community friction through continuous consultation and adjustment. For Chinese enterprises investing overseas, following internationally accepted practice helps both to secure financing and to sustain long-term operations.

3. Industry guidance for overseas investment in highway construction projects

Unlike PV or wind projects, which concentrate construction at a specific site, highways are linear and cross multiple ecosystems and communities. Their environmental impacts are intrusive and diffuse, and their social impacts extend to land acquisition, resettlement, and community severance. Following the same framework as before, this section describes the industry characteristics of highway construction in environmental and social management, as a reference for Chinese enterprises investing overseas.

(1) Industry-specific environmental disclosure requirements and standards

The environmental impacts of highway projects are intrusive and diffuse, and the core of their disclosure requirements is managing the systemic effects of a linear intrusion across the landscape. Table 5–9 summarizes six characteristic environmental topics and their disclosure requirements.

Table 5–9 Characteristic environmental disclosure requirements of highway projects

Environmental topic	Disclosure content	Standard requirements	Disclosure stage
Severance of ecological corridors and biodiversity	- Habitat fragmentation effects - Blocking of wildlife movement routes - Design and effectiveness evaluation of wildlife crossings	- IFC Performance Standard 6: biodiversity protection - World Bank ESS6: biodiversity - Regional ecological protection regulations	ESIA at appraisal stage Design stage Monitoring during operation
Hydrological change and water pollution	- Changes in surface runoff patterns - Construction-phase sediment and operational-phase road runoff pollution - Effects of river crossings on aquatic ecology	- IFC EHS Guidelines for Toll Roads - World Bank ESS3: resource efficiency and pollution prevention - National water pollution regulations	ESIA at appraisal stage Monitoring during construction and operation
Soil erosion and geological hazards	- Slope stability of high fills and deep cuts - Siting of spoil disposal areas and soil and water conservation measures - Risk of inducing or aggravating landslides and debris flows	- IFC EHS Guidelines for Toll Roads - World Bank ESS4: community health and safety - National soil conservation and geological hazard regulations	ESIA at appraisal stage Design and construction stages
Noise, vibration, and air quality	- Noise prediction for construction and operation - Effects on residents, schools, and hospitals along the alignment - Construction dust and vehicle exhaust	- IFC EHS Guidelines for Toll Roads - WHO environmental noise guidelines - National air quality and noise standards	ESIA at appraisal stage Monitoring during construction and operation
Land take and soil impacts	- Permanent and temporary land occupation - Conversion of high-quality farmland - Soil compaction and contamination at borrow pits and spoil areas	- IFC Performance Standard 5: land acquisition and involuntary resettlement - World Bank ESS5: land acquisition, restrictions on land use, and involuntary resettlement	ESIA at appraisal stage Management during construction
Climate change adaptation	- Risk assessment of extreme weather events (rainstorms, floods) for highway infrastructure - Climate-resilient design (reinforced drainage, and so on)	- World Bank climate and disaster risk screening tools - Industry climate-resilient design guides	Appraisal stage Design stage

Severance of ecological corridors is the most distinctive environmental challenge of highway projects.

A new highway cuts formerly contiguous forest, grassland, or wetland into two or more isolated ecological islands, impeding wildlife movement, foraging, and gene flow. This habitat fragmentation effect is a leading cause of regional biodiversity decline. IFC Performance Standard 6 and World Bank ESS6 therefore both require projects to identify key wildlife movement corridors at the planning stage and maintain ecological connectivity through dedicated wildlife crossings such as large culverts, underpasses, and overpasses. This is not merely a technical matter but a deep ecological question, requiring interdisciplinary research and long-term monitoring to verify effectiveness.

Soil erosion and geological hazards are inherent risks of highway construction, especially in mountainous terrain. Large-scale cutting and filling create many unstable artificial slopes that rainfall can quickly erode, and that can trigger landslides and debris flows threatening the highway itself and downstream communities. The siting of spoil disposal areas, slope protection and greening, and drainage design are therefore top priorities in both the environmental and social impact assessment and engineering design, and must strictly follow the IFC EHS Guidelines and host country technical codes.

(2) Industry-specific initiatives, standards, and conventions

Highway construction is an old and mature engineering field with a complete international standards system, focused on embedding environmental and social considerations in conventional engineering codes. Table 5–10 summarizes eight key industry-specific standards and guides.

Table 5–10 Industry-specific standards and initiatives for highways

Standard / initiative	Publisher	Core content	Scope of application	Binding force
IFC EHS Guidelines for Toll Roads	International Finance Corporation	Environmental, health, and safety management rules for large highway projects	Projects financed by IFC and other IFIs	Mandatory (condition of financing)
World Bank Environmental and Social Framework (ESF)	World Bank	Ten environmental and social standards covering all risk categories	World Bank-financed projects	Mandatory (condition of financing)
ADB Safeguard Policy Statement (SPS	Asian Development Bank	Three safeguard policies: environment, involuntary resettlement, and Indigenous Peoples	ADB-financed projects	Mandatory (condition of financing)
PIARC (World Road Association))	International industry association	Technical reports and best practice on highway design, construction, and operation	Global highway industry	Voluntary (authoritative technical reference)

Table 5–10 Industry-specific standards and initiatives for highways (cont'd)

Standard / initiative	Publisher	Core content	Scope of application	Binding force
Roads and the Environment Handbook	World Bank	Compilation of good practice in highway environmental management	Global highway industry	Voluntary (good practice guide)
AASHTO Green Highways standard	American Association of State Highway and Transportation Officials	Rating system for sustainable highway design, construction, and maintenance	United States (widely drawn on internationally)	Voluntary (sustainability certification)
China's Code for Environmental Impact Assessment of Highway Construction Projects	Ministry of Transport of China	Technical requirements for the EIA of Chinese highway projects	Domestic Chinese projects (available for reference overseas)	Mandatory (in China)
China's Guidelines for Ecological and Environmental Protection in Foreign Investment and Cooperation Construction Projects	Ministry of Ecology and Environment and Ministry of Commerce of China	Environmental management guidance for overseas construction projects	Chinese overseas projects	Voluntary (good practice guide)

The IFC Environmental, Health, and Safety Guidelines for Toll Roads (2007) are among the most frequently cited technical documents in international project finance. They specify performance indicators and management measures for highways across the environment (noise, water, waste, and so on), occupational health and safety (construction safety, traffic safety), and community health and safety (public traffic safety, emergency response). They explicitly require, for example, noise prediction at noise-sensitive receptors such as residential areas and schools, with mitigation measures such as noise barriers designed on the basis of the predictions.

Unlike energy projects, the environmental and social management of highways is embedded deeply in the details of engineering design and construction management. Wildlife crossing design must combine animal behavior with road engineering; road runoff treatment must combine hydrology with materials science. Environmental and social specialists on the project team must therefore work extremely closely with road, bridge, and hydrogeological engineers. This requires an environmental and social management system that is not a bolt-on, but an integrated system capable of efficient cross-departmental, cross-disciplinary coordination.

In addition, for Chinese enterprises it is equally valuable to know and draw on China's own standards, such as the Code for Environmental Impact Assessment of Highway Construction Projects (JTG B03-2006). These standards distill decades of experience and lessons from China's large-scale infrastructure program and offer strong practical guidance on soil and water conservation and high-slope treatment, serving as a useful complement to international standards.

(3) Life cycle environmental disclosure requirements

The environmental impacts of highway projects are distributed very unevenly across stages: impacts during construction are severe and concentrated, while operational impacts are long-term and far-reaching. The key to management is thorough avoidance up front, strict control in the middle, and continuing monitoring afterward. Table 5–11 summarizes the characteristic disclosure content for each stage.

Table 5–11 Life cycle environmental disclosure for highway projects

Project stage	Characteristic disclosure content	Disclosure focus	Reference standards
Planning and siting	- Route alternative comparison (including the zero option) - Overlay mapping of ecological and social sensitivity - Avoidance of major environmental constraints	- Treat environmental and social costs as core decision criteria for route selection - Avoid protected areas, water sources, cultural heritage, and densely populated areas to the maximum extent	- IFC Performance Standard 1 - World Bank ESS1 - ADB SPS
Design	- Environmental engineering design: wildlife crossings, ecological slope protection, noise barriers - Restoration design for each borrow pit and spoil disposal area - Design of road runoff collection and treatment systems	- Translate mitigation measures into construction drawings and bills of quantities - Ensure environmental investment has an explicit budget line	- IFC EHS Guidelines for Toll Roads - National engineering design codes

Table 5–11 Life cycle environmental disclosure for highway projects (cont'd)

Project stage	Characteristic disclosure content	Disclosure focus	Reference standards
Procurement	- Review of contractors' environmental and social management capacity and track record - Incorporation of environmental and social requirements into construction contracts - Environmental standards for bulk materials such as asphalt and cement	- Ensure the builder has the capability and resources to implement the environmental management plan - Assign liability for breach through contracts	- IFC Performance Standard 1 - World Bank ESS1
Construction	- Implementation of the construction environmental management plan (CEMP) - On-site management of borrow and spoil areas, construction camps, and asphalt plants - Simultaneous implementation of soil and water conservation measures - Construction monitoring (noise, dust, water quality)	- Build a strong on-site environmental supervision team - Ensure soil and water conservation facilities are designed, built, and commissioned together with the main works (the 'three simultaneities' requirement)	- IFC EHS Guidelines for Toll Roads - World Bank ESS4
Operation	- Operational monitoring (traffic noise, road runoff) - Monitoring and evaluation of wildlife crossing use - Maintenance of environmental facilities (noise barriers, wastewater treatment)	- Verify the accuracy of EIA predictions and take remedial action as needed - Ensure environmental facilities remain effective over the long term	- IFC EHS Guidelines for Toll Roads - IFC Performance Standard 6
Decommissioning / reconstruction	- Recycling of waste pavement materials - Land restoration and ecological rebuilding on abandoned sections - Reassessment of environmental and social impacts for reconstruction and expansion	- Promote circular techniques such as in-place hot recycling of asphalt pavement - Repeat the full environmental and social assessment process	- World Bank ESS1 - National circular economy regulations

Route alternative comparison is the core of highway environmental management and the step that decides success or failure. At this stage the developer must systematically and publicly compare the environmental and social impacts of at least two or three potential route corridors, and weigh them against the long-term impacts of the zero option, that is, not building the road at all. Overlaying protected areas, geological hazard zones, population distribution, and land use types in a geographic information system (GIS) makes it possible to identify the green corridor with the fewest environmental and social constraints at a glance. A wise decision at the siting stage avoids spending large sums later on mitigating impacts that could have been avoided altogether.

Environmental management during construction is the most distinctive feature of highway projects. Construction stretches over long distances and scattered work sites, lasts years, and involves enormous earthworks. Managing hundreds or thousands of borrow pits, spoil areas, haul roads, and labor camps tests the contractor's on-site execution capacity. A strong site management system must be established, comprising the owner, the supervision engineer, and the contractor, overseen by an independent environmental monitoring body, to ensure that every detail of the construction environmental management plan is carried from paper into practice.

(4) Life cycle social management requirements

If a highway's environmental risks run in a line, its social risks form a web. Highways do not merely occupy land; they reshape the social fabric, economic activity, and daily life of communities along the alignment. Table 5–12 summarizes the characteristic social management content for each stage.

Table 5–12 Life cycle social management for highway projects

Project stage	Characteristic social management content	Management focus	Reference standards
Planning and siting	- Initial identification and screening of the scale of involuntary resettlement - Assessment of community severance effects - Social risk assessment	- Make reducing the number of resettled people a core criterion in route comparison - Identify potential flashpoints of social conflict early	- IFC Performance Standard 5 - World Bank ESS5
Design	- Preparation of the resettlement action plan (RAP) - Planning of community crossing facilities (footbridges, underpasses) - Special assistance measures for vulnerable groups	- Ensure compensation standards are fair and transparent and livelihood restoration measures are feasible - Consult communities fully on the location and number of crossing facilities	- IFC Performance Standard 5 - World Bank ESS5

Table 5–12 Life cycle social management for highway projects (cont'd)

Project stage	Characteristic social management content	Management focus	Reference standards
Procurement	- Assessment of contractors' community relations and labor management capacity - Specifying local employment and procurement requirements in contracts	- Select contractors experienced in handling complex community relations	- IFC Performance Standard 2 - World Bank ESS2
Construction	- Implementation and monitoring of resettlement - Establishment and operation of the construction-phase grievance mechanism - Local hiring and management - Construction traffic safety management and community outreach	- Ensure resettled people move out, settle in, and develop - Handle community complaints about noise, dust, and cracked houses promptly and fairly	- IFC Performance Standards 5 and 4
Operation	- Operational grievance mechanism - Ex-post evaluation and remediation of community severance - Road traffic safety management and public education - Prevention campaigns for HIV/AIDS and other diseases	- Track livelihood restoration among resettled people over the long term - Add crossing or safety facilities in response to community feedback	- IFC Performance Standards 1 and 4
Decommissioning / reconstruction	- A fresh round of land acquisition and resettlement triggered by reconstruction - Managing secondary disruption to communities along the alignment	- Restart the full social impact assessment and resettlement process	- IFC Performance Standard 5 - World Bank ESS5

Involuntary resettlement is among the most serious social risks of highway projects. A road several hundred kilometers long may require the acquisition of tens of thousands of mu of land, the relocation of thousands of households, and the disruption of livelihoods for tens of thousands of people. Under IFC and World Bank requirements, the developer must prepare and implement a detailed resettlement action plan whose core objective is that affected people's living standards and livelihood capacity are restored, and ideally improved, after the project. This goes far beyond a one-off cash payment: it is a systematic undertaking covering asset valuation, cash compensation, housing reconstruction, employment training, linkage with social protection, and long-term monitoring, demanding large financial and professional resources sustained over years.

Community severance is another profound social impact of highways. An expressway or urban expressway can split a community in two, cutting residents off from farmland, schools, and markets and rupturing existing social networks. If the design stage fails to account for community crossing needs and to place footbridges, underpasses, and service roads appropriately, persistent social tensions follow during operation, and residents may risk crossing the road on foot with tragic consequences. Thorough, patient communication with communities along the alignment at the design stage is therefore an essential part of social risk management.

(5) Case example

Case example: Peshawar-Karachi Motorway (PKM), Sukkur-Multan section, Pakistan

The Sukkur-Multan section of Pakistan's Peshawar-Karachi Motorway (PKM) is the largest transport infrastructure project under the China-Pakistan Economic Corridor, known locally as the China-Pakistan Friendship Highway. Built by China State Construction Engineering Corporation (CSCEC) under an EPC contract, it runs 392 kilometers with six lanes in both directions, a design speed of 120 km/h, and opened to traffic along its full length in 2019. Crossing Sindh and Punjab, Pakistan's most populous provinces, it was delivered successfully in a complex social environment and fragile ecology, offering valuable experience in the environmental and social management of large linear infrastructure.

The central challenges were large-scale land acquisition and resettlement and the management of community relations during construction. The project permanently acquired more than 12,000 hectares, affecting tens of thousands of people, while a 392-kilometer construction front interlaced with hundreds of villages placed heavy demands on the surrounding communities.

On resettlement and livelihood restoration, the project team supported the Pakistan National Highway Authority in strictly following the safeguard policies of the World Bank and the Asian Development Bank. First, using drone aerial photography and field surveying, every parcel of land, building, and fruit tree was registered precisely, keeping asset valuation open and transparent. Second, dispossessed farmers received land compensation well above market rates, and the project worked with local government to provide agricultural training, micro business loans, and other livelihood restoration support. New communities with complete facilities were built for displaced households.

On construction-phase community relations, the project pursued localization and cross-cultural communication. First, local employment was maximized: at peak, more than 28,000 Pakistani staff, over 95 percent of the workforce, received systematic safety and skills training that raised local skill levels. Second, a multi-tier grievance mechanism was established, with community liaison offices in every contract section staffed by Pakistani employees speaking Urdu and local dialects to receive, handle, and document villagers' complaints. Third, the project actively discharged its social responsibility, building footbridges, wells, and schools for villages along the alignment and joining flood rescue and relief efforts, winning wide recognition and trust.

On environmental protection, in response to desertification and soil erosion along the alignment, the project built Pakistan's first green corridor along both sides of the motorway, planting more than one million trees. The alignment includes 100 bridges, 468 grade-separated crossings, and 991 culverts, keeping irrigation systems unobstructed and allowing wildlife to pass.

The PKM project involved extensive land acquisition, resettlement, and community communication. For large infrastructure, technical and construction quality are the foundation, but community acceptance equally shapes continued operation. Through localized hiring, community communication, and benefit sharing, Chinese enterprises on the project reduced friction with communities along the route.

4. Industry guidance for overseas investment in mining projects

Mining is a foundational industry of the modern economy. Its activities typically involve large-scale land use and disturbance of ecosystems, and touch on water resources, community livelihoods, Indigenous Peoples' rights, and closure and post-closure liabilities. From exploration through construction, operation, and post-closure management, a mining project may span decades, and some environmental impacts and management responsibilities persist long after production ends. Compared with manufacturing and services, the environmental and social impacts of mining are wide in scope, long in chain, and distinctive in the weight of post-closure responsibility. This section therefore reviews the industry characteristics of mining as a reference for the environmental and social risk management of Chinese enterprises investing overseas.

(1) Industry-specific environmental disclosure requirements and standards

Environmental disclosure in mining should focus on long-lived impacts: landform change, pollution control, and post-closure liabilities. Table 5–13 summarizes seven characteristic environmental topics and their disclosure requirements. Tailings storage facility management and acid mine drainage are strongly industry-specific, though the actual level of risk depends on the mineral, the scale of facilities, location, engineering design, and management performance.

Table 5–13 Characteristic environmental disclosure requirements of mining projects

Environmental topic	Disclosure content	Standard requirements	Disclosure stage
Tailings storage facility management and dam failure risk	- Siting and design of tailings storage facilities (with comparison of alternatives) - Dam failure risk assessment and emergency response plans - Long-term stability monitoring and management	- Host country regulations and permit conditions for tailings facilities - IFC EHS Guidelines for Mining - Applicable national technical codes (ANCOLD, CDA, and so on)	Appraisal, design, construction, operation, closure, and post-closure
Acid mine drainage (AMD)	- Acid-generation potential assessment of ore and waste rock - AMD prediction, prevention, and treatment plans - Commitments to long-term post-closure water quality monitoring and treatment	- IFC EHS Guidelines for Mining - Global Acid Rock Drainage (GARD) Guide	Appraisal, design, operation, closure, and post-closure
Water consumption and pollution	- Site water balance calculation - Effects on regional surface water and groundwater - Treatment of wastewater (especially heavy metals and process chemicals)	- IFC EHS Guidelines for Mining - ICMM water management guidance	Appraisal, design, operation, and closure
Biodiversity and habitat loss	- Permanent impacts on ecosystems (especially critical habitats) - Biodiversity offset schemes - Post-closure ecological restoration plans	- IFC Performance Standard 6 - World Bank ESS6 - ICMM biodiversity management guidance	Appraisal, design, operation, and closure

Table 5–13 Characteristic environmental disclosure requirements of mining projects (cont'd)

Environmental topic	Disclosure content	Standard requirements	Disclosure stage
Closure, reclamation, and financial assurance	- Conceptual, preliminary, and detailed closure and reclamation plans - Post-closure land use planning - Closure cost estimates and financial assurance mechanisms (bonds, insurance)	- IFC Performance Standard 1 - IFC EHS Guidelines for Mining - ICMM closure guidance - Host country mining regulations	Appraisal, design, operation, and closure
Air quality and dust	- Dust emissions from blasting, extraction, haulage, and crushing - Health risks to communities from heavy-metal-bearing dust	- IFC EHS Guidelines for Mining - WHO air quality guidelines	Appraisal, construction, and operation
Greenhouse gas emissions	- Whole-of-life carbon accounting (especially Scopes 1 and 2) - Energy efficiency and renewable energy substitution options	- GHG Protocol - ICMM climate change position statements	Appraisal and operation

Tailings storage facility management is the risk with the gravest potential consequences in mining.

Tailings storage facilities are dedicated structures for storing processing tailings, which may contain heavy metals, residual reagents, and other contaminants. Structural instability or dam failure can cause severe loss of life and downstream environmental damage. The tailings disasters at Mariana (2015) and Brumadinho (2019) in Brazil, together with related incidents in other countries, demonstrate that elevated environmental and social risks can arise across the whole life of a tailings facility, from construction through operation to retirement. The casualties, ecological damage, and community losses these incidents caused further underline the importance of strengthening the safety, environmental, and social management of tailings facilities.

For overseas mining projects, tailings risk management should run through planning, design, construction, operation, closure, and subsequent maintenance, with whole-of-life mechanisms for risk identification, monitoring and early warning, emergency response, and information disclosure. During implementation, enterprises should, in accordance with host country laws and regulations, project environmental assessment and permit conditions, and applicable international good practice, strengthen the management of facility siting, engineering design, construction quality, operation and maintenance, and closure treatment, and clarify the responsibilities of the enterprise, contractors, and relevant specialist institutions.

Enterprises should also attend to the potential effects of tailings risk on neighboring communities, the surrounding ecology, and other stakeholders, and establish the necessary mechanisms for information communication and response to grievances, addressing reasonable concerns promptly. Where a major environmental, safety, or social incident occurs, incident reporting, risk response, and subsequent rectification should proceed in a timely manner in accordance with host country laws, permit conditions, and the stipulations of financing institutions, to limit the consequences for people, the environment, communities, and project operations.

The lessons of these incidents show that tailings risk management cannot focus solely on the engineered structure itself. Environmental, safety, community relations, and emergency management factors must be considered together, and whole-of-process, systematic risk management is what raises the safety and sustainable operation of overseas mining projects.

Acid mine drainage is a major long-term environmental risk of mining. When sulfide-bearing minerals are exposed to air and water, oxidation can produce acidic, metal-laden drainage; its formation and duration depend on mineralogy, climate, hydrology, and engineering controls. AMD management should prioritize prevention at the source and control during operation, with post-closure monitoring, treatment plans, and the corresponding funding security allocated on the basis of risk assessment.

(2) Industry-specific initiatives, standards, and conventions

The environmental and social risks of mining have produced a multi-tiered ESG standards system composed of host country regulation, financier requirements, industry initiatives, and corporate commitments. These standards differ in their subjects, points of application, and modes of constraint. Table 5–14 lists eight representative industry standards and initiatives.

Table 5–14 Industry-specific standards and initiatives for mining

Standard / initiative	Initiator	Core content	Scope of application	Binding force
Sustainable Mining Code (draft for comment)	China Chamber of Commerce of Metals, Minerals and Chemicals Importers and Exporters (CCCMC)	The draft proposes 24 core topics with auditable requirements, covering governance, social, and environmental issues	Intended for mineral exploration, mining, smelting, refining, and related processing	Voluntary industry code (draft for comment)
IRMA Standard for Responsible Mining	Multi-stakeholder initiative	Mine-site standard with independent third-party assessment, covering business integrity, social responsibility, environmental responsibility, and labor	Industrial-scale mines worldwide; specific minerals and activities subject to IRMA's current scope	Voluntary

Table 5–14 Industry-specific standards and initiatives for mining (cont'd)

Standard / initiative	Initiator	Core content	Scope of application	Binding force
ICMM Mining Principles	International Council on Mining and Metals	10 principles and 38 performance expectations focused on sustainable development	Large mining companies worldwide (mandatory for members)	Commitment requirement for members
Extractive Industries Transparency Initiative (EITI)	Multi-stakeholder initiative	Requires governments and companies to disclose mining revenues, contracts, and related information	More than 50 implementing countries worldwide	Per the laws, contracts, or EITI implementation arrangements of each implementing country
Responsible Minerals Initiative (RMI)	Responsible Business Alliance and others	The Responsible Minerals Assurance Process (RMAP) conducts third-party audits of management systems and responsible sourcing practices at key supply chain links	Smelters, refiners, and recycling facilities; supports downstream supply chain due diligence	Voluntary; may become a customer procurement condition
Voluntary Principles on Security and Human Rights (VPs)	Governments, companies, NGOs	Principles and practices for respecting human rights in security operations	Global extractive industry	Voluntary
International Cyanide Management Code	Multi-stakeholder initiative	Safe production, transport, use, and disposal of cyanide in gold mining	Gold mines worldwide using cyanide	Voluntary
World Gold Council Responsible Gold Mining Principles	World Gold Council	ESG principles framework for gold mining	Global gold mining industry	Commitment requirement for members

The Initiative for Responsible Mining Assurance (IRMA) is jointly governed by mining companies, mineral purchasers, NGOs, communities, and labor, and provides a mine-site standard with independent third-party assessment. Its content covers business integrity, social responsibility, environmental responsibility, and labor, with an emphasis on publishing assessment results. IRMA assessments can

inform downstream companies seeking to identify mine-level environmental and social performance, but their scope of application, assessment grades, and customer procurement requirements should each be verified separately and cannot be generalized into a universal supply chain entry qualification.

Members of the International Council on Mining and Metals (ICMM) must establish management systems, undergo performance verification, and report publicly in line with the Mining Principles and related member commitments. ICMM membership reflects a company's acceptance of governance and disclosure commitments, but it is not a substitute for assessing the environmental and social performance of specific projects.

The Extractive Industries Transparency Initiative (EITI) is a transparency mechanism implemented jointly by governments, companies, and civil society, requiring implementing countries to disclose extractive industry revenues, contracts, and related information according to the EITI Standard. A company's specific disclosure obligations depend on host country law, contracts, and local EITI implementation arrangements, and cannot be described as a universal statutory obligation for all companies.

In March 2026, CCCMC released the Sustainable Mining Code for public comment. The draft covers governance, social, and environmental dimensions and provides self-assessment and third-party assessment frameworks for mineral exploration, mining, smelting, refining, and related processing. Since the text is still at the comment stage, enterprises should verify the final published version, its scope of application, and transitional arrangements before use.

In 2026, China issued a series of new mining regulations. State Council Decree No. 839, the Implementing Regulations of the Mineral Resources Law, took effect on June 15, refining the systems for granting mining rights, ecological restoration of mining areas, and closure liabilities. The Ministry of Natural Resources issued the Notice on Improving the Administration of Construction Projects That Overlie Mineral Resources (NFG [2026] No. 2), standardizing approval for projects overlying strategic minerals. The Supreme People's Court issued the Interpretation on Several Issues Concerning the Application of Law in the Trial of Mineral Resources Dispute Cases (Fa Shi [2026] No. 2), clarifying adjudication rules for boundary-crossing extraction, compensation for overlying mineral deposits, and ecological restoration. These instruments provide a domestic institutional reference for whole-of-life environmental responsibility management in overseas mining projects.

(3) Life cycle environmental disclosure requirements

Mining projects run long cycles, and environmental risks, information needs, and responsible parties differ by stage. The management priorities are thorough assessment up front, continuing control through construction and operation, and sustained discharge of responsibilities after closure in proportion to risk. Table 5–15 summarizes the characteristic disclosure content for each stage.

Table 5–15 Life cycle environmental disclosure for mining projects

Project stage	Characteristic disclosure content	Disclosure focus	Reference standards
Exploration	- Environmental and social baseline surveys covering key seasons - Initial community contact and information disclosure - Environmental management of exploration activities (roads, drilling, camps)	- Establish comprehensive, credible baseline data as the foundation for future assessment - Manage community expectations and avoid over-promising	- IFC Performance Standard 1 - ICMM good practice guidance
Development and construction	- Full ESIA report - Design of tailings facilities, waste rock dumps, and AMD treatment - Conceptual closure and reclamation plans - Obtaining environmental permits	- The ESIA must be prepared by an independent, qualified third party - Facility designs must account for long-term and extreme conditions	- IFC EHS Guidelines for Mining - GARD Guide
Operation	- Annual environmental and social monitoring reports - Routine monitoring and annual review of tailings facilities - Water balance and water efficiency reporting - Biodiversity monitoring and implementation of offset measures	- Publish monitoring data openly and transparently - Establish an independent tailings review board (ITRB)	- Host country tailings regulations and permit conditions - ICMM Mining Principles
Closure	- Detailed closure and reclamation plans (typically completed five years before closure) - Stakeholder consultation on final land use - Post-closure social transition plans (staff re-employment, community economy)	- Ensure closure plans are technically feasible and fully funded - Achieve a just transition from a mining economy to a sustainable economy	- ICMM closure guidance - IFC Performance Standards 2 and 5
Post-closure	- Post-closure monitoring in line with regulations, risk, and permit requirements - Continuing maintenance of tailings and AMD treatment facilities - Monitoring of ecological restoration in reclaimed areas - Verification of financial assurance effectiveness	- Ensure a dedicated team and sufficient funding for long-term responsibilities - Report monitoring results to regulators and the public regularly	- Host country closure and tailings regulations - GARD Guide

Closure and post-closure management are central to environmental responsibility in mining. Tailings facilities, waste rock dumps, and open pits can continue to pose stability and water quality risks after production stops. Enterprises should therefore roll closure and reclamation plans forward from the earliest project stages, update cost estimates in line with facility risk, regulatory requirements, and the intended land use, and put executable financial assurance in place. Closure objectives should be determined through stakeholder consultation and typically include facility safety, pollution control, ecological restoration, and community transition; specific land uses must be determined in light of baseline conditions, technical feasibility, and host country approval.

Exploration usually involves modest investment, but opening roads, drilling, sampling, temporary camps, and the arrival of personnel can still affect land use, the environment, and community relations. Before entering a site, enterprises should identify rights holders and affected groups, disclose the scope, duration, potential impacts, and exit arrangements of exploration, establish grievance channels, and conduct consultation in accordance with host country law and applicable financier standards. Early commitments should match the project's authority and capacity to deliver, avoiding later conflict risk caused by opacity or over-promising.

(4) Life cycle social management requirements

The social risks of mining arise from its exclusive claim on land and resources, and from the deep conflicts with local communities, Indigenous Peoples above all, over economics, culture, and rights that follow from it. Table 5–16 summarizes the characteristic social management content for each stage.

Table 5–16 Life cycle social management for mining projects

Project stage	Characteristic social management content	Management focus	Reference standards
Exploration	- Stakeholder identification and analysis - Initial identification of and contact with Indigenous communities - Establishment of an early grievance mechanism	- Use interviews, participatory surveys, and public sources to identify affected groups, power relations, vulnerable populations, and potential conflict points, and maintain an updatable stakeholder map - Where exploration triggers the applicable conditions of host country law or IFC Performance Standard 7, obtain FPIC through good faith negotiation; otherwise conduct meaningful consultation	- IFC Performance Standards 1 and 7 - ICMM community development toolkit

Table 5–16 Life cycle social management for mining projects (cont'd)

Project stage	Characteristic social management content	Management focus	Reference standards
Development and construction	- Full social impact assessment (SIA) - FPIC process with Indigenous Peoples - Resettlement action plan (RAP) - Local development plans (employment, procurement)	- FPIC is an ongoing process of consultation and decision-making, requiring full information, adequate time, and appropriate support - The RAP should aim at livelihood restoration and improved living standards, not one-off compensation in place of sustained measures	- IFC Performance Standards 5 and 7 - World Bank ESS5 and ESS7
Operation	- Implementation and management of community development agreements (CDAs) - Effective operation of the community grievance mechanism - Management of local employees and contractors - Coexistence with artisanal and small-scale mining (ASM)	- Publish the community development fund charter, funding sources, uses, and audit results; establish decision-making that includes community representatives with conflict-of-interest recusal - Establish a grievance mechanism that is anonymous, free of retaliation, tiered, time-bound, and reviewable, with outcomes disclosed regularly - Identify the legal status and risks of ASM; where lawful and risk-controlled, negotiate registration and licensing, safety and environmental training, traceable purchasing, or alternative livelihoods; unlawful activity must be handled under the law, never through violent eviction	- IFC Performance Standards 1 and 2 - Host country ASM regulation - Sustainable Mining Code (draft)
Closure	- Planning of post-closure social transition - Staff severance, redeployment, and re-employment training - Support for alternative community industries - Just transition	- Assess closure impacts on employment, local revenue, and public services, and phase mitigation measures - Determine the regional transition plan, responsible parties, and funding sources with government, community, and worker representatives	- ICMM closure guidance - IFC Performance Standard 2
Post-closure	- Long-term fulfillment of historical commitments to communities - Final handover of residual land	- Complete land handover in line with the closure plan, handover agreements, and regulatory requirements, and continue to discharge outstanding environmental and social obligations	- IFC Performance Standard 1

Free, prior, and informed consent is an important mechanism for managing risks involving Indigenous Peoples, but it does not apply unconditionally to all mining activity. Under IFC Performance Standard 7, FPIC must be obtained through good faith negotiation where the project is expected to adversely affect land or natural resources subject to traditional ownership or customary use, involve the relocation of Indigenous Peoples from such land, significantly impact critical cultural heritage, or make commercial use of their cultural heritage. Enterprises should document the consultation process and the evidence of agreements as mutually recognized; FPIC does not automatically mean unanimous consent or a general project veto. Enterprises should also check host country law and any additional requirements of financiers and customers.

The social license to operate is not a legal permit issued by government; it describes the continuing acceptance of a project by local communities and stakeholders. It shifts with environmental performance, transparency, benefit distribution, and grievance handling. Declining community acceptance can provoke protests, stoppages, litigation, and permit risk, so enterprises should embed stakeholder communication, impact management, and grievance response in project governance, and maintain trust through verifiable performance.

Artisanal and small-scale mining conflicts with large mining projects over mineral rights, safety, the environment, and livelihoods in some developing countries. Enterprises should first identify the legal status of ASM activity, the groups involved, and supply chain risks, then negotiate workable arrangements with government and affected groups. Measures may include designating compliant working zones, registration and licensing, safety and environmental training, traceable purchasing, or alternative livelihood support; unlawful activity must be handled under the law, and violent eviction is never an acceptable substitute for consultation and due process.

(5) Case example

Case example: Akyem Gold Mine, Ghana

The Akyem gold mine, in the Birim North District of Ghana's Eastern Region within the Ajenjua Bepo Forest Reserve, is one of the larger producing gold mines in West Africa. Zijin Mining completed the acquisition of 100 percent of the project in April 2025. Situated inside a forest reserve, with diverse community demands, a thin local industrial base, and strict ecological controls, the project carries high risks in environmental compliance, community relations, and localized development. It responds with four systems: green technology transition, institutionalized community partnership, standardized ecological restoration, and full-chain local talent development; several of its standards exceed Ghana's domestic environmental and forestry requirements, offering a reference for sustainable mining within forest reserves.

The foundation of stable operation is a green, low-carbon extraction model paired with a quantifiable biodiversity protection system, built to international mining environmental management standards. The mine is electrifying its vehicle fleet in stages, deploying 20 battery-electric and 5 hybrid mining trucks to cut exhaust, noise, and carbon emissions route by route, consistent with Ghana's national energy transition. Local technicians have completed specialized training in equipment operation and maintenance, combining green equipment adoption with local capacity building. To meet the ecological requirements of a forest reserve, the project implements biodiversity offsets under IFC Performance Standard 6 and Business and Biodiversity Offsets Programme principles, creating 317 hectares of restored forest in two phases over ten years, sequestering roughly 2,500 tonnes of CO_2 equivalent per year; a community medicinal plant garden preserves rare native medicinal plant germplasm. A quality-hectare quantified monitoring mechanism, combining GIS mapping with annual field surveys, tracks restoration outcomes and avoids one-for-one area replacement. Ecological monitoring equipment and vehicles were handed over in full to the Ghana Forestry Commission, strengthening the host country's own regulatory capacity. Endangered bird species and pangolins have returned to the restored forest, seedling survival stands at 94.6 percent, and statutory ecological compensation targets have been exceeded.

A second foundation is an institutionalized community partnership system that treats host communities as long-term partners, built on four mechanisms: funding, industry, communication, and talent.

First, a full-chain, multi-tier local talent development system: the A-SEED chain covers basic education, vocational apprenticeships, heavy equipment operation, and financial support. Akyem Vocational Training Institute offers sought-after trades such as welding, electrical work, and construction, with 420 scholarships awarded to date; the three-year ASSIST community apprenticeship program waives tuition and pays stipends for all eligible local youth across 16 scarce mining trades; heavy machinery training prioritizes nearby residents, who can join the mine directly on completion. The project also supports a community credit union serving nearly 5,000 residents, filling a gap in grassroots formal financial services and strengthening local human capital through skills, stable employment, and financial security.

Second, an institutionalized long-term community development fund and local supply chain enablement: the Zijin Akyem Development Foundation is financed through a dual mechanism, US$1 per ounce of gold sold plus one percent of the company's annual pre-tax profit, governed by a board of government, community, and company representatives, with spending fully open and auditable. In 2025 the foundation invested US$1.14 million in a hospital pediatric ward renovation, community water supply, agricultural industry support, local cultural preservation,

and other livelihood projects, and actively supports local small and medium-sized suppliers to raise incomes along the local industrial chain.

Third, routine transparent community communication and front-loaded risk governance: quarterly public council meetings convene traditional chiefs, community representatives, and local government officials, who are briefed on mine production plans, project progress, and outstanding issues, with residents' concerns addressed directly. For major ecological and mining projects, public consultation covered more than 44 associated communities before commencement, embedding deep public participation in front-loaded risk management and sustaining the social license for compliant, long-term operations.

The project's record shows that embedding ESG requirements in business strategy has long-term value. Ecologically, it has built a benchmark for biodiversity governance in Ghanaian mining, with restored ecological functions supporting stable ecological stewardship jobs for more than 200 local residents. In talent development, the foundation has supported nearly 7,000 students, and the apprenticeship program has formed a virtuous cycle from targeted training to stable employment, cultivating a large cohort of professional mining technicians for Ghana. In community terms, sustained funding, routine communication, and continuing industry support have built a mutually beneficial company-community relationship, secured a smooth long-term mining license renewal, and earned recognition as a model responsible mining project in Ghana. The Akyem experience shows that the success of an overseas mining project should not be measured by output and revenue alone: creating sustainable, comprehensive development benefits for the host country and its communities matters just as much.

The environmental and social impacts of mining are wide in scope and long in duration, and post-closure responsibilities stand out, making the industry a focal point of the global sustainable development agenda. For Chinese mining enterprises investing overseas, environmental and social management capability has become a necessary condition for continued operation. Responsibility arrangements for closure and post-closure are the longest and most easily underestimated part of mining environmental and social management, and funding arrangements and responsible parties should be settled at the financing stage.

5. Industry guidance for overseas investment in waste-to-energy projects

Waste-to-energy is one method of treating municipal solid waste while recovering heat for power generation. Because incineration can produce dioxins, heavy metals, and other pollutants, such projects commonly face public concern and siting resistance everywhere, making them a classic case of not-in-my-backyard (NIMBY) effects. The core of environmental and social management for WTE

projects is pollution control and building public trust. This section describes the risk profile of the industry as a reference for Chinese enterprises building and operating WTE projects overseas.

(1) Industry-specific environmental disclosure requirements and standards

The core of environmental disclosure for WTE projects is demonstrating to regulators and the public that the project can keep the highly toxic byproducts of incineration within safe limits. Table 5–17 summarizes six characteristic environmental topics, which center on the flue gas and the residues, that is, fly ash and bottom ash.

Table 5–17 Characteristic environmental disclosure requirements of waste-to-energy projects

Environmental topic	Disclosure content	Standard requirements	Disclosure stage
Dioxin and furan emissions	- Prediction and control of dioxin and furan concentrations in flue gas - Continuous and periodic monitoring plans - 3T+E combustion control technology	- EU Industrial Emissions Directive (IED) - Stockholm Convention - IFC EHS Guidelines for Waste Management	Appraisal, design, and operation
Fly ash treatment and disposal	- Generation volume, composition, and hazardous characteristics of fly ash - Stabilization and solidification schemes - Siting and design of final disposal (hazardous waste landfills)	- Basel Convention - IFC EHS Guidelines for Waste Management - National hazardous waste regulations	Appraisal, design, and operation
Heavy metal emissions (flue gas)	- Predicted concentrations of mercury, cadmium, lead, and other metals - Design of high-efficiency flue gas cleaning systems	- EU Industrial Emissions Directive - IFC EHS Guidelines for Waste Management	Appraisal, design, and operation
Acid gas emissions	- Control of hydrogen chloride (HCl), sulfur dioxide (SO_2), and nitrogen oxides (NOx)	- EU Industrial Emissions Directive - IFC EHS Guidelines for Waste Management	Appraisal, design, and operation
Leachate management	- Generation volume and quality of leachate from the waste bunker - Treatment process and reuse or discharge schemes	- IFC EHS Guidelines for Waste Management - National wastewater discharge standards	Appraisal, design, and operation
Odor control	- Odor control measures in the tipping hall and waste bunker - Monitoring of odor concentrations at the plant boundary	- IFC EHS Guidelines for Waste Management - National odor emission standards	Appraisal, design, and operation

Dioxin control is the crux of WTE environmental management.

Dioxins are classified by the International Agency for Research on Cancer as Group 1 carcinogens, with extreme bioaccumulation and environmental persistence. Incomplete combustion of waste, especially chlorine-containing plastics, readily generates dioxins. International standards and responsible practice therefore concentrate on two points: first, minimizing formation at the source through the 3T+E principles, namely sufficiently high temperature (above 850 degrees C), sufficiently long residence time (over 2 seconds), adequate turbulence, and excess air; and second, capturing dioxins at the end of the process, before discharge, by means such as activated carbon adsorption. The EU emission limit of 0.1 ng TEQ per cubic meter is among the strictest recognized worldwide and is the benchmark that internationally financed projects commonly reference.

The safe disposal of fly ash is the other critical risk point of WTE projects. Fly ash is the fine particulate captured by the flue gas cleaning system, enriched with the heavy metals and dioxins generated in combustion, and is classified as hazardous waste. Under the Basel Convention, the management and disposal of hazardous waste must be strictly controlled. Fly ash must be solidified with cement or stabilized with chemical agents and sent to a licensed hazardous waste landfill for final disposal. In many developing countries, qualified hazardous waste landfills are scarce or nonexistent, and this is often the single largest external constraint on WTE projects. Developers must work with government from the planning stage to secure a lawful, safe disposal route for fly ash.

(2) Industry-specific initiatives, standards, and conventions

The WTE industry's technology and standards system is highly mature, centered on borrowing and adopting the strictest emission standards and monitoring requirements, as represented by the EU. Table 5–18 summarizes six key industry-specific standards and conventions.

Table 5–18 Industry-specific standards and conventions for waste-to-energy

Standard / convention	Publisher / governing body	Core content	Scope of application	Binding force
EU Industrial Emissions Directive (IED)	European Union	Sets best available techniques (BAT) and emission limit values (ELVs) for industrial installations including WTE	EU (widely adopted worldwide as the highest standard)	Mandatory in the EU
IFC EHS Guidelines for Waste Management Facilities	International Finance Corporation	EHS management rules for landfills, incinerators, composting plants, and similar facilities	Projects financed by IFC and other IFIs	Mandatory (condition of financing)

Table 5–18 Industry-specific standards and conventions for waste-to-energy (cont'd)

Standard / convention	Publisher / governing body	Core content	Scope of application	Binding force
Stockholm Convention	UN Environment Programme	Requires parties to eliminate or reduce emissions of persistent organic pollutants (including dioxins)	More than 180 parties worldwide	Mandatory for parties
Basel Convention	UN Environment Programme	International convention controlling the transboundary movement and disposal of hazardous waste (such as fly ash)	More than 180 parties worldwide	Mandatory for parties
China's GB 18485 (Standard for pollution control on the municipal solid waste incineration)	Ministry of Ecology and Environment of China	Chinese national standard aligned comprehensively with EU standards	China (available for reference by overseas projects)	Mandatory (in China)
ISWA (International Solid Waste Association)	International industry association	Publishes technical guidance, best practice, and industry reports on WTE	Global solid waste industry	Voluntary (authoritative technical reference)

The EU Industrial Emissions Directive, together with its accompanying Best Available Techniques Reference Document for Waste Incineration (WI BREF), represents the stricter end of current WTE technical requirements. It sets strict emission limit values for dioxins, heavy metals, acid gases, and other pollutants, and, more importantly, describes in detail the best available techniques required to achieve them, covering the whole process from waste reception and combustion control to flue gas treatment and residue management. For overseas WTE projects seeking international recognition, publicly committing to and implementing EU standards helps build trust and defuse NIMBY sentiment.

For Chinese enterprises, mastering and promoting China's own GB 18485-2014 standard is equally valuable. The standard matches EU requirements on core indicators such as dioxins. In emerging markets including BRI partner countries, promoting Chinese standards reflects not only technical confidence but also responsible support for host countries in building high-standard environmental regulation. In January 2026, the State Council issued the Action Plan for Comprehensive Solid Waste Management, calling for an integrated whole-chain system of source reduction, process control, and end-of-pipe utilization, and setting stricter requirements for the disposal of hazardous waste such as WTE fly ash, echoing this practical reference's exit-stage management and fly ash disposal requirements at the domestic policy level.

(3) Life cycle environmental disclosure requirements

The environmental risks of WTE projects concentrate heavily in the operation stage, but their roots lie deep in siting and design. The core of management is sound planning up front, design benchmarked to the best, and full transparency in operation. Table 5–19 summarizes the characteristic disclosure content for each stage.

Table 5–19 Life cycle environmental disclosure for waste-to-energy projects

Project stage	Characteristic disclosure content	Disclosure focus	Reference standards
Planning and siting	- Environmental and social sensitivity analysis of candidate sites - Atmospheric dispersion modeling (especially for dioxins) - Public opinion surveys and social risk assessment	- Siting is the decisive factor of project success - Open, sincere communication with the public must begin early in planning	IFC Performance Standard 1 World Bank ESS1
Design	- Technology route and design parameters of the flue gas cleaning system - Design of fly ash solidification and stabilization systems - Configuration of the continuous emissions monitoring system (CEMS)	- Technology choices must benchmark against EU best available techniques - CEMS must monitor key pollutants in real time	EU IED IFC EHS Guidelines for Waste Management
Procurement and construction	- Procurement and quality control of core equipment (grate furnaces, waste heat boilers, flue gas cleaning) - Construction environmental management plan	- Ensure core equipment comes from proven, reputable suppliers	IFC Performance Standard 1
Operation	- Real-time public disclosure of CEMS data - Periodic supervisory testing reports by independent third parties - Transfer and disposal manifests for fly ash - Annual environmental and social responsibility reports	- No transparency, no trust - Open data are the most effective tool for dispelling public doubts	EU IED China GB 18485
Exit	- Pollution prevention during dismantling - Investigation and remediation of contaminated soil (if any) - Final restoration of the site	- Ensure decommissioning causes no secondary pollution	IFC EHS Guidelines for Waste Management

Transparency during operation is the core of WTE environmental management. The competitive strength of a modern WTE plant no longer lies in generation efficiency but in its ability to meet emission standards consistently and win public trust. Best practice is to install a large electronic display at the plant gate showing key CEMS data in real time, such as flue gas temperature, oxygen content, SO2, NOx, HCl, and particulate concentrations, published simultaneously on the project company's website for anyone to consult at any time. Community representatives, NGOs, and media are regularly invited into the plant, and may even take random samples for independent testing. Open monitoring data reduce information asymmetry and are among the most important routes to long-term trust.

Public communication at the planning and siting stage is equally critical. Unlike mining or highway projects, WTE plants are usually located in or near cities, directly affecting densely populated areas. Social risk assessment must therefore begin at the very start of siting, with all potential stakeholders identified and their concerns answered patiently and professionally through hearings, round tables, and similar formats. Attempting to avoid controversy through opacity or inadequate communication almost always produces sharper conflict later.

(4) Life cycle social management requirements

The social risks of WTE projects focus on a single core: the NIMBY effect. All social management work revolves around preventing, mitigating, and defusing this effect. Table 5–20 summarizes the characteristic social management content for each stage.

Table 5–20 Life cycle social management for waste-to-energy projects

Project stage	Characteristic social management content	Management focus	Reference standards
Planning and siting	- NIMBY risk assessment and management - Stakeholder identification and early communication - Establishment of a project information disclosure platform (website, social media accounts)	- Treat social acceptability as a decisive siting criterion - Turn NIMBY into YIMBY through proactive communication and trust building	IFC Performance Standard 1 World Bank ESS10
Design	- Aesthetic design and landscape integration of the plant - Establishment of a public environmental education center	- Design the plant as a landmark or park to soften its visual impact - Make the project an environmental education base	Industry best practice

Table 5–20 Life cycle social management for waste-to-energy projects (cont'd)

Project stage	Characteristic social management content	Management focus	Reference standards
Construction	- Construction-phase community grievance mechanism - Local employment and procurement	- Respond promptly to community complaints about construction noise and dust	IFC Performance Standard 1
Operation	- Long-term, effective community communication and oversight mechanisms - Regular public open days - Community oversight committees - Benefit-sharing with neighboring communities (discounted electricity, heating)	- Shift from reactive response to proactive service - Make the community a supervisor and beneficiary of the project	Industry best practice
Exit	- Community notification of decommissioning plans	- Ensure transparency throughout decommissioning	IFC Performance Standard 1

There is no shortcut to defusing NIMBY effects; the keys are sincere communication, transparent information, and shared benefit. Successful WTE projects position themselves as environmental education centers and good neighbors. The main plant building may be designed as a distinctive architectural landmark, with a public cafe and viewing platform where residents can see the entire waste treatment process firsthand. A community oversight committee of residents, teachers, and doctors may be granted the power to inspect the plant and review data at intervals. Part of the power or heat revenue may fund infrastructure improvements in neighboring communities or discounts on residents' electricity. Through such measures, the relationship between project and community shifts from a zero-sum standoff to a cooperative partnership.

(5) Case example

Case example: Can Tho waste-to-energy project, Vietnam

Can Tho is the largest city in Vietnam's Mekong Delta. For years its municipal waste could only be landfilled crudely, consuming large amounts of land and threatening the water environment of the Mekong. In 2018, the Can Tho WTE project, invested in, built, and operated by China Everbright Environment (formerly China Everbright International), came on stream as Vietnam's first modern, high-standard WTE plant, offering a Chinese solution to the country's waste crisis.

The project represented a total investment of roughly US$47 million, designed to process 400 tonnes of household waste per day and generate about 60 million kilowatt-hours annually. From the outset it faced a dual challenge of technical standards and public trust.

On technology and environmental standards, Everbright Environment adopted standards above local requirements. Rather than relying on Vietnam's lower domestic standards, the project benchmarked comprehensively against the EU 2010/75/EU directive and imported in full Everbright's independently developed grate furnace, flue gas cleaning, and leachate treatment technologies, already proven in China. Flue gas emissions data are displayed to the public in real time on a large screen at the plant, open to scrutiny by society at large. Its successful operation treats more than half of Can Tho's household waste and, more importantly, has demonstrated to the Vietnamese government and public that modern WTE technology is safe, reliable, and clean.

On winning social trust, Can Tho is a model of the transparent plant and the garden plant. First, it embraced scrutiny: throughout construction and operation it regularly invited Vietnamese officials, media, residents, and students to tour the facility, explaining the processes and environmental measures and answering questions. Second, it created a landmark: the main plant building is shaped like a blooming kapok flower, handsome and integrated with its surroundings, overturning the local impression of waste facilities as dirty and disorderly and becoming a new landmark of Can Tho. Third, it discharged its social responsibility: the project hires local staff actively and funds local schools and poor households, striving to be part of the community.

The project's success quickly made it a benchmark for Vietnam and Southeast Asia. Vietnamese leaders inspected the plant and spoke highly of it. Everbright Environment has since built new WTE projects in Hue and elsewhere in Vietnam and replicated the model in European markets including Poland and Germany. The project has been listed by the relevant Chinese authorities as a typical green Belt and Road case.

The lesson of Can Tho is that for highly sensitive projects such as WTE, technical hard power and communicative soft power matter equally. By adopting strict emission standards, maintaining full transparency, and integrating actively into the community, Chinese enterprises can turn NIMBY facilities abroad into welcome projects that reassure government and win public support.

Public acceptance of WTE projects depends on emission control and information transparency. For Chinese WTE companies going global, strict compliance with emission standards and open monitoring data are the baseline conditions for building trust in host countries.

Annex 1 Environmental and Social Risk Management Tools of International Financial Institutions

Multilateral development banks including the World Bank, the International Finance Corporation (IFC), the Asian Development Bank (ADB), the Inter-American Development Bank (IDB), the African Development Bank (AfDB), the Asian Infrastructure Investment Bank (AIIB), the European Bank for Reconstruction and Development (EBRD), and the New Development Bank (NDB) have each established their own environmental and social frameworks or policies. In addition, more than 130 financial institutions worldwide (Equator Principles Financial Institutions) have adopted the Equator Principles, using the IFC Performance Standards as a reference to assess the environmental and social risks of projects above US$10 million. The Export-Import Bank of China has also issued environmental and social management guidance, used as a reference when providing financing for the overseas projects of Chinese enterprises. Meanwhile, IFC launched in 2025 the first comprehensive revision of its Sustainability Framework (including the Environmental and Social Sustainability Performance Standards) since 2012, and enterprises should follow the changes in the revised Performance Standards and disclosure requirements.

1. Environmental risk management tools provided by international financial institutions

The environmental risk management tools of international financial institutions fall into two groups: mature tools and emerging standards-based tools. Mature tools have stood the test of years of practice, are applied globally, and come with complete technical guidance and abundant case references; they are the foundation for enterprises building environmental risk management systems. Emerging standards-based tools have developed rapidly in recent years and represent the frontier of environmental risk management, particularly on climate change and biodiversity protection.

(1) Mature environmental risk management tools

Table I-1 shows the mature environmental risk management tools of nine major institutions. These include the environmental, health, and safety guidelines; implementation guidance for environmental and social standards; environmental impact assessment handbooks; environmental management plan templates; environmental and social management system toolkits; environmental due diligence handbooks; pollution prevention and control guidance; project classification methods; and environmental monitoring and reporting requirements.

Table I-1 Comparison of mature environmental risk management tools

Tool type	World Bank	IFC	ADB	IDB	AfDB	AIIB	EBRD	NDB	China Exim Bank
EHS guidelines		■							
Implementation guidance for environmental and social standards	■	■	■	■	■	■	■	■	
Environmental impact assessment handbooks / guides	■	■	■	■	■	■	■	■	■
Environmental management plan (EMP) templates	■	■	■	■	■	■	■	■	■
Environmental and social management system (ESMS) toolkit		■							
Environmental due diligence handbooks / checklists		■					■		■
Pollution prevention and control guidance	■	■	■			■	■	■	
Project classification method (A/B/C)	■	■	■	■	■	■	■	■	■
Environmental monitoring and reporting requirements	■	■	■	■	■	■	■	■	■
Host country environmental compliance checklists									■

Among these tools, the EHS guidelines developed by IFC are the globally recognized technical benchmark, known as good international industry practice (GIIP). The guidelines comprise a general guideline and more than 60 industry guidelines, covering everything from pollution prevention, waste management, and occupational health and safety to community health and safety. Although only IFC provides them, virtually all major financial institutions refer to them as their technical standard. For enterprises, the EHS guidelines are the best starting point for developing their own environmental, health, and safety standards, providing specific emission limits, technical measures, and management requirements.

Project classification is common to all institutions. Projects are classified as high risk (Category A), medium risk (Category B), or low risk (Category C) according to their potential environmental and social impacts, with differentiated assessment and management requirements. This classification helps enterprises allocate resources sensibly, focus on high-risk projects, and improve efficiency.

Table I-2 summarizes the uses, application stages, and core value of five core environmental risk management tools. These tools function at different project stages and together form a complete environmental risk management system.

Table I-2 Core environmental risk management tools

Tool	Use	Application stage	Core value
EHS guidelines	Provide industry technical benchmarks (emission limits, technical measures)	Design, construction, operation	IFC's 60+ industry guidelines are the globally recognized GIIP
EIA handbook	Identify environmental impacts and formulate mitigation measures	Project preparation	Core financing compliance requirement; optimizes project design
EMP templates	Translate EIA conclusions into actionable management measures	Implementation	The bridge between assessment and implementation
ESMS toolkit	Establish a systematic environmental and social management system	Whole life cycle	IFC provides complete policy templates, procedure documents, and training materials
Project classification (A/B/C)	Differentiated management by risk level	Screening	Allocates resources sensibly and focuses management on high-risk projects

(2) Emerging environmental standards-based tools

As global challenges such as climate change and biodiversity loss have intensified, international financial institutions have developed a series of emerging environmental standards-based tools in recent years. Table I-3 shows their adoption across institutions.

Table I-3 Comparison of emerging environmental standards-based tools

Tool type	World Bank	IFC	ADB	IDB	AfDB	AIIB	EBRD	NDB	OECD	GCF
Climate risk screening and assessment tools	■	■	■	■	■	■	■	■	■	
Climate benefits accounting methodologies										■
Cumulative impact assessment (CIA) guidance		■								
Biodiversity assessment tools		■		■						
Resource efficiency assessment methods						■	■			

Climate risk screening and assessment tools are the fastest-growing environmental tools of recent years, and nearly all major financial institutions have developed them. These tools help enterprises assess the physical risks of climate change to a project (extreme weather, sea level rise, water scarcity) and the transition risks (carbon pricing, policy shifts, technology substitution), and formulate adaptation and mitigation measures. Climate risk assessment has become a core consideration in project finance, especially for climate-sensitive sectors such as infrastructure, energy, and agriculture.

The Green Climate Fund provides climate benefits accounting methodologies for quantifying a project's greenhouse gas emission reductions and adaptation benefits. The tool is essential for enterprises seeking climate finance, offering standardized accounting methods and reporting formats. As carbon neutrality goals advance worldwide, a growing number of enterprises must master climate benefits accounting in order to demonstrate a project's climate contribution and secure green financing.

Cumulative impact assessment is an advanced assessment tool developed by IFC for evaluating a project's cumulative and combined impacts at the regional level. Conventional environmental impact assessment generally considers a single project, whereas cumulative impact assessment takes account of the overlapping effects of multiple projects in one area, their effects accumulating over time, and their spatial interactions. The tool is particularly suitable for large infrastructure, resource development, and ecologically sensitive areas.

Biodiversity assessment tools evaluate a project's impacts on ecosystems and biodiversity and formulate protection and offset measures. IFC and IDB provide detailed tools, including critical habitat identification, biodiversity baseline surveys, impact assessment, and the mitigation hierarchy (avoid, minimize, restore, offset). As the Convention on Biological Diversity and the TNFD framework advance, biodiversity assessment is becoming a standard requirement for high-risk projects.

Table I-4 summarizes the uses, frontier significance, and applicable projects of five emerging environmental tools. These tools indicate the direction of environmental risk management, and enterprises should apply them selectively according to project characteristics and financing needs.

Table I-4 Emerging environmental tools

Tool	Use	Frontier significance	Applicable projects
Climate risk assessment	Assess physical risks (extreme weather) and transition risks (carbon pricing)	Required by nearly all institutions; now a core financing consideration	All projects, especially infrastructure, energy, and agriculture
Climate benefits accounting	Quantify greenhouse gas reductions and adaptation benefits	A distinctive GCF tool, essential for climate finance	Projects seeking climate finance
Cumulative impact assessment	Assess the combined effects of multiple projects in a region	An advanced IFC tool, essential in ecologically sensitive areas	Large infrastructure, resource development, ecologically sensitive projects
Biodiversity assessment	Assess impacts on ecosystems and biodiversity	Aligns with the TNFD framework; becoming a standard requirement	Projects affecting forests, wetlands, oceans, and other sensitive ecosystems
Resource efficiency assessment	Assess and improve water, energy, and material efficiency	Cuts operating costs and shrinks the environmental footprint	Resource-intensive projects

2. Social risk management tools provided by international financial institutions

Like the environmental tools, the social risk management tools of international financial institutions divide into mature tools and emerging standards-based tools. Mature tools have developed mature methodologies and practice in social risk management and are an important reference for handling community relations, protecting vulnerable groups, and managing labor rights. Emerging standards-based tools reflect the latest international concerns in human rights protection, gender equality, and social inclusion.

(1) Mature social risk management tools

Table I-5 shows the mature social risk management tools of nine major institutions. These include stakeholder engagement plan guidance, grievance mechanism design toolkits, resettlement action plan frameworks, labor management procedure templates, Indigenous Peoples plan guidance, community health and safety risk assessment tools, land acquisition and involuntary resettlement guidance, and social impact assessment templates.

Table I-5 Comparison of mature social risk management tools

Tool type	World Bank	IFC	ADB	IDB	AfDB	AIIB	EBRD	NDB	China Exim Bank
Stakeholder engagement plan (SEP) guidance	■	■	■	■	■	■	■	■	■
Grievance mechanism design toolkits / guidance	■	■	■	■	■	■	■	■	■
Resettlement action plan (RAP) frameworks	■	■	■	■	■	■	■	■	
Labor management procedure (LMP) templates / guidance	■	■		■		■	■		■
Indigenous Peoples plan (IPP/IPDP) guidance	■	■	■	■				■	
Community health and safety risk assessment tools		■				■			
Land acquisition and involuntary resettlement guidance		■							
Social impact assessment templates / checklists	■	■	■	■	■	■	■	■	■

Stakeholder engagement plans and grievance mechanisms are the foundation of all social risk management tools, and every institution provides detailed preparation guidance. Stakeholder engagement requires enterprises to communicate continuously and meaningfully with affected communities, government, civil society organizations, and other stakeholders throughout the project life cycle. A grievance mechanism gives individuals and communities affected by the project an accessible, free, transparent, fair, and culturally appropriate channel for raising concerns and seeking solutions. Together these two tools are the key to preventing and defusing social conflict, winning community support, and building the project's social license to operate.

The resettlement action plan applies to projects involving land acquisition and physical relocation and is among the most complex tools in social risk management. Most institutions provide detailed RAP preparation frameworks covering census of affected people, compensation standards, livelihood restoration measures, resettlement options, and monitoring and evaluation. The core principle of the RAP is that affected people's living standards must not decline as a result of the project and should improve where possible. Land acquisition and resettlement are the most common social risks in overseas projects and the ones most likely to provoke conflict, so enterprises must observe international standards strictly and consult and compensate adequately.

Labor management procedures govern the labor rights and working conditions of project workers, including directly employed staff, contractor workers, and supply chain workers. Modeled on the ILO core labor standards, they cover the prohibition of forced labor and child labor, occupational health and safety, wages and benefits, freedom of association, and grievance mechanisms. Labor management is not only a legal duty and moral obligation but also an important means of raising employee satisfaction, reducing the risk of labor disputes, and improving productivity.

Table I-6 summarizes the uses, application stages, and core value of six core social risk management tools.

Table I-6 Core social risk management tools

Tool	Use	Application stage	Core value
Stakeholder engagement plan (SEP)	Continuing communication with affected communities, government, and civil society	Whole life cycle	A core requirement of all institutions and the key to preventing and defusing social conflict
Grievance mechanism	An accessible, free, transparent channel for affected individuals and communities	Whole life cycle	A core requirement of all institutions and the safety valve of social risk management
Resettlement action plan (RAP)	Manage land acquisition and physical relocation	Preparation and implementation	Ensures living standards do not decline; the most common social risk in overseas projects
Labor management procedure (LMP)	Manage labor rights and working conditions of project workers	Whole life cycle	Modeled on ILO core labor standards; covers direct employees, contractors, and supply chain workers
Indigenous Peoples plan (IPP)	Special assessment and consultation for projects involving Indigenous Peoples	Preparation and implementation	Respects Indigenous identity, culture, and rights; FPIC required in some circumstances
Social impact assessment	Identify impacts on communities, vulnerable groups, and cultural heritage	Preparation	The basis for social management plans, conducted alongside environmental impact assessment

(2) Emerging social standards-based tools

In areas such as human rights protection, gender equality, and social inclusion, international financial institutions have developed a series of emerging social standards-based tools in recent years. Table I-7 shows their adoption across institutions.

Table I-7 Comparison of emerging social standards-based tools

Tool type	ADB	IDB	AfDB	AIIB	EBRD	OECD	GCF
FPIC handbook for Indigenous Peoples		■					
Human rights impact assessment guidance					■		
Human rights due diligence tools		■			■	■	
Gender action plan (GAP) tools / templates	■	■			■		■
Vulnerable group identification and protection tools		■	■				■
Community development action plan tools			■				
Climate-vulnerable group identification tools							■

The FPIC handbook for Indigenous Peoples is a distinctive tool of the Inter-American Development Bank and represents the highest standard of Indigenous rights protection. FPIC requires that free, prior, and informed consent be obtained from Indigenous communities when a project affects their land, resources, or livelihoods. Although only IDB currently provides a dedicated handbook, the FPIC principle is affirmed by the UN Declaration on the Rights of Indigenous Peoples and is being adopted by a growing number of institutions and companies.

Human rights impact assessment guidance and human rights due diligence tools are rapidly developing instruments reflecting the rising importance of human rights in corporate responsibility. The European Bank for Reconstruction and Development and others have led in embedding human rights due diligence in financing requirements; the Organisation for Economic Co-operation and Development provides a general due diligence framework; and IDB also offers a human rights due diligence tool. Modeled on the UN Guiding Principles on Business and Human Rights and the OECD Due Diligence Guidance for Responsible Business Conduct, these tools require enterprises to identify, assess, prevent, and mitigate the potential adverse human rights impacts of projects and to establish remediation mechanisms.

Gender action plan tools promote gender equality and women's empowerment in projects. The Asian Development Bank, IDB, EBRD, and the Green Climate Fund all provide detailed GAP preparation tools covering gender gap analysis, gender-sensitive design, women's participation mechanisms, and gender monitoring indicators. In many developing countries, gender inequality is a significant social risk: women often fare worse in land rights, employment opportunities, and participation in decision-making. Gender action plans are an effective tool for managing this risk and an important route for enterprises to honor gender equality commitments and create social value.

Table I-8 summarizes the uses, frontier significance, and applicable projects of seven emerging social tools.

Table I-8 Emerging social tools

Tool	Use	Frontier significance	Applicable projects
FPIC handbook	Obtain free, prior, and informed consent when Indigenous Peoples are affected	A distinctive IDB tool; the highest standard of Indigenous rights protection	Projects in Indigenous territories in Latin America, North America, Australia, and the Nordic countries
Human rights due diligence	Identify, assess, prevent, and mitigate adverse human rights impacts	Pioneered by EBRD and OECD; mandated by EU legislation	Projects in countries or regions with high human rights risk
Gender action plan (GAP)	Promote gender equality and women's empowerment	Tools provided by ADB, IDB, EBRD, and GCF	Regions and industries with pronounced gender inequality
Vulnerable group protection	Identify and protect people in poverty, persons with disabilities, older people, children, and others	Tools provided by IDB, AfDB, and GCF	Projects involving vulnerable groups
Community development action plans	Create positive community development benefits (employment, training, infrastructure)	A distinctive AfDB tool; from risk management to opportunity creation	Projects seeking to create shared value
Climate-vulnerable group identification	Identify and protect groups especially vulnerable to climate change	An innovative GCF tool, bringing climate justice into climate action	Climate projects

Annex 2 Guide to Designing and Implementing Grievance Mechanisms

A grievance mechanism is an indispensable element of any organization or project. It provides stakeholders with a formal channel for voicing dissatisfaction, concerns, or problems and seeking solutions. A well-designed, efficiently run mechanism not only helps resolve problems and defuse tensions promptly; it also strengthens organizational transparency and credibility and reinforces accountability, supporting good relationships with stakeholders and the smooth progress of the project. A well-designed grievance mechanism should be easy to understand and use, while maintaining the necessary procedural rigor in handling specific claims and avoiding oversimplified treatment.

Drawing on recognized good practice and on the grievance mechanism flowchart, this guide offers a comprehensive, systematic, and operational framework for designing and implementing grievance mechanisms, covering the core stages of receipt and registration, screening and assessment, classification and handling, and communication, feedback, and learning. The framework can be applied both to establishing a new mechanism and to improving an existing one.

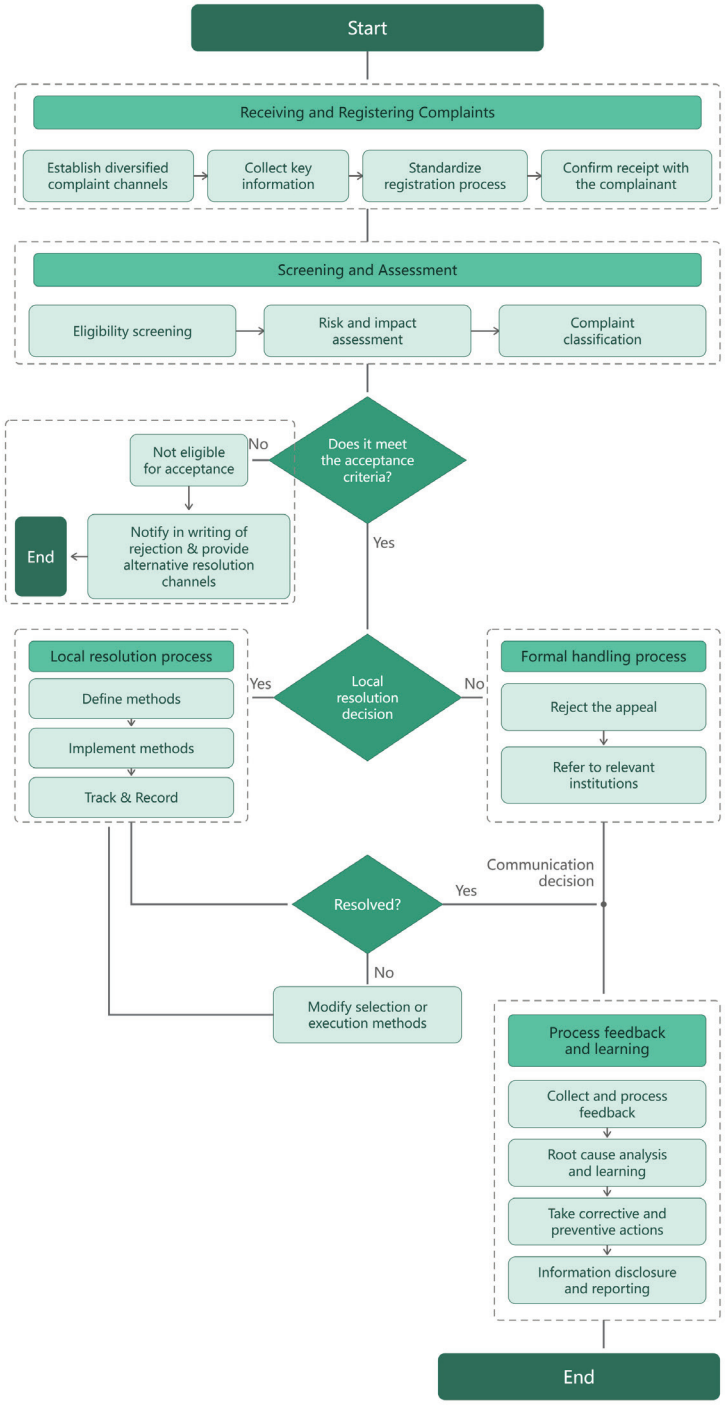


Figure II-1 Grievance mechanism flowchart

Step 1: Receive and register the grievance

The starting point of the grievance process is receiving and registering grievances, the foundation on which the whole mechanism operates. The goal of this stage is to ensure that all grievances are received fairly, promptly, and without barriers, and recorded systematically, providing an accurate basis for subsequent handling.

1. Establish multiple channels for submitting grievances

To make submission convenient for different complainants, multiple accessible channels should be established, taking account of possible barriers of language, culture, geography, literacy, and disability. Commonly effective channels include the following.

(1)Telephone hotline. A dedicated grievance line, answered by trained staff able to communicate in the complainant's own language.

(2) Email. A dedicated email address allowing complainants to submit details in writing.

(3) Letter or fax. Retaining traditional written channels for grievances submitted by post or fax.

(4) In-person submission. Offices or liaison points at the project site or in community centers where complainants can submit grievances face to face and speak directly with staff.

(5) Community representatives or third parties. Allowing complainants to submit grievances through trusted community leaders, NGOs, or other intermediaries.

2. Specify the information to be collected

Whatever the channel, the following key information should be collected on receipt, so that the grievance can be assessed and handled effectively.

(1) Complainant information. Name and contact details (telephone, address, email, and so on). An anonymous submission option should be offered, with a clear explanation of the limitations anonymity may impose on investigation and feedback.

(2) Grievance content. A clear, specific description of the events, problems, or concerns, including times, places, and the people involved.

(3) Desired resolution. What the complainant hopes to achieve through the grievance.

(4) Supporting evidence. Complainants should be encouraged to provide any evidence that clarifies the issue, such as photographs, documents, or recordings.

3. Standardize the registration procedure

All grievances received, whatever their form or content, must be recorded in a single, confidential registration system, whether an electronic database or a paper ledger. The system should capture the following.

(1) A unique grievance number, assigned to each grievance for tracking and management.

(2) The date of registration, recording the date the grievance was received.

(3) The channel through which the grievance was submitted.

(4) A summary of the grievance, concisely capturing its substance.

(5) Complainant information, stored securely and kept strictly confidential.

Once registration is complete, the complainant should immediately receive a written or verbal acknowledgment confirming receipt, giving the unique grievance number and the expected timing of the next step. This reassures the complainant and demonstrates the professionalism and responsiveness of the mechanism.

After a grievance is registered, the next step is systematic screening and assessment. This stage is critical: it determines whether the grievance is admissible and makes an initial judgment of its severity, urgency, and complexity, providing the basis for classification and the allocation of resources.

Step 2: Screen and assess

1. Eligibility screening

First, apply pre-set criteria to determine whether the grievance falls within the mechanism's scope. Eligibility criteria should be clear and explicit and stated in the mechanism's public information. Screening typically covers the following.

(1) Standing of the complainant. Whether the complainant is directly or indirectly affected by the project or the organization's activities.

(2) Relevance of the subject matter. Whether the grievance concerns the operations, policies, or conduct of the project or organization.

(3) Timeliness. Some mechanisms set a time limit for filing, requiring grievances to be raised within a defined period after the event. Such limits must be set cautiously, so that legitimate grievances are not unreasonably excluded.

(4) Duplication or bad faith. Whether the grievance repeats one already handled and closed, or is plainly vexatious or harassing.

For grievances that fail the eligibility test, the complainant should be informed clearly and courteously, in writing, of the decision and its reasons, and offered other feasible avenues of redress where possible, such as referral to government agencies or legal aid providers. This process must also be documented in full.

2. Risk and impact assessment

For admissible grievances, conduct an initial risk and impact assessment to determine priority and handling route. The assessment should consider the following.

(1) Impact on the complainant. The severity of the actual or potential harm to the complainant's safety, livelihood, health, or human rights.

(2) Environmental and social impact. Whether the problem threatens the wider community or the environment.

(3) Risk to the organization. The potential consequences for reputation, legal compliance, financial position, and stakeholder relations.

(4) Urgency. Whether immediate action is needed to prevent harm or stop it worsening.

(5) Complexity. The depth of investigation, technical expertise, and resources required to resolve it.

Based on the assessment, grievances can be classified so that each receives the most appropriate treatment. A typical classification framework is as follows.

(1) Category 1 (low risk, simple): problems resolvable quickly at the local level through simple communication, explanation, or limited negotiation.

(2) Category 2 (medium risk, complex): problems requiring more formal investigation, mediation, or multi-party negotiation.

(3) Category 3 (high risk, serious): problems involving grave allegations, such as human rights abuses, major environmental pollution, or corruption, requiring immediate action and possibly an independent professional investigation team.

When screening and assessment are complete, record the assessment results and classification, and prepare to move to the decision stage.

Step 3: Decide whether to resolve locally

After screening and assessment, the process reaches a key decision point: whether the grievance is suitable for rapid local resolution. This decision divides the handling path into two main branches, reflecting the mechanism's flexibility and efficiency.

1. Yes: begin local resolution

If the grievance is assessed as relatively simple, low risk, and most effectively resolved through direct communication and negotiation, the decision is Yes, and local resolution begins. This typically fits the following situations.

(1) Problems caused by misunderstanding or information asymmetry.

(2) Minor harm that can be remedied through simple measures or an apology.

(3) Matters that do not involve complex legal or policy questions.

The core of local resolution is speed, flexibility, and negotiation. The steps are as follows.

Define the approach

Hold an initial discussion with the complainant and agree on a solution both sides accept. This may include the following.

(1) Direct dialogue: arrange for the responsible project or organization manager to meet the complainant for an open, candid conversation.

(2) Information or clarification: provide more detailed information to dispel doubts or misunderstanding.

Implement the approach

Act promptly on the agreed approach. If the agreed remedy involves compensation of some form, internal procedures should be initiated immediately to deliver it; if dialogue was agreed, the meeting should be arranged as soon as possible.

Track and document

Record the local resolution process in detail, including the measures taken, the agreement reached, and the complainant's feedback. This is essential to ensuring commitments are honored and for subsequent evaluation.

Resolved?

After implementing the solution, verify with the complainant whether they are satisfied with the outcome. If they confirm resolution, proceed to the final stage of feedback and learning. If the grievance is Not resolved?, or the complainant is dissatisfied, the process returns to defining or implementing the approach, and the solution is reexamined and adjusted. If several attempts fail to resolve the matter locally, the grievance should be reassessed and moved onto a more formal path.

2. No: begin formal handling

If the grievance is assessed as complex or high risk, involves serious allegations such as corruption or human rights abuses, or the complainant explicitly declines local resolution, the decision is No, and the grievance enters a more formal, structured process.

Reject the grievance

In rare cases, a grievance that passed initial screening may prove on deeper assessment to be wholly unfounded or made in bad faith, and the mechanism retains the right to reject it. Such a decision must rest on sufficient evidence and strict internal approval, and a detailed explanation must be provided to the complainant.

Refer as appropriate

For grievances beyond the competence or mandate of the mechanism, the most appropriate course is referral to the body with authority to act. Allegations of criminal conduct, for example, should be referred immediately to judicial authorities. Referral should proceed with the complainant's consent and with all feasible assistance.

Communicate the decision

Whether the grievance is rejected or referred, the decision and its detailed reasons must be communicated formally and clearly to the complainant in writing, transparently and respectfully, and recorded. For rejected grievances, if the mechanism provides for higher-level review or appeal, this should also be explained to the complainant.

Step 4: Process feedback and learn

Whether a grievance was resolved locally or through the formal process, the final stage, feedback and learning, is indispensable. The goal is to draw lessons systematically, identify systemic problems, and use the information gained from grievance handling to improve project operations and the mechanism itself, creating a virtuous cycle of continuous improvement.

1. Collect and process feedback

After each grievance is closed, seek feedback from the complainant on their experience of the whole process. Feedback can be collected in several forms: a short satisfaction questionnaire covering handling time, clarity of communication, staff conduct, and the fairness of the outcome; or telephone or face-to-face interviews that probe complex cases for richer qualitative feedback. The feedback gathered should be analyzed systematically to assess the mechanism's overall performance and identify its strengths and weaknesses. If most respondents report that handling takes too long, for example, the bottlenecks in the process need to be examined.

2. Root cause analysis and learning

Handling grievances is not only about resolving individual cases; more importantly, cases reveal latent systemic problems. The organization should periodically, for example quarterly or semi-annually, analyze grievance trends and root causes. Trend analysis examines whether the type, origin, or geographic distribution of grievances shows concentrations: are complaints from a particular area rising abnormally, or does a particular problem such as noise pollution or land occupation recur? Root cause analysis traces recurring problems back to operating procedures, contractor management, community communication strategies, and other underlying factors: frequent complaints about unfair recruitment, for example, may stem from opaque hiring procedures or weak oversight.

3. Take corrective and preventive measures

Based on the analysis, the organization must take concrete corrective and preventive measures to address problems at their source and prevent recurrence.

(1) Corrective measures: remedial action for problems that have already occurred, such as revising unreasonable compensation standards or disciplining staff whose conduct fell short.

(2) Preventive measures: adjusting policies, procedures, or operations to prevent future problems, such as improving construction methods to reduce disturbance to communities, or strengthening environmental and social responsibility training and supervision of contractors.

4. Disclosure and reporting

To strengthen transparency and accountability, the organization should report periodically to all stakeholders, including affected communities, investors, and regulators, on the mechanism's operation. Reports may include the following.

(1) The number and types of grievances received.

(2) The average time taken to handle grievances.

(3) The number resolved and a breakdown by resolution method.

(4) The main problems and trends identified through grievance analysis.

(5) The corrective and preventive measures taken and their results.

Through this cycle of feedback and improvement, the grievance mechanism ceases to be a passive instrument for reacting to problems and becomes an active management system that drives organizational learning and continuous improvement, providing a solid guarantee for sustainable development of the project and harmonious community relations.