Financing Mitigation and Adaptation Projects (FMAP) in Indian MSMEs Programme

Environmental & Social Impact Assessment [ESIA] and Environmental & Social Management Plan [ESMP]

Direct Financing

Textile Sector

Updated On: 08th June, 2026

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Under guidance of Green Climate Fund (GCF)

Note: This version reflects stakeholder's feedback. Based on the feedback, the Grievance Redressal Mechanism (GRM) format has been updated.

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1. ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)

1.1 Executive Summary

1.1.1 Overview of the sector related to project activities and its objective

The Indian textile sector is one of the largest contributors to the economy, combining traditional strengths with modern industrial technologies. According to the Press Information Bureau (PIB) released in August 2025[1], India ranks as the 6th largest exporter of textiles and apparel in the world, holding a 4.1% share in global exports in Calendar year by 2024. This position reflects India's strong manufacturing base and its ability to cater to diverse international markets.

The PIB report highlights that the combined size of the Indian textile industry in 2024–25 was approximately USD 179 billion, which includes USD 142 billion in domestic consumption and USD 37 billion in exports. Textiles and handicrafts together contributed 8.63% to India's total merchandise exports, underlining the sector's strategic importance in trade and economic development.

Government Vision and Strategic Focus: The Government of India has set an ambitious target of achieving USD 100 billion in textile exports by 2030. To accomplish this, the PIB release emphasizes several key strategies:

- **Market Diversification**: Expanding into new geographies to reduce dependency on traditional markets.
- **Value Addition within India**: Encouraging domestic processing and finishing to enhance competitiveness.
- **Sustainability and Innovation**: Promoting eco-friendly practices and technological advancements to meet global standards.

It encompasses diverse product categories such as knitwear, sarees and dress materials, semi-finished fabrics, terry towels, and home furnishings. The sector operates through integrated process chains that transform raw yarn and fabrics into finished consumer products.

MSME in India stands for Micro, Small, and Medium Enterprises. These are businesses categorized based on their investment in plant and machinery/equipment and annual turnover. The MSME classification applies to both manufacturing and service industries. The classification is based on:

- **Investment in Plant & Machinery** (not land/building)
- **Annual Turnover**

All amount in Indian Rupee (₹)

Category	Investment Limit	Turnover Limit
Micro	Up to ₹2.5 crore	Up to ₹10 crore
Small	Up to ₹25 crore	Up to ₹100 crore
Medium	Up to ₹125 crore	Up to ₹500 crore

This helps industries access priority lending, government schemes, and subsidies.

[1] Ministry of Textiles, 2025, "Seizing opportunities, thrust on quality and zero defect and Enhancing Export Competitiveness of Indian Textile Industry:- Minister of Textiles meets with the stakeholders of the textile sector" , PIB, https://www.pib.gov.in/PressReleasePage.aspx?PRID=2156220&reg=3&lang=2

Environmental & Social Impacts of the Textile Sector

The Indian textile and apparel sector faces persistent environmental and social challenges due to intensive use of water, energy, chemicals, and fuel across the value chain. Inefficient processes lead to pollution, waste generation, and adverse social outcomes.

Key Environmental Issues

- **Water Pollution & High Consumption:** India's textile industry consumes 200–250 m^3 water/tonne of cotton cloth—much higher than global best practices. Many small units still discharge untreated dye effluents.
- **Excessive Chemical Use:** Over 8,000 chemicals are used in production, including several hazardous substances under global conventions. India uses an estimated 3.4 million tons of textile chemicals annually.
- **High Energy Use:** Significant reliance on fossil fuels, with limited but growing adoption of renewable and energy-efficient technologies.
- **Waste Generation:** India produces ~7.8 million tons of textile waste annually. 59% enters reuse/recycling streams (mostly low-grade recycling) and 41% are downcycled, incinerated, or landfilled

Key Social Issues

- **Working Conditions:** Long hours, low wages, weak safety standards, and lack of grievance systems, especially in the informal/unorganized sector.
- **Child Labour Risks:** Mostly eliminated but still observed in informal sub-sectors due to weak oversight.
- Informal Sector Vulnerability: A large workforce lacks social protection, making them prone to exploitation.
- **Health & Safety Hazards:** Workers face risks from chemicals, dust, and ergonomics; PPE usage remains low.

Addressing these challenges requires coordinated action by the statutory bodies, industry, civil society, and consumers. A combined focus on environmental sustainability and social responsibility is essential for a resilient and equitable textile sector in India.

Textile Clusters in India[2]:

The Indian textile industry thrives on several prominent regional clusters that drive domestic supply and global exports; a few of these key clusters are highlighted below:

1. **Ludhiana (Punjab):** Ludhiana is one of India's most prominent textile clusters, specializing in woolen and acrylic knitwear and hosiery products. It is often referred to as the "Manchester of India" for woolens due to its large-scale production of sweaters, cardigans, and sportswear. The cluster caters to both domestic and international markets, making it a key hub for winter garments and knitted apparel.

[2] Textile sphere,2025, "Textile clusters in India", 2025, Textile Sphere, https://www.textilesphere.com/2024/11/textile-clusters-in-india.html

2. **Panipat (Haryana):** The cluster focuses on producing blankets, rugs, mats, and durries, and is a major exporter of home furnishing products worldwide. Its strength lies in its ability to manufacture high-quality, durable products that meet global standards, making Panipat an essential contributor to India's textile exports.
3. **Pali (Rajasthan):** Pali is a well-known cluster for dyeing and printing of fabrics. It specializes in cotton and synthetic fabrics with traditional prints, supported by numerous processing units. The cluster is famous for its vibrant and intricate designs, which are widely used in ethnic wear and home textiles, adding cultural value to India's textile industry.
4. **Ahmedabad (Gujarat):** Ahmedabad is one of India's oldest and most significant textile hubs, primarily known for cotton textiles and composite mills. The cluster produces a wide range of fabrics, including denim, shirting, and home textiles. With modern textile parks and advanced infrastructure, Ahmedabad continues to be a leader in cotton-based textile production.
5. **Jetpur (Gujarat):** Jetpur is renowned for its expertise in screen printing and dyeing. The cluster is famous for producing colorful sarees and dress materials with vibrant prints. Its specialization in traditional and contemporary designs makes Jetpur a preferred destination for printed fabrics in both domestic and export markets.
6. **Surat (Gujarat):** Surat is India's largest hub for synthetic textiles and man-made fibers. The cluster specializes in polyester fabrics, sarees, and dress materials, and is a major supplier of synthetic fabrics across the country. Surat's advanced technology and large-scale production capacity have positioned it as a global leader in synthetic textile manufacturing.
7. **Bhiwandi (Maharashtra):** Bhiwandi is one of the biggest power loom clusters in India, focusing on the production of grey fabrics and cotton blends. The cluster plays a crucial role in supplying raw fabrics to garment manufacturers across the country. Its extensive network of power looms ensures cost-effective and high-volume production.
8. **Solapur (Maharashtra):** Solapur is famous for its production of terry towels and bed linens. The cluster has earned a reputation for quality and durability, making it a significant player in the home textile segment. Solapur's products are widely exported, contributing to India's presence in global home furnishing markets.
9. **Tirupur (Tamil Nadu):** Tirupur is globally recognized as the knitwear capital of India. The cluster specializes in T-shirts, innerwear, and sportswear, and serves as a major export hub for cotton knitwear. Its strong integration of spinning, knitting, dyeing, and garmenting processes makes Tirupur a model cluster for efficiency and quality.
10. **Erode (Tamil Nadu):** Erode is known for its handloom and power loom fabrics, producing traditional cotton sarees, dhotis, and lungis. The cluster combines traditional weaving techniques with modern methods to cater to both domestic and international markets. Erode's products are valued for their authenticity and cultural significance.

Note: *The above cluster list is indicative and not exhaustive; additional clusters could be added by the Accredited Entity (AE) for funding under FMAP Programme.*

1.1.2 Process in Textile Industry in Indian Setup

1.1.3 Purpose of the ESIA and its scope.

The Environmental and Social Impact Assessment (ESIA) has been developed as a programme - level assessment to evaluate and disclose potential environmental and social risks associated with MSME sub-projects financed under the ***Financing Mitigation and Adaptation Projects (FMAP) in Indian MSMEs Programme***. It complements SIDBI's screening and due diligence process under its Environmental and Social Management System (ESMS) [approved by GCF Board] and ensures consistency with the Green Climate Fund (GCF) Environmental and Social Standards (ESS).

In line with ESMS procedures, all proposed sub-projects are first screened against the Exclusion List (Annexure 1) to confirm eligibility. Eligible projects are then assessed for compliance with SIDBI's Environmental and Social Management Policy which is in alignment with IFC Performance Standards. Applicants are required to submit the Environmental and Social Due Diligence (ESDD) form (Annexure 2), followed by project appraisal. During project appraisal, financial ratings of the MSME borrowers are carried out using the respective credit rating model / tool adopted by the organization alongside the Environmental Social and Governance (ESG) rating/ ESDD format. The project appraisal is carried out after carrying out project site assessments to confirm risk categorization and safeguard requirements under FMAP Programme. ESIA/ESMP shall only be applicable for **Category B projects**. The definition of **Category B** and **Category C** projects are mentioned below.

- **Category B projects** involve technology or process changes that may result in moderate, site-specific, and reversible impacts, such as water discharge, air emissions, chemical and waste handling, energy use, and occupational health and safety concerns. These impacts must be carefully assessed and managed through structured mitigation planning or involve technology or process where risks and impacts are considered limited, and the magnitude is expected to be low to moderate. The risks and impacts are few in number, contained within the footprint of the activities, largely reversible, and readily mitigated through generally accepted mitigation measures and good international industry practices.
- **Category C projects** involve low-risk efficiency improvements or equipment upgrades that do not alter manufacturing chemistry or increase pollution loads and therefore present minimal potential for adverse environmental or social effects or Category C activities are typically those that have no physical elements or defined footprints. However, in certain contexts, activities that have physical elements or a footprint may also be considered as low risk, particularly where the activities are small-scale, undertaken within an already built environment, do not involve

physical and economic displacement of people or have minimal or no adverse impacts on indigenous peoples.

By providing a structured assessment framework, this ESIA enables the FMAP Programme to evaluate Category B interventions - identifying, analyzing, and mitigating potential environmental and social impacts - while also validating the low-risk nature of Category C projects. This ensures full alignment with SIDBI's ESMS (aligned with IFC Performance Standards), and the GCF Environmental and Social standards.

This ESIA and ESMP are applicable across diverse industrial activities and processes within the **textile sector, covering various MSME clusters in India**. These frameworks define pathways for classifying risks, evaluating the implications of mitigation technologies and adaptation investments, and establishing a transparent, standardized basis for environmental and social risk management under the FMAP

Linkage with GCF

The **FMAP Programme** supports projects that reduce greenhouse gas emissions and enhance climate resilience. MSMEs in the textile industry can avail assistance under GCF-FMAP Programme for any of the following project types:

A. Mitigation

- **Energy Efficiency Projects**: Example- Retrofitting / replacing / upgrading EE machinery / interventions / process optimization, and waste heat recovery to reduce energy consumption.
- **Renewable Energy Integration:** Example- Installation of solar panels / solar water heater in manufacturing units for captive use / Renewable Energy Service sector enterprises that sell solar / wind power to the manufacturing enterprises.
- **Green Mobility & Logistics:** Example- 2 Wheelers, 3 Wheelers, 4 Wheelers, E-buses, E-trucks, charging infrastructure and battery swap.
- **Waste to Energy:** Example- Setting up Waste to Energy projects for generation of Biogas/ BioCNG/ Power/ producer or syngas from urban, industrial and agricultural wastes/residues.

B. Adaptation:

- **Water-efficient technologies:** Example- Wastewater / Effluent treatment / ZLD/ Rainwater harvesting systems, surface water storage units, stormwater management equipment and aquifer recharge solutions for drought-prone areas.
- **Climate-resilient materials:** Example-Green Buildings using locally suited, durable materials for housing and infrastructure to withstand extreme weather.
- **Manufacturing Climate innovation related products:** Example- Innovative and locally suited technologies aimed increasing climate adaptation.
- **Supplying alternative raw materials for those that are at risk from climate change:** Example- Aiding MSMEs who are the suppliers to bigger industries manufacturing technologies to enhance adaptive capacity of end beneficiaries.

1.1.4 Objectives of the ESIA:

The key objectives of this ESIA are to:

- Provide a programme-level framework for environmental and social risk assessment of MSME sub-projects under FMAP Programme.

- Ensure compliance with SIDBI's ESMS, IFC Performance Standards, and GCF Environmental and Social Standards.
- Identify and categorize potential risks associated with Category B and Category C projects.
- Establish mitigation measures and safeguard requirements for Category B interventions.
- Validate the low-risk nature of Category C projects to streamline approval and implementation.
- Promote transparency and accountability in environmental and social risk management across MSME sectors.

1.1.5 Scope of the ESIA:

The scope of this ESIA covers:

- MSME sub-projects financed under the FMAP Programme in India viz., (i) Brownfield projects set up by an existing enterprise within its existing industrial premises, (ii) Brownfield enterprises going for expansion and modernization of their existing operations in a new location / premises; and (iii) Greenfield projects i.e., setting up of new enterprises.
- Environmental risks such as emissions, effluents, waste management, energy use, and resource efficiency.
- Social risks including occupational health and safety, community impacts, and labor practices.
- Screening, categorization, and appraisal processes consistent with SIDBI's ESMS and GCF ESS requirements.
- Programme-level analysis to guide project-specific assessments and safeguard planning.

1.1.6 Summary of key Environmental and Social Risks.

The textile sector plays a crucial role in global manufacturing and livelihoods, yet it is also associated with notable environmental and social challenges. Environmentally, the industry is highly resource-intensive, particularly in wet processes such as dyeing, bleaching, printing, and washing. These stages consume vast amounts of water and energy, while generating wastewater rich in dyes, salts, alkalis, and other chemicals that can pollute rivers and groundwater if not adequately treated. Energy demand from heating, curing, and mechanical operations contributes to greenhouse gas emissions, and solid waste such as sludge from effluent treatment plants and fabric scraps adds to disposal concerns.

On the social side, workers often face exposure to chemicals, heat, dust, and noise. This can lead to respiratory problems, skin irritation, heat stress, and ergonomic issues from repetitive tasks. Risks of accidents from machinery and limited emergency preparedness in smaller enterprises further heighten concerns. Communities may also be indirectly affected through untreated effluents, emissions, and noise, making the sector's impacts extend beyond factory boundaries.

1.1.7 Key mitigation measures and recommendations:

To address these challenges, the textile sector can adopt a more balanced and forward-looking approach that safeguards both the environment and people:

- **Water & Effluent Management:** Establish effluent treatment plants (ETPs), adopt Zero Liquid Discharge (ZLD) systems, and promote water recycling and reuse to minimize pollution.
- **Energy Efficiency & Renewables:** Upgrade to energy-efficient machinery and integrate renewable energy solutions such as solar PV to reduce emissions and operating costs.
- **Cleaner Production & Safer Chemistry:** Transition to less hazardous chemicals, optimize wet processes, and ensure proper neutralization of effluents to reduce toxicity.

- **Worker Health & Safety:** Provide personal protective equipment (PPE), ergonomic workstations, dust extraction systems, and regular training on safe handling of chemicals and machinery.
- **Community Safeguards:** Monitor and control noise, dust, and emissions, while maintaining strong fire and emergency preparedness systems to protect surrounding populations.
- **Technology Upgradation:** Encourage adoption of automation, PLC-based controls, and modern wastewater treatment technologies to improve compliance and reduce risks.

Note: (larger list is described in the process wise section 1.3)

1.2 Risk categorization Methodology

The methodology adopted for the ESIA is based on a systematic and participatory approach, ensuring the involvement of all relevant stakeholders and partners associated with the FMAP Programme. With the support of administrative bodies, local authorities, industry associations, and MSME representatives, the study was conducted in a consultative manner to promote transparency and broad dissemination of information regarding the programme's objectives and potential impacts.

Risk categorization methodology tailored for SIDBI–GCF ESIA/ESMP screening of textile MSMEs in India.

- **Low**: Limited, site-specific impacts; easily mitigated; compliant is categorized as C.
- **Moderate**: Manageable with standard measures; no significant legacy issues are categorized as B.
- **High**: Significant, diverse, or irreversible impacts; cumulative cluster impacts; resettlement/ land acquisition affecting biodiversity-sensitive areas, indigenous communities, or cultural heritage without regulatory compliance: major legal non-compliance; sensitive receptors affected is categorized as A. **Under the programme, Category A projects are not covered.**

Key steps in the methodology includes:

- **Stakeholder Consultations:** Structured discussions were held with MSME owners, workers, local communities, and sectoral experts to capture diverse perspectives on environmental and social risks, benefits, and concerns.
- **Documentary Review:** Existing policies, regulatory frameworks, sectoral studies, and SIDBI's ESMS procedures were reviewed to ensure alignment with national standards, IFC Performance Standards, and GCF Environmental and Social Standards.
- **Portfolio Data Review:** Technical, financial, and environmental data from SIDBI's previous portfolio assets (earlier loan cases) were analyzed to identify patterns of risk, performance outcomes, and mitigation effectiveness. This evidence base provided valuable insights into sector-specific challenges, compliance trends, and the practical feasibility of proposed interventions.
- **Site Assessments:** Field visits and site-level assessments were conducted to validate information provided in the Environmental and Social Due Diligence (ESDD) forms and the ESG Screening Sheets, ensuring accurate categorization and safeguard planning.
- **Risk Analysis and Mitigation Planning:** Environmental and social risks were analyzed for Category B interventions, focusing on emissions, effluents, waste management, energy use, and occupational health and safety. Mitigation measures were identified to ensure impacts remain moderate, site-specific, and reversible.

- **Screening and Categorization:** Sub-projects were systematically screened against the ESMS Exclusion List, followed by categorization into Category B or Category C based on potential risk pathways. Screening of sub-projects follows a joint interpretation framework, where SIDBI applies its internal ESMS processes while ensuring full alignment with GCF's safeguards
- **Validation of Low-Risk Projects:** Category C projects were reviewed to confirm their low-risk nature, particularly efficiency improvements and equipment upgrade that do not alter manufacturing chemistry or increase pollution loads.

This participatory and evidence-based methodology ensures a common understanding of the issues, benefits, and concerns associated with MSME sub-projects under FMAP Programme. By integrating historical portfolio data with forward-looking risk analysis, the ESIA provides a transparent and standardized framework for environmental and social risk management, strengthening compliance with SIDBI's ESMS and the GCF Environmental and Social Policy.

1.3 Environmental and Social Due Diligence and Assessment

As the Accredited Entity (AE), SIDBI is responsible for ensuring that all subprojects under the Program adhere to the Green Climate Fund (GCF) Environmental and Social Safeguards (ESS) and follow a proportionate, risk-based due diligence process.

Fit-for-Purpose ESIA (Environmental and Social Impact Assessment): For subprojects categorized as High risk (Category A) and Moderate risk (B), the review a sector-specific ESIA that:

- Identifies environmental impacts such as high-water demand, high-COD effluent generation, sludge management, air emissions, and hazardous chemical handling—critical in textile dyeing and wet-processing.
- Assesses social risks such as labor conditions, OHS (chemical exposure, boilers, confined-space risks), migrant worker conditions, and community-level impacts, especially in textile clusters.
- Evaluates contextual sensitivities (e.g., proximity to drainage channels, rivers, or groundwater sources).
- GCF guidelines state that the ESIA must be proportional to the risk category and designed to address the specific impacts of the activity.
- For sub-projects where Brownfield enterprises going for expansion and modernization of their existing operations in a new location / premises; and (ii) Greenfield projects i.e., setting up of new enterprises, the scope of land is limited to industrial area, industrial estate, notified industrial zone, special economic zones, Land parcels already designated by the Government for non-agricultural use, solar / wind farms etc where all the necessary statutory permission / infrastructure are available.
- Such projects are eligible under this ESIA only where Environmental and Social Due Diligence (ESDD) and legal/site screening confirm that there is no compulsory land acquisition with physical or economic displacement, no Indigenous Peoples impacts, no critical habitat/protected ecosystem impacts, no cultural heritage impacts, and no other material PS5–PS8 consequence in line with SIDBI's ESMS and GCF Environmental and Social Standards.
- Any sub-project for which screening identifies impacts falling under exclusion criteria or PS5–PS8 requirements shall be deemed ineligible and excluded from financing under the GCF-FMAP Programme.

Following are the detailed E&S Risk Assessment associated with Textile Process & Technologies.

1.3.1 Spinning

It is process in textiles refers to the conversion of fibers into yarn. Spinning is the process of drawing out and twisting fibers (natural like cotton, wool, or synthetic like polyester) to form a continuous strand called yarn. This process improves the strength, uniformity, and usability of fibers for subsequent textile operations.

(a) Key Environmental Risks:

- **Energy Consumption:** Spinning machines require continuous electricity, contributing to greenhouse gas emissions indirectly through power consumption.
- **Dust Emissions:** Cotton fibers and lint released during spinning can lead to air quality deterioration inside the facility and surrounding areas if not properly managed.
- **Noise Pollution:** High-speed machinery can create noise levels that affect both workers and nearby communities.

(b) Key Social Risks:

- **Worker Exposure to Cotton Dust:** Prolonged inhalation of cotton dust can cause respiratory issues.
- **Occupational Safety:** Risks of accidents due to moving parts and machinery if safety protocols are not followed.

Categorization of activities in spinning process - Category: C (Low Risk)

Risks are minimal and can be manageable with proper interventions like energy-efficient tech and worker safety measures.

Rationale for the categorization of spinning process:

Spinning does not involve hazardous chemicals or large-scale water pollution, but its energy intensity and dust emissions make it environmentally significant. Social risks primarily relate to worker health and safety rather than community-level impacts. With appropriate mitigation measures such as installing dust extraction systems, providing PPE (Personal Protective Equipment), and implementing energy-efficient technologies, the risks can be managed effectively.

Applicable IFC Performance Standards in spinning process

PS 1- Assessment and Management of Environmental and Social Risks and Impacts is a foundational standard that applies when a project has significant environmental or social risks requiring a structured management system.

For spinning, PS1 is generally not considered primary because of its nature of Risks where Spinning is a dry process with minimal environmental footprint and no hazardous chemicals, no large-scale water pollution, and thus negligible community-level impacts.

PS2 – Labor & Working Conditions: Addresses occupational health and safety (OHS) risks such as cotton dust exposure, noise-induced hearing loss, and ergonomic issues.

PS3 – Resource Efficiency & Pollution Prevention: Relevant for reducing energy consumption and minimizing airborne dust emissions through efficient machinery and ventilation systems.

PS4 – Community Health & Safety: Ensures that dust and noise emissions do not adversely affect surrounding people and that emergency preparedness measures are in place.
PS 5 to PS 8 are conditional because they apply only if projects involve land acquisition affecting biodiversity-sensitive areas, indigenous communities, or cultural heritage without regulatory compliance.

SIDBI's ESMS and GCF ESS require these checks during screening and due diligence.

Risk Mitigation / Adaptation Technologies in Spinning process

SIDBI has identified energy efficient technologies under the above process category for textile sector**.**

Sl. No.	Technology / Machine Name	Process Category	Project Category
1	Light weight bobbins	Spinning	Category - C
2	Blow Room machinery	Spinning	Category - C
3	High-speed carding machine	Spinning	Category - C
4	Overhead travelling cleaner using energy efficient motor and PLC control system	Spinning	Category - C
5	High-speed Ring spinning frame	Spinning	Category - C
6	Ring Frame Machine	Spinning	Category - C
7	Light weight carbon reinforced spinning pot	Spinning	Category - C
8	Automatic Rotor Spinning Machine with MRPS System	Spinning	Category - C
9	Speed Frame Machine	Spinning	Category - C
10	Photocells for Speed Frames	Spinning	Category - C
11	Air Draw Texturising Machine	Texturising / Twisting	Category - C
12	Crepe Yarn Solutions	Texturising / Twisting	Category - C
13	Draw Texturizing Machine	Texturising / Twisting	Category - C
14	Filament Twisting Solutions	Texturising / Twisting	Category - C
15	Spun Twisting Solutions	Texturising / Twisting	Category - C
16	Thread Manufacturing Solutions	Texturising / Twisting	Category - C
17	Industrial Twisting Solutions	Texturising / Twisting	Category - C
18	Solar Photo Voltaic power projects for captive use within the existing operating / manufacturing premises	Renewable Energy Tech	Category - C
19	Electric mobility - 2 Wheelers, 3 Wheelers, 4 Wheelers, E-buses, E-trucks etc for transit of passengers / industry staffs / transport of consumer goods & finished products etc.	Green Mobility & Logistics	Category - C
20	Charging infrastructure and Battery swap set up within the existing operating / manufacturing premises	Green Mobility & Logistics	Category - C
21	Rainwater harvesting systems, surface water storage units, stormwater	Water-efficient technologies	Category - C

	management equipment and aquifer recharge solutions		
22	Green Buildings using locally suited, durable materials for housing and infrastructure to withstand extreme weather	Climate-resilient materials	Category - C

***Note**- (i) The above list is indicative and not exhaustive; additional technologies/machines may be considered by the AE for funding only where they fall within the approved scope and eligibility criteria of FMAP, are screened and categorized in accordance with the ESMS, and comply with applicable E&S standards.*

(ii) The category indicated in the table reflects the typical risk profile of the technology/process itself. Where the same technology is proposed as part of (a) a brownfield enterprise expanding/modernizing in a new location, (b) a greenfield enterprise, or (c) an off-site RE/EE project, the final categorization of the overall subproject shall be determined through ESDD and site/legal screening. In such cases, the sub-project may be classified as Category B where land-related, siting, community health and safety, or other site-specific risks are assessed as moderate, site-specific, and manageable.

1.3.2 Pre-Dyeing process

The **pre-dyeing process** in the textile industry refers to all preparatory steps carried out on fibers, yarns, or fabrics before the actual dyeing stage. These steps ensure uniform dye uptake, improve color fastness, and maintain fabric quality.

(a) Key Environmental Risks:

- **Water Pollution:** Dyeing uses huge volumes of water for washing, dyeing, and rinsing fabrics. The wastewater contains dyes, salts, heavy metals, and organic chemicals, which can contaminate rivers and groundwater if discharged untreated.
- **Chemical Discharge:** Reactive dyes, acids, alkalis, and fixing agents are commonly used. These chemicals increase Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) in effluents, harming aquatic life.
- **Energy Consumption:** Heating water for dye baths requires significant energy, contributing to carbon emissions.

(b) Key Social Risks:

- **Chemical Exposure:** Workers handling dyes and chemicals face risks of skin irritation, respiratory issues, and allergic reactions.
- **Health Hazards:** Long-term exposure can lead to chronic illnesses, including respiratory disorders and chemical burns.
- **Occupational Safety:** Risks of accidents due to handling corrosive chemicals and hot dye baths.

Categorization of activities in Pre-Dyeing process - Category: B (Moderate Risk)

Risks are significant but manageable with proper interventions like energy-efficient stenters, effluent treatment, and worker safety measures.

Rationale for the categorization of Pre-Dyeing process:

Pre-Dyeing is done to ensure uniform dye uptake, improve color fastness, and maintain fabric quality to meet functional and market requirements, provide customization, and improve product value and durability.

Applicable IFC Performance Standards in the Pre-Dyeing process

- PS1: Fully applicable due to significant environmental risks (colored effluent, chemical discharge) requiring structured management systems and ESMP implementation.
- PS2: Critical for worker safety during handling of acids, alkalis, and hot baths.
- PS3: Applies for water and energy efficiency, effluent treatment, and pollution prevention.
- PS4: Ensures community health protection from untreated effluent and boiler emissions.

  PS 5 to PS 8 are conditional because they apply only if projects involve land acquisition affecting biodiversity-sensitive areas, indigenous communities, or cultural heritage without regulatory compliance.

SIDBI's ESMS and GCF ESS require these checks during screening and due diligence.

Risk Mitigation / Adaptation Technologies in the Pre- Dyeing process

Sr. No.	Technology Name	Process Category	Project Category
1	Wet Fabric Spreading and Squeezing Machine (Dyeing)	Pre- Treatment/Dyeing	Category - B
2	Washing Range with Arrangement of Tension Free Fabric Drying and Reduced Water Consumption / Water Reuse System (Dyeing)	Pre- Treatment/Dyeing	Category - B
3	Solar Photo Voltaic power projects for captive use within the existing operating / manufacturing premises	Renewable Energy Tech	Category - C
4	Electric mobility - 2 Wheelers, 3 Wheelers, 4 Wheelers, E-buses, E-trucks etc for transit of passengers / industry staffs / transport of consumer goods & finished products etc.	Green Mobility & Logistics	Category - C
5	Charging infrastructure and Battery swap set up within the existing operating / manufacturing premises	Green Mobility & Logistics	Category - C
6	Wastewater / Effluent treatment / ZLD/	Water-efficient technologies	Category - C
7	Rainwater harvesting systems, surface water storage units, stormwater management equipment and aquifer recharge solutions	Water-efficient technologies	Category - C

8	Green Buildings using locally suited, durable materials for housing and infrastructure to withstand extreme weather	Climate-resilient materials	Category - C

Note-
(i) The above list is indicative and not exhaustive; additional technologies/machines may be considered by the AE for funding only where they fall within the approved scope and eligibility criteria of FMAP, are screened and categorized in accordance with the ESMS, and comply with applicable E&S standards.

(ii) The category indicated in the table reflects the typical risk profile of the technology/process itself. Where the same technology is proposed as part of (a) a brownfield enterprise expanding/modernizing in a new location, (b) a greenfield enterprise, or (c) an off-site RE/EE project, the final categorization of the overall subproject shall be determined through ESDD and site/legal screening. In such cases, the subproject may be classified as Category B where land-related, siting, community health and safety, or other site-specific risks are assessed as moderate, site-specific, and manageable.

1.3.3 Washing & Heat Setting

- **Washing:** This step involves cleaning fabrics after dyeing or printing to remove unfixed dyes, chemicals, and impurities. It ensures color fastness and fabric quality.
- **Heat Setting:** A thermal process applied mainly to synthetic fabrics (like polyester) to stabilize dimensions, improve texture, and prevent shrinkage. Fabrics are exposed to controlled heat in stenter machines or ovens.

(a) Environmental Risks

Water Pollution: Washing generates large volumes of wastewater containing residual dyes, detergents, and chemicals. High BOD/COD levels can harm aquatic ecosystems if untreated.

Energy Consumption: Heat setting requires high temperatures (180–220°C), consuming significant energy. In MSMEs, reliance on inefficient boilers increases carbon emissions.

Chemical Use: Washing often uses detergents and finishes chemicals, adding to effluent load.

(b) Social Risks

Heat Exposure: Workers near stenter machines face risks of heat stress and burns.

Chemical Handling: Detergents and finishing agents can cause skin irritation and respiratory issues.

Categorization of activities in Washing & Heat Setting process - Category: B (Moderate Risk)

Risks are significant but manageable with proper interventions like energy-efficient stenters, effluent treatment, and worker safety measures.

Rationale for the categorization of Washing & Heat Setting process:

Washing & Heat Setting does not involve highly toxic chemicals like dyeing or bleaching but still poses moderate environmental and social risks due to water pollution and heat exposure. MSMEs often lack advanced wastewater treatment and energy-efficient equipment, making interventions critical for sustainability.

Applicable IFC Performance Standards in Washing & Heat Setting process

- PS1: Applicable for risk assessment and ESMP due to water use, heat exposure, and VOC emissions.

- PS2: Addresses OHS risks like heat stress and chemical handling.
- PS3: Focus on energy-efficient stenters and water reuse systems.
- PS4: Community safeguards for air emissions and wastewater discharge.
- **PS 5 to PS 8** are conditional because they apply only if projects involve land acquisition affecting biodiversity-sensitive areas, indigenous communities, or cultural heritage without regulatory compliance.

SIDBI's ESMS and GCF ESS require these checks during screening and due diligence.

Risk Mitigation / Adaptation Technologies in Washing & Heat Setting process

Sr. No.	Technology Name	Process Category	Project Category
1	Heat Recovery System for Stenters	Finishing/Heat Setting	Category - B
2	Grey Heat Setting	Finishing/Heat Setting	Category - B
3	Multi Chamber Stenter (min 4 Chambers) with Arrangement of Oil / Gas Heating (Finishing)	Finishing/Heat Setting	Category - B
4	Gas fired stenters	Finishing/Heat Setting	Category - B
5	Airtight Hot Air Stenter Machine (using AC Inverter Drive)	Finishing/Heat Setting	Category - B
6	Solar Photo Voltaic power projects for captive use within the existing operating / manufacturing premises	Renewable Energy Tech	Category - C
7	Electric mobility - 2 Wheelers, 3 Wheelers, 4 Wheelers, E-buses, E-trucks etc for transit of passengers / industry staff / transport of consumer goods & finished products etc.	Green Mobility & Logistics	Category - C
8	Charging infrastructure and Battery swap set up within the existing operating / manufacturing premises	Green Mobility & Logistics	Category - C
9	Rainwater harvesting systems, surface water storage units, stormwater management equipment and aquifer recharge solutions	Water-efficient technologies	Category - C
10	Green Buildings using locally suited, durable materials for housing and infrastructure to withstand extreme weather	Climate-resilient materials	Category - C

Note-

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(ii) The category indicated in the table reflects the typical risk profile of the technology/process itself. Where the same technology is proposed as part of (a) a brownfield enterprise expanding/modernizing in

a new location, (b) a greenfield enterprise, or (c) an off-site RE/EE project, the final categorization of the overall subproject shall be determined through ESDD and site/legal screening. In such cases, the subproject may be classified as Category B where land-related, siting, community health and safety, or other site-specific risks are assessed as moderate, site-specific, and manageable.

1.3.4 Stitching including Knitting, Sewing, Texturizing, and Twisting

Stitching is the process of sewing fabric pieces together to create garments or textile products. It is typically done using manual or semi-automatic sewing machines. Stitching similarities with Knitting, Sewing, Texturizing, and Twisting, as they all fall under fabric or yarn construction processes.

(a) Environmental Risks

- Minimal Environmental Impact: Stitching does not involve water or chemical discharge. The main environmental concern is energy consumption from sewing machines and lighting.
- Waste Generation: Small fabric scraps and thread waste are generated, which can contribute to solid waste if not recycled.

(b) Social Risks

- Worker Fatigue & Ergonomic Issues: Long hours of sitting and repetitive movements can cause musculoskeletal disorders.
- Eye Strain: Continuous focus on stitching lines can lead to vision problems.
- Occupational Safety: Risks of needle injuries and accidents due to machine operation.

Categorization of activities in Stitching including Knitting, Sewing, Texturizing, and Twisting processes - Category: C (Low Risk)

Environmental impact is negligible, but social risks related to worker health and safety need attention.

Rationale for the categorization of Stitching including Knitting, Sewing, Texturizing, and Twisting processes:

Stitching is a low-pollution process, but MSMEs often lack ergonomic setups and safety measures, leading to worker health issues. Simple interventions like ergonomic chairs, proper lighting, and safety training can mitigate risks.

Applicable IFC Performance Standards in Stitching including Knitting, Sewing, Texturizing, and Twisting processes

- **PS1**: Not primary; negligible environmental footprint.
- **PS2**: Key for ergonomic risks, needle injuries, and electrical safety.
- **PS3**: Limited relevance for energy-efficient sewing machines.
- **PS4**: Ensures safe electrical setups and fire safety.
- **PS 5 to PS 8** are conditional because they apply only if projects involve land acquisition affecting biodiversity-sensitive areas, indigenous communities, or cultural heritage without regulatory compliance.

SIDBI's ESMS and GCF ESS require these checks during screening and due diligence.

Risk Mitigation / Adaptation Technologies in Stitching including Knitting, Sewing, Texturizing, and Twisting processes

Sr. No.	Technology Name	Process Category	Project Category
1	Single Jersey Auto Striper Machines	Knitting	Category - C
2	High Speed Circular Knitting Machines	Knitting	Category - C
3	Circular Grain Knitting Machine	Knitting	Category - C
4	Woven Like Corduroy Machine	Knitting	Category - C
5	Double Knit Electronic Jacquard Machine	Knitting	Category - C
6	3 Thread Fleece Machines (Poly Plating)	Knitting	Category - C
7	Float Plating Denim Machine	Knitting	Category - C
8	High Speed / Ultra High-Speed Knitting Machines	Knitting	Category - C
9	Interlock Knitting Machines	Knitting	Category - C
10	RIB Pointel Jacquard Machines	Knitting	Category - C
11	RIB Knitting Machines	Knitting	Category - C
12	High Speed Single Jersey Knitting Machines	Knitting	Category - C
13	Single Jersey Machines with Open Width Take Up System	Knitting	Category - C
14	Terry Knitting Machines	Knitting	Category - C
15	Warp / Raschel Knitting Machine (Manufacturing Knitted Fabric)	Knitting	Category - C
16	High Speed Computerized Warping Machine for Knitting	Knitting	Category - C
17	Automatic Stitching Machine	Stitching/Sewing	Category - C
18	Computer- controlled, High-speed, Bartacking Machine	Stitching/Sewing	Category - C
19	Computer- controlled, High-speed, Lockstitch, Button Sewing Machine	Stitching/Sewing	Category - C
20	Computer- controlled, High Speed, Lock stitching Buttonholing Machine	Stitching/Sewing	Category - C
21	Four Needle Chain Stitch Machine	Stitching/Sewing	Category - C
22	High-speed, Cylinder- bed, Top & Bottom Coverstitch Machine High-speed, Cylinder- bed, Top & Bottom Cover stitch Machine	Stitching/Sewing	Category - C
23	High-speed, Flatbed, Top & Bottom Coverstitch Machine	Stitching/Sewing	Category - C
24	Armflat Lock Machine	Stitching/Sewing	Category - C
25	Lockstitch Machine with Automatic Thread Trimmer	Stitching/Sewing	Category - C

26	Direct-drive, High Speed, Lockstitch Machine with Automatic Thread Trimmer	Stitching/Sewing	Category - C
27	Semi-dry-head, High Speed, Overlock Stitch Machine	Stitching/Sewing	Category - C
28	Automatic Saddle Stitchers (with Variable Frequency Drive)	Stitching/Sewing	Category - C
29	Clutch Motor Stitching Machines with 3-phase Motor	Stitching/Sewing	Category - C
30	Servo-motor Stitching Machines	Stitching/Sewing	Category - C
31	Solar Photo Voltaic power projects for captive use within the existing operating / manufacturing premises	Renewable Energy Tech	Category - C
32	Electric mobility - 2 Wheelers, 3 Wheelers, 4 Wheelers, E-buses, E-trucks etc for transit of passengers / industry staff / transport of consumer goods & finished products etc.	Green Mobility & Logistics	Category - C
33	Charging infrastructure and Battery swap set up within the existing operating / manufacturing premises	Green Mobility & Logistics	Category - C
34	Rainwater harvesting systems, surface water storage units, stormwater management equipment and aquifer recharge solutions	Water-efficient technologies	Category - C
35	Green Buildings using locally suited, durable materials for housing and infrastructure to withstand extreme weather	Climate-resilient materials	Category - C

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(ii) The category indicated in the table reflects the typical risk profile of the technology/process itself. Where the same technology is proposed as part of (a) a brownfield enterprise expanding/modernizing in a new location, (b) a greenfield enterprise, or (c) an off-site RE/EE project, the final categorization of the overall subproject shall be determined through ESDD and site/legal screening. In such cases, the subproject may be classified as Category B where land-related, siting, community health and safety, or other site-specific risks are assessed as moderate, site-specific, and manageable.

1.3.5 Weaving

Weaving is the process of interlacing two sets of yarns warp (lengthwise) and weft (crosswise) to produce fabric. This is typically done on looms, which can be manual, semi-automatic, or fully automatic.

(a) Environmental Risks

- Energy Consumption: Power looms and automatic weaving machines consume electricity, contributing to carbon emissions.
- Noise Pollution: High-speed looms generate noise, which may affect workers and nearby communities.
- Solid Waste: Yarn waste and defective fabric pieces are generated, though minimal compared to wet processes.

(b) Social Risks

- Noise Exposure: Prolonged exposure to loud machinery can cause hearing loss and stress.
- Occupational Safety: Risks of accidents due to moving parts and entanglement in looms.

Categorization of activities in Weaving process -Category: C (Low Risk)

While weaving does not involve water or chemical discharge, the combination of energy use, noise pollution, and worker safety risks makes it a moderate-risk process.

Rationale for the categorization of Weaving process:

Weaving is less polluting than dyeing or bleaching but still poses social risks (noise, ergonomics) and environmental concerns (energy consumption). MSMEs often use older looms without noise control or energy efficiency features, increasing risks. Interventions like energy-efficient looms, noise dampening systems, and worker safety training can mitigate these issues.

Applicable IFC Performance Standards in Weaving process

- **PS1:** Not primary; risks are minor and occupational.
- **PS2:** Addresses noise exposure and machine safety.
- **PS3:** Applies for energy-efficient looms and noise control.
- **PS4:** Community safeguards for noise emissions.
- **PS 5 to PS 8** are conditional because they apply only if projects involve land acquisition affecting biodiversity-sensitive areas, indigenous communities, or cultural heritage without regulatory compliance.

SIDBI's ESMS and GCF ESS require these checks during screening and due diligence.

Risk Mitigation / Adaptation Technologies in Weaving process

Sr. No.	Technology Name	Process Category	Project Category
1	Air Jet Looms	Weaving	Category - C
2	Auto loom	Weaving	Category - C
3	Circular Weaving Machine	Weaving	Category - C
4	Bridge Guiding machine	Weaving	Category - C
5	Jacquard Machine with Electronic Control	Weaving	Category - C
6	Rapier Looms	Weaving	Category - C
7	Rapier or Auto Loom	Weaving	Category - C
8	VFD/Servo/ PLC driven High Speed Shuttleless Weaving Machine	Weaving	Category - C
9	High Speed Shuttleless Velcro Machine	Weaving	Category - C
10	Water Jet Looms	Weaving	Category - C

11	VFD/Servo/PLC driven High Speed Warping Machine	Weaving Preparation	Category - C
12	Solar Photo Voltaic power projects for captive use within the existing operating / manufacturing premises	Renewable Energy Tech	Category - C
13	Electric mobility - 2 Wheelers, 3 Wheelers, 4 Wheelers, E-buses, E-trucks etc for transit of passengers / industry staffs / transport of consumer goods & finished products etc.	Green Mobility & Logistics	Category - C
14	Charging infrastructure and Battery swap set up within the existing operating / manufacturing premises	Green Mobility & Logistics	Category - C
15	Rainwater harvesting systems, surface water storage units, stormwater management equipment and aquifer recharge solutions	Water-efficient technologies	Category - C
16	Green Buildings using locally suited, durable materials for housing and infrastructure to withstand extreme weather	Climate-resilient materials	Category - C

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(ii) The category indicated in the table reflects the typical risk profile of the technology/process itself. Where the same technology is proposed as part of (a) a brownfield enterprise expanding/modernizing in a new location, (b) a greenfield enterprise, or (c) an off-site RE/EE project, the final categorization of the overall subproject shall be determined through ESDD and site/legal screening. In such cases, the subproject may be classified as Category B where land-related, siting, community health and safety, or other site-specific risks are assessed as moderate, site-specific, and manageable.

1.3.6 Bleaching & Mercerizing

- **Bleaching:** A wet processing step that removes natural color, impurities, and stains from fibers/fabrics (commonly cotton) to achieve a uniform, lighter base suitable for dyeing/printing. Typical agents include hydrogen peroxide, sodium hypochlorite (legacy/high-risk), along with alkali and wetting agents.
- **Mercerizing:** A controlled treatment of cellulosic fabrics (primarily cotton) with concentrated caustic soda (NaOH) followed by neutralization and washing, often under tension. It improves luster, dye uptake, dimensional stability, and strength.

(a) Environmental Risks

1. **High Chemical Load in Effluent**
   - **Bleaching:** Peroxide residues, stabilizers, surfactants, and high alkalinity can elevate COD/BOD and affect aquatic life if untreated.

- **Mercerizing:** Strong alkaline effluent (NaOH) requires stringent neutralization; poor handling can cause high TDS and pH shocks in receiving water bodies.

2. **Water Consumption & Pollution**: Multiple wash/rinse cycles lead to large wastewater volumes containing alkali, salts, and chemicals.
3. **Energy Use**: Heated baths, scouring/bleaching at 60–95°C, and drying increase thermal energy demand, raising carbon footprint, especially where MSMEs rely on inefficient boilers.
4. **Solid/Chemical Waste**: Sludge from ETPs, discarded packaging of chemicals, and occasional chlorinated compounds (if hypochlorite is used) pose disposal challenges.

(b) Social Risks (MSME Context)

1. **Chemical Exposure**: Risks of skin burns, eye injuries, and respiratory irritation from caustic/oxidizing agents. In MSMEs, PPE usage and ventilation may be inconsistent.
2. **Heat Stress & Wet Floors**: Hot processes and steam create heat stress; wet floors increase slip/fall hazards.
3. **Emergency Response Gaps**: Limited training and lack of eyewash stations/neutralizing kits increase severity of incidents.

Categorization of activities in Bleaching & Mercerizing- Category: B (Moderate Risk)

Intensive chemical use (strong alkali and oxidizers), high-volume wastewater with significant pH/TDS/COD loads, and notable worker safety hazards elevate overall risk. Impacts are manageable but require robust controls; many MSMEs have resource constraints that make compliance challenging without targeted interventions.

Rationale for the categorization of Bleaching & Mercerizing:

Bleaching & Mercerizing are chemically intensive wet processes. Unlike stitching or weaving, they directly generate high-load effluents and carry acute occupational hazards.

- MSMEs often operate with basic equipment, limited automation/monitoring, and budget constraints, increasing the likelihood of effluent non-compliance and worker exposure.
- With appropriate process controls, safer chemistry, and ETP optimization, both environmental and social risks can be significantly reduced.

Applicable IFC Performance Standards in Bleaching & Mercerizing process

- **PS1**: Fully applicable due to chemical-intensive processes and effluent risks.
- **PS2**: Critical for handling caustic soda and oxidizing agents.
- **PS3**: Focus on water and energy efficiency, ETP compliance.
- **PS4**: Community safeguards for effluent discharge and emergency response.
- **PS 5 to PS 8** are conditional because they apply only if projects involve land acquisition affecting biodiversity-sensitive areas, indigenous communities, or cultural heritage without regulatory compliance.

SIDBI's ESMS and GCF ESS require these checks during screening and due diligence.

Risk Mitigation / Adaptation Technologies in Bleaching & Mercerizing process

Sr. No.	Technology Name	Process Category	Project Category
1	Open-width Continuous Scouring and Bleaching Range with Microprocessor Control	Bleaching/Pre-treatment	Category - B
2	PLC Based Mercerizing Machine	Pre-treatment	Category - B
3	Solar Photo Voltaic power projects for captive use within the existing operating / manufacturing premises	Renewable Energy Tech	Category - C
4	Electric mobility - 2 Wheelers, 3 Wheelers, 4 Wheelers, E-buses, E-trucks etc. for transit of passengers / industry staff / transport of consumer goods & finished products etc.	Green Mobility & Logistics	Category - C
5	Charging infrastructure and Battery swap set up within the existing operating / manufacturing premises	Green Mobility & Logistics	Category - C
6	Wastewater / Effluent treatment / ZLD/	Water-efficient technologies	Category - C
7	Rainwater harvesting systems, surface water storage units, stormwater management equipment and aquifer recharge solutions	Water-efficient technologies	Category - C
8	Green Buildings using locally suited, durable materials for housing and infrastructure to withstand extreme weather	Climate-resilient materials	Category - C

Note-

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(ii) The category indicated in the table reflects the typical risk profile of the technology/process itself. Where the same technology is proposed as part of (a) a brownfield enterprise expanding/modernizing in a new location, (b) a greenfield enterprise, or (c) an off-site RE/EE project, the final categorization of the overall subproject shall be determined through ESDD and site/legal screening. In such cases, the subproject may be classified as Category B where land-related, siting, community health and safety, or other site-specific risks are assessed as moderate, site-specific, and manageable.

1.3.7 Dyeing & Printing

- **Dyeing:** Application of color to fibers, yarns, or fabrics using dyes in aqueous solutions, ensuring penetration and fixation.
- **Printing:** Localized application of color patterns on fabric using printing pastes (containing dyes/pigments, thickeners, binders, and chemicals) through methods like screen printing, rotary printing, or digital printing.

(a) Environmental Risks

1. **High Water Pollution**: Dyeing uses large volumes of water for dye baths and rinsing. Printing generates water with pigments, binders, and chemicals. Effluent contains dyes, salts, thickeners, and organic chemicals, raising COD/BOD and color load.
2. **Chemical Discharge**: Reactive dyes, acids, alkalis, fixing agents, and printing auxiliaries add toxicity. Heavy metals (from pigments) and formaldehyde-based binders may appear in effluent.
3. **Energy Consumption**: Dyeing requires heated baths; printing often involves drying and curing at high temperatures, increasing thermal energy demand.
4. **Solid Waste**: Sludge from ETPs and leftover printing pastes pose disposal challenges.

(b) Social Risks

1. **Chemical Exposure**: Workers handling dyes, pigments, and auxiliaries risk skin irritation, respiratory issues, and allergic reactions.
2. **Heat Stress**: High temperature curing and drying create heat exposure risks.
3. **Occupational Safety**: Risks of spills, burns, and inhalation of volatile chemicals (especially in MSMEs with poor ventilation).

Categorization of activities in Dyeing & Printing process -Category: B (Moderate Risk)

Intensive water and chemical use, high effluent load, and significant worker safety hazards make this process high-risk. MSMEs often lack advanced effluent treatment and automation, amplifying risks.

Rationale for the categorization of Dyeing & Printing process:

Dyeing & Printing are among the most polluting textile processes, generating colored effluents with high COD/BOD and toxic chemicals. Social risks are also high due to chemical exposure and heat stress. MSMEs typically operate with basic infrastructure, limited ETP capacity, and manual operations, making interventions critical for compliance and sustainability.

Applicable IFC Performance Standards in Dyeing & Printing process

- **PS1**: Fully applicable for managing colored effluent and hazardous sludge.
- **PS2**: Addresses chemical exposure and heat stress.
- **PS3**: Applies for water reuse, energy-efficient dyeing, and pollution prevention.
- **PS4**: Community safeguards for air emissions and wastewater.
- **PS 5 to PS 8** are conditional because they apply only if projects involve land acquisition affecting biodiversity-sensitive areas, indigenous communities, or cultural heritage without regulatory compliance.

SIDBI's ESMS and GCF ESS require these checks during screening and due diligence.

Risk Mitigation / Adaptation Technologies in Dyeing & Printing process

Sr. No.	Technology Name	Process Category	Project Category
1	Automatic Printing Machine	Printing	Category - B
2	Air-Dyeing Technology	Dyeing	Category - B
3	PLC based dyeing machine	Dyeing	Category - B
4	Pulser dyeing technique	Dyeing	Category - B

5	Soft Flow / Jet Flow Dyeing Machine (Low MLR of 1:5 or Lower)	Dyeing	Category - B
6	Roller Steamer / Polymeriser (Dyeing)	Dyeing	Category - B
7	Waterless Dyeing Technology	Dyeing	Category - B
8	Automatic Hank / Yarn Dyeing Machine	Dyeing	Category - B
9	PLC Based Package Dyeing Machine	Dyeing	Category - B
10	Tumble Dryer (Dyeing)	Dyeing	Category - B
11	Hydro Extractor (Dyeing)	Dyeing	Category - B
12	Computerized Embroidery Machine	Printing / Embroidery	Category - C
13	Solar Photo Voltaic power projects for captive use within the existing operating / manufacturing premises	Renewable Energy Tech	Category - C
14	Electric mobility - 2 Wheelers, 3 Wheelers, 4 Wheelers, E-buses, E-trucks etc for transit of passengers / industry staffs / transport of consumer goods & finished products etc.	Green Mobility & Logistics	Category - C
15	Charging infrastructure and Battery swap set up within the existing operating / manufacturing premises	Green Mobility & Logistics	Category - C
16	Wastewater / Effluent treatment / ZLD/	Water-efficient technologies	Category - C
17	Rainwater harvesting systems, surface water storage units, stormwater management equipment and aquifer recharge solutions	Water-efficient technologies	Category - C
18	Green Buildings using locally suited, durable materials for housing and infrastructure to withstand extreme weather	Climate-resilient materials	Category - C

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1.3.8 Finishing (Stenter, Heat Setting)

Finishing refers to the final treatment of fabrics to improve appearance, feel, and performance.

- **Stenter:** A process where fabric is stretched and heat-treated in a stenter machine to set dimensions and apply finishing chemicals.
- **Heat Setting:** Thermal treatment (usually for synthetics like polyester) to stabilize fabric structure and prevent shrinkage.

(a) Environmental Risks

1. Energy Consumption
   - Stenter machines and heat-setting units operate at high temperatures (180–220°C), consuming large amounts of thermal energy.
   - MSMEs often use inefficient boilers, increasing carbon footprint.
2. Air Emissions: Volatile organic compounds (VOCs) from finishing chemicals and oils can pollute air.
3. Chemical Discharge: Finishing chemicals (softeners, resins, flame retardants) may enter wastewater during washing or cleaning.
4. Noise Pollution: High-speed fans and motors in stenter machines contribute to noise.

(b) Social Risks

1. Heat Exposure: Workers near stenter machines face heat stress and dehydration risks.
2. Chemical Handling: Exposure to finishing chemicals can cause skin irritation and respiratory issues.
3. Machine Safety: Risks of burns and accidents due to moving parts and high-temperature zones.

Categorization of activities in Finishing (Stenter, Heat Setting) - Category: B (Moderate Risk)

While finishing does not involve large-scale water pollution like dyeing, it has high energy demand, air emissions, and worker safety hazards

Rationale for the categorization of Finishing (Stenter, Heat Setting):

Finishing processes are critical for fabric quality but pose moderate environmental and social risks. MSMEs often lack energy-efficient stenters, proper ventilation, and automation, increasing exposure and operational costs. Interventions can significantly reduce risks and improve compliance.

Applicable IFC Performance Standards in Finishing (Stenter, Heat Setting) process

- **PS1**: Applicable for air emissions and energy-intensive processes.
- **PS2**: Addresses heat stress and machine safety.
- **PS3**: Focus on energy efficiency and VOC capture.
- **PS4**: Community safeguards for SO_2/NO_x emissions.
- **PS 5 to PS 8** are not applicable because they apply only if projects involve land acquisition affecting biodiversity-sensitive areas, indigenous communities, or cultural heritage without regulatory compliance

SIDBI's ESMS and GCF ESS require these checks during screening and due diligence.

Risk Mitigation / Adaptation Technologies in Finishing (Stenter, Heat Setting)

Sr. No.	Technology Name	Process Category	Project Category
1	PLC Based Compacting Machine	Finishing	Category - B
2	Radio Frequency / Infrared Radiant Gas Fired / Microwave / Loop / Relax Dryer (Finishing)	Finishing	Category - B
3	Automatic VFD/ Servo/PLC driven Fabric Straightening System Machine	Finishing	Category - B
4	Balloon Padding	Finishing	Category - B
5	Balloon Padding Machine	Finishing	Category - B
6	Relax Dryer	Finishing	Category - B
7	Slit Opener with Squeeze Mangle	Finishing	Category - B
8	Fabric Reversing and Slit Opening Machine	Finishing	Category - B
9	Specialty Fabric Finisher such as Brushing, Sueding, Raising, and Compacting	Finishing	Category - B
10	Squeezer with Slit Opener	Finishing	Category - B
11	Industrial Washing / Drying Machine / Tumble Dryers	Finishing / Garmenting	Category - B
12	Solar Photo Voltaic power projects for captive use within the existing operating / manufacturing premises	Renewable Energy Tech	Category - C
13	Electric mobility - 2 Wheelers, 3 Wheelers, 4 Wheelers, E-buses, E-trucks etc for transit of passengers / industry staffs / transport of consumer goods & finished products etc.	Green Mobility & Logistics	Category - C
14	Charging infrastructure and Battery swap set up within the existing operating / manufacturing premises	Green Mobility & Logistics	Category - C
15	Wastewater / Effluent treatment / ZLD/	Water-efficient technologies	Category - C
16	Rainwater harvesting systems, surface water storage units, stormwater management equipment and aquifer recharge solutions	Water-efficient technologies	Category - C
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project may be classified as Category B where land-related, siting, community health and safety, or other site-specific risks are assessed as moderate, site-specific, and manageable.

Other Utility Risk Mitigation Technologies

Sr. No.	Technology Name	Process Category	Project Category
1	Fluidized Bed Combustion Boiler (replacing Stoker Boiler)	Boilers/Thermal	Category - B
2	Water-tube Boilers (by Replacing Conventional Smoke-tube Boiler)	Boilers/Thermal	Category - B
3	Sludge Combustion Boiler	Boilers/Thermal	Category - B
4	Energy Efficient Boiler with Combustion Control System (Steam Heating System)	Boilers/Thermal	Category - B
5	Thermo Pac (Heating System)	Boilers/Thermal	Category - B
6	Heat Recovery Systems for Boilers (Economizer, Air Pre-heater)	Boilers/Thermal	Category - C
7	Transvector Nozzle for Cleaning Application	Miscellaneous / Cross-cutting	Category - C
8	High Speed Flexible Chip Shooter	Miscellaneous / Cross-cutting	Category - C
9	Hollow Heading Machine	Miscellaneous / Cross-cutting	Category - C
10	Heading Machine with Semi Cover	Miscellaneous / Cross-cutting	Category - C
11	High Speed Mouldar Mounter	Miscellaneous / Cross-cutting	Category - C
12	Ultrasonic technology	Miscellaneous / Cross-cutting	Category - C
13	Carbon Fiber Fan	Humidification & Utilities	Category - C
14	Energy Efficient Fans	Humidification & Utilities	Category - C
15	SITRA Excel fans	Humidification & Utilities	Category - C
16	Variable Frequency Drive for Humidification Fan	Humidification & Utilities	Category - C
17	Waste heat recovery in centrifugal compressor	Humidification & Utilities	Category - C
18	High Efficiency Atomizers in Humidification Plant	Humidification & Utilities	Category - C
19	Modern Industrial Humidification System (for Controlling Relative Humidity & Temperature)	Humidification & Utilities	Category - C

20	Exhaust humidity measurement & control system	Humidification & Utilities	Category - C
21	High Efficiency Diesel Generating Sets with High Specific Energy Generation Ratio	Generators & Power Quality	Category - C
22	Automatic Power Factor Controller	Generators & Power Quality	Category - C
23	Open width knitted Inspection machine for fabric with Inverter control	Inspection & Process Control	Category - C
24	Polishing Line with High Efficient Electric Motors using AC drives	Power/Drives & Electrical	Category - C
25	Synthetic Flat Belt Drives (Replace V-belts)	Power/Drives & Electrical	Category - C
26	Synthetic sandwich tapes	Power/Drives & Electrical	Category - C
27	Energy Efficient Motor	Power/Drives & Electrical	Category - C
28	Energy Efficient Fan, Blower, Pump	Power/Drives & Electrical	Category - C
29	Variable Frequency Drive for Autocore Suction Motor	Power/Drives & Electrical	Category - C
30	Biomass Gasifier Based Hot Water Generator	Boiler/Thermal	Category - C
31	Variable Frequency Drive for Autocore Suction Motor	Power/Drives & Electrical	Category - C
32	Variable Frequency Drive for Fan, Blower, Pump	Power/Drives & Electrical	Category - C

Note-

(i) The above list is indicative and not exhaustive; additional technologies/machines may be considered by the AE for funding only where they fall within the approved scope and eligibility criteria of FMAP, are screened and categorized in accordance with the ESMS, and comply with applicable E&S standards.

(ii) The category indicated in the table reflects the typical risk profile of the technology/process itself. Where the same technology is proposed as part of (a) a brownfield enterprise expanding/modernizing in a new location, (b) a greenfield enterprise, or (c) an off-site RE/EE project, the final categorization of the overall subproject shall be determined through ESDD and site/legal screening. In such cases, the sub-project may be classified as Category B where land-related, siting, community health and safety, or other site-specific risks are assessed as moderate, site-specific, and manageable.

Currently, 132 technologies/machines are documented under textile processes, along with an additional indicative **351 cross-functional technologies listed** which are not exhaustive and can be used by MSMEs in the Textile segment as mentioned in **Annexure 3.**

In addition to it, SIDBI highlights that MSME is required to prepare and maintain the minimum mandatory documentation. These documents collectively demonstrate compliance with GCF ESS, IFC PS, and

SIDBI's ESMS. Each MSME must prepare the ESDD Checklist (Annexure 2) as part of screening and categorization under FMAP Programme.

Cumulative cluster-level Effluent risks, including CETP capacity, performance, and compliance with regulatory norms, will be explicitly assessed as part of the Environmental & Social Due Diligence (ESDD) for all Category B textile subprojects. During ESDD (Annexure 2), and through the ESG Rating Tool (Annexure 7 of ESMS), SIDBI's loan officer/relationship manager and E&S expert will:

- verify the operational status, performance, and regulatory compliance of the ETP/ CETP to which the MSME is connected, as appropriate.
- examine whether the additional hydraulic/organic/colour load from the proposed subproject may exceed CETP capacity or receiving-environment limits
- require that MSMEs implement effluent minimization, in-house pre-treatment, and source-level pollution reduction measures as part of the site-specific ESMP.

During inspection, assessment identifies whether the effluent wastewater is non-compliant, or projected incremental loads would exceed treatment or disposal capacity, or environmental compliance cannot be assured even after mitigation, then the subproject will be:

(a) excluded from FMAP financing, or

(b) phased/deferred until adequate treatment capacity and regulatory compliance are demonstrably ensured.

This approach is fully consistent with SIDBI's ESMS and ESIA framework, which already screens out non-compliant proposals, excludes higher-risk activities, and requires risk-based appraisal and verification before approval. For all Category B MSMEs need to have prescribed Wastewater within the limit, site-specific ESMP conditions will include effluent minimization, pre-treatment, monitoring, and compliance reporting of Environmental parameters.

1.4 Regulatory compliance analysis (Indian environmental laws + GCF standards)

1.4.1 Central Pollution Control Board (CPCB) of India: Classification of Sectors into Red, Orange, Green, White and Blue Categories, 2025[3]

Based on Pollution Index (PI) derived from water emissions, air emissions, hazardous waste generation, and resource consumption, CPCB categorizes 419 industrial sectors into four color-coded groups. CPCB has classified total 419 sectors and sub-sectors under Red (125), Orange (137), Green (94), White (54) and Blue (9) categories.

Table 1: List of Industrial Sectors Classified Under Red, Orange, Green, And White Category

Sl. No	CPCB Sl. No.	Textile Industry	Industry Category (Based Upon the Pollution Index – PI)

[3] CPCB,2025, "Report on Classification of Sectors into Red, Orange, Green, White and Blue Categories (A tool for progressive environmental management)"- 2025 https://cpcb.nic.in/openpdffile.php?id=TGF0ZXN0RmlsZS9fMTczNzYxMzk2OV9tZWRpYXBob3RvMTEzODMucGRm

1	178.1	Yarn / Textile processing involving any effluent/emission generating processes including bleaching, dyeing, printing, and coloring, including the garment and apparel manufacturing industry	RED
2	178.2	Yarn to grey fabric manufacturing with water jet machines	ORANGE
3	178.3	Garment and apparel manufacturing industry including Doubling / Reeling / TFO-Two for one unit (dry process)-with boiler	GREEN
4	178.4	Garment and apparel manufacturing industry including Doubling / Reeling / TFO-Two for one unit (dry process)-without boiler	WHITE
5	179.1	Saree/fabric printing by screen / wooden block/hand block	ORANGE
6	179.2	Hand block printing without effluent generation	GREEN
7	180.1	Textile spinning, sizing and weaving mills (wastewater generation≥ 10 KLD)	ORANGE
8	180.2	Textile spinning, sizing and weaving mills (wastewater generation	GREEN
9	181	Power looms (without dye and bleaching)	GREEN
10	182.1	Integrated facility for reprocessing of waste textile fabric (including washing, bleaching, dyeing etc.)	RED
11	182.2	Reprocessing of waste textile fabric (dry process)	GREEN
12	183	Cotton and woollen Hosiers making (Dry process only without any dying / washing operation)	WHITE

Whereas,

1) Red Category industries are High pollution requires frequent monitoring.
2) Orange Category industries are Moderate pollution is less frequent, but regulated control.
3) Green Category industries are Low pollution—minimal regulatory oversight.
4) White Category industries are Practically non-polluting—often exempt from routine consent procedure
5) Blue Category industries are essential Environmental Services e.g. Waste Management.

Pollution Index (PI) Ranges & Categories: methodology with equal weighting of **Air pollutant Score** (PI_A), **Water pollutant Score** (PI_W), **Waste Pollutant Score** (PI_H). Each pollutant group is scored out of 100, and the Cumulative Pollution Index is calculated.

- **PI ≥ 80**: Red
- **55 ≤ PI < 80**: Orange
- **25 ≤ PI < 55**: Green
- **PI < 25**: White.

Additionally, State Pollution Control Boards (SPCBs) and Pollution Control Committees (PCCs) were authorized to categorize any new or leftover sectors according to the CPCB's 2016 methodology.

1.4.2 IFC Performance Standard (PS) will be checked by Third-party and SIDBI

For Environmental & Social Risk, assessment by Third Party and SIDBI need to be considered the IFC Principles Standard for throughout the process which has been stated above in each process of the textile segment (Section 2.2).

PS1- Assessment and Management of Environmental and Social Risks and Impacts: Verified through ESDD, ESG Screening Sheets, and ESMP documentation (Annexure 2).

PS2 - Labor & Working Conditions: Checked via OHS audits, PPE, gender safeguards in ESMP.

PS3 - Resource Efficiency & Pollution Prevention: Confirmed through energy/water efficiency measures, Environmental performance reports.

PS4 - Community Health & Safety: Linked to GRM, community disclosure, and effluent/air emission compliance.

PS 5 to PS 8 are not applicable to "Brownfield projects set up by an existing enterprise within its existing industrial premises", because they apply only if projects involve land acquisition affecting biodiversity-sensitive areas, indigenous communities, or cultural heritage without regulatory compliance.

IFC Performance Standard 5 – Land Acquisition and Involuntary Resettlement

- **Applicability:**
  - Not applicable where Greenfield or expansion projects are undertaken within industrial area, industrial estate, notified industrial zone, special economic zones, Land parcels already designated by the Government for non-agricultural use, or privately purchased land through willing buyer–willing seller transactions with clear title or solar / wind farms etc where all the necessary statutory permission / infrastructure are available.
  - May be triggered if land acquisition results in economic displacement (loss of livelihoods, access restrictions) or physical displacement, even in the absence of formal resettlement.
- **Requirements:**
  - Screening to confirm no involuntary land acquisition; projects involving resettlement or displacement of households are excluded.

IFC Performance Standard 6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources

- **Applicability:**
  - Not applicable where Greenfield or expansion projects are undertaken within industrial area, industrial estate, notified industrial zone, special economic zones, Land parcels already designated by the Government for non-agricultural use, or privately purchased land through willing buyer–willing seller transactions with clear title or solar / wind farms etc where all the necessary statutory permission / infrastructure are available.
  - Screening is required to ensure no conversion or degradation of natural habitats, wetlands, forests, or protected areas.
- **Requirements:**
  - Any project with potential impacts on critical habitats is ineligible under the programme.

IFC Performance Standard 7 – Indigenous People

- **Applicability:**
  - Not applicable where Greenfield or expansion projects are undertaken within industrial area, industrial estate, notified industrial zone, special economic zones,

Land parcels already designated by the Government for non-agricultural use, or privately purchased land through willing buyer–willing seller transactions with clear title or solar / wind farms etc where all the necessary statutory permission / infrastructure are available.
    - Screening is required to confirm absence of Indigenous People / communities are not affected by the project.
- **Requirements:**
    - Any project with potential impacts on Indigenous People / communities are ineligible under the programme.

IFC Performance Standard 8 – Cultural Heritage

- **Applicability:**
    - Not applicable where Greenfield or expansion projects are undertaken within industrial area, industrial estate, notified industrial zone, special economic zones, Land parcels already designated by the Government for non-agricultural use, or privately purchased land through willing buyer–willing seller transactions with clear title or solar / wind farms etc where all the necessary statutory permission / infrastructure are available.
    - Screening is required to ensure that there is no known impact on sites of cultural, archaeological, or religious significance.
- **Requirements:**
    - No financing of projects involving significant impacts on cultural heritage.

For Brownfield projects set up by an existing enterprise within its existing industrial premises, the Environmental and Social Impact Assessment (ESIA) confirms that IFC Performance Standards PS 5 to PS 8 that is relating to land acquisition and involuntary resettlement; Indigenous Peoples; biodiversity and critical habitats; and cultural heritage are not applicable, as these activities do not involve land acquisition, displacement, impacts on sensitive ecosystems, or disturbance of cultural assets.

However, in case of brownfield enterprises going in for expansion or modernization in a new location and for setting up of a Greenfield enterprise, land is generally acquired. While PS 5–8 may be triggered in these cases due to land acquisition, SIDBI ensures that these risks are adequately identified, assessed, and mitigated within the scope of this ESIA & ESMP, ensuring no adverse environmental or social impacts i.e., land acquisition for the project does not affect biodiversity-sensitive areas, indigenous communities, or cultural heritage. If the land acquisition affects any of the PS 5-8 triggers, SIDBI will not assist the project under GCF-FMAP Programme.

Accredited Entity (SIDBI) clarifies that any subproject that triggers PS5–PS8 requirements will be automatically deemed ineligible under the FMAP programme as currently structured. This aligns with SIDBI's existing ESMS, which already: screens out high-risk proposals and all Category A / I-1 activities during initial screening and due diligence.

Detailed ESDD, ESG risk rating, and site verification to confirm safeguard compliance prior to sanction of project. Rejects any project that fails to meet E&S compliance or falls under the exclusion list.

Under FMAP Programme, SIDBI will not finance any MSME subproject that involves: land acquisition with physical/economic displacement of people, impacts on Indigenous Peoples, activities located within or adversely affecting critical habitats or legally protected ecosystems, any kind of risks to cultural heritage or archaeological resources.

Social Risks & Safeguards

Social risks include chemical exposure, inadequate sanitation, potential forced labour, and community impacts from wastewater discharge. Vulnerable groups comprise dye-house workers, contract and migrant labor, women workers, and nearby households. Safeguards will include substituting safer chemicals, enforcing PPE usage and sanitation standards, conducting supplier due diligence to prevent labor exploitation, and providing gender-sensitive facilities to ensure inclusivity and worker welfare.

1.5 Stakeholder Engagement & Monitoring

Stakeholder engagement begins at the appraisal stage for all the sub-projects. Engagement activities include: -

- Consultations with MSME owners, workers, machinery supplier and other stakeholders (if necessary) about the project
- Awareness sessions on Energy conservation, Emission reduction, OHS, chemical safety, E&S risk assessment & mitigation, and social, labour & Gender rights etc;
- Disclosure of applicable safeguard requirements, ESMP obligations, and mitigation responsibilities.
- SIDBI shall ensure continuous stakeholder engagement throughout implementation, including periodic site visits, safety meetings, and environmental monitoring interactions.

Stakeholder engagement will focus on transparency and inclusivity throughout project implementation. Key actions include community disclosure on environmental management practices, establishment of a worker grievance redressal mechanism, and regular safety briefings for all operational staff and workers.

Monitoring will be guided by measurable indicators such as effluent discharge norms, Personal Protective Equipment (PPE) compliance, percentage of workers trained on chemical exposure and handling, and average grievance resolution time (Refer section number 4). These indicators will ensure accountability and continuous improvement in environmental and social performance.

The FMAP programme integrates stakeholder engagement, public disclosure, and grievance redressal as core elements of its Environmental & Social Management System. MSME subprojects are embedded within densely populated industrial clusters. Therefore, meaningful engagement with workers, nearby communities, and institutional stakeholders is critical to ensure transparency, risk communication, and participatory monitoring.

1.6 Impact Category & GCF Linkages

The overall impact is assessed as moderate, site-specific, and reversible with appropriate controls. Based on GCF categorization, Pre-dyeing, Washing, Heat-setting, Bleaching & Mercerizing, Dyeing & Printing and Finishing (Stenter, Heat Setting) processes / operations fall under **Category B (I-2)** due to potential chemical and pollutant-related risks, while low-risk interventions such as Spinning, Stitching including Knitting, Sewing, Texturizing, Twisting and Weaving are classified as **Category C (I-3)**.

The rationale for this classification lies in the fact that colored/pigment effluent and chemical hazards can be effectively managed through pollution control systems and safer chemical practices, whereas Category C activities have minimal or no adverse impacts and mostly involve dry processes without any heat treatment / effluents / emissions.

1.7 Community Health and Safety

In line with Community Health & Safety, the ESIA acknowledges that MSME operations requires structured systems for emergency preparedness, fire and explosion prevention, and safe handling of hazardous materials. This report tries to highlight key risks associated with chemical exposure, heat stress, emissions, boiler operations and hazardous effluent handling. To make these requirements explicit, every Category B subproject will be required to maintain and implement a Site Specific Emergency Preparedness & Response Plan (EPRP), covering at minimum: chemical spill response and containment; fire and explosion prevention measures for dyes, solvents and thermal units; boiler and pressurized steam safety, evacuation procedures with clear signage; worker training and periodic emergency drills. coordination with local emergency services.

Where relevant, MSMEs must also address traffic and road safety risks linked to transport of raw materials (chemicals, dyes, fuels) and outward movement of finished products. Although most MSMEs operate inside established industrial parks and clusters, which already include controlled internal transport infrastructure, MSMEs implements measures to minimize off site impacts, including safe loading and unloading, vehicle movement scheduling, and spill/accident response.

MSME units ought to ensure that external stakeholders including nearby residents, worker housing, local authorities, or downstream users are informed community health and safety measures relevant to them. This includes disclosure of emergency procedures, contact details of grievance focal points, and communication of associated risks, consistent with the stakeholder engagement and disclosure practices already defined in the ESIA, which include community disclosure, periodic meetings, and dissemination of safeguard responsibilities

1.8 Disclosure Requirements & GCF linkages

- **Category B (I-2):** Requires ESIA & ESMP and 30-day advance disclosure before GCF Board consideration.
- **GCF Linkages**
  - Applies to Pre-dyeing, Washing, Heat-setting, Bleaching & Mercerizing, Dyeing & Printing and Finishing (Stenter, Heat Setting) processes / operations due to effluent and chemical risks.
  - Requires ESIA & ESMP and 30-day advance disclosure under GCF Information Disclosure Policy.
- **Category C (I-3):** No advance disclosure required under GCF Information Disclosure Policy.
- **GCF Linkages**
  - Applies to Spinning, Stitching, Automatic Stitching, Weaving, Knitting (minimal/no adverse impacts).
  - For this, no advanced disclosure is required.

1.9 Textile Sector: Environmental Risks, Mitigation, and GCF Classification

Table 2: E&S Risk Assessment with Mitigation Measures Across Textile Manufacturing Processes

Process	Key Environmental & Social Risks	Mitigation Measures	GCF Category	Rationale	Applicable IFC PS
Spinning	Airborne fibers/dust (SPM), noise, high energy use Respiratory irritation (cotton dust/byssinosis), noise-induced hearing loss, machine safety (entanglement), eye strain	Local exhaust ventilation, high-efficiency filtration, housekeeping; acoustic enclosures, PPE; VFD/servo motors, efficient frames	C (I-3)	Impacts are largely occupational and readily mitigated; negligible residual environmental footprint.	PS 2, PS3 & PS 4
Pretreatment Dyeing	Colored effluent, high BOD/COD, heavy metals, hazardous sludge, boiler emissions Skin/eye irritation and chemical burns (acids/alkalis), inhalation of vapors, heat stress (hot baths/steam), manual handling of chemicals, inadequate PPE/ventilation, spill/exposure incidents	Multi-stage ETP (screening, pH control, biological oxidation, tertiary polishing); biodegradable surfactants; pad-batch dyeing; stack compliance, bag filters, low-NOx burners; TSDF disposal	B (I-2)	Risks are moderate, site-specific, and reversible with robust treatment and substitution; residual risk linked to effluent/chemicals.	PS 1, PS2, PS3 & PS4
Washing & Heat Setting	High water use, thermal energy consumption, minor VOCs Heat stress near stenter/ovens, slip/fall risk on wet floors, chemical exposure to detergents/softeners, musculoskeletal strain from loading/unloading	Low liquor washing ranges; water reuse/recycling; heat recovery from wash water/exhaust; airtight stenters; vapor capture	B (I-2)	Impacts are site-specific and reversible; managed through efficiency and recovery systems.	PS1, PS2, PS3 & PS4
Stitching including Knitting, Sewing, Texturizing and Twisting	Minimal footprint; OHS risks (needle injuries, ergonomics), electrical safety, minor noise Needle puncture injuries, repetitive	Machine guarding, ergonomic workstations, PPE; electrical safety checks	C (I-3)	Negligible environmental impact; risks confined to OHS and easily controlled.	PS2 & PS4

Process	Key Environmental & Social Risks	Mitigation Measures	GCF Category	Rationale	Applicable IFC PS
	strain (neck/shoulder/wrist), eye strain, electrical safety (machines)				
Weaving	Noise, dust, energy consumption Noise-induced hearing loss, ergonomic strain (beam handling), entanglement with moving parts, slip/trip hazards, fatigue in high-speed operations	Enclosures, LEV, PPE; VFD/servo drives, shuttle-less looms	C (I-3)	Environmental impacts are minor and controllable; primarily occupational.	PS2, PS3 & PS4
Bleaching & Mercerizing	High alkalinity effluent (NaOH), oxidizing agents, water use Caustic burns and eye injuries (NaOH), respiratory irritation, heat stress, chemical drum handling injuries, emergency response gaps	Closed-loop caustic recovery; ETP neutralization and staged treatment; chlorine-free bleaching	B (I-2)	Risks are site-specific and reversible; mitigable through recovery and treatment.	PS1, PS2, PS3 & PS4
Dyeing & Printing	Colored effluent (BOD/COD), residual metals (Cr, Cu, Ni), hazardous sludge, boiler emissions Dermal/respiratory exposure to dyes/pigments/binders (incl. formaldehyde-based), heat stress during curing, manual screen/roll handling strain, poor ventilation leading to VOC exposure	Metal-free dyes; multi-stage ETP with tertiary polishing; pad-batch dyeing; stack compliance, APCS; sludge disposal via TSDF	B (I-2)	Moderate, site-specific impacts; reversible with proven BAT and safe disposal.	PS1, PS2, PS3 & PS4

Process	Key Environmental & Social Risks	Mitigation Measures	GCF Category	Rationale	Applicable IFC PS
Finishing (Stenter, Heat Setting)	SO_2/NO_x emissions, energy use, minor VOCs Heat stress and dehydration near hot zones, contact dermatitis from softeners/resins, burn risks, machine safety (pinning/edge regions)	Low-NOx burners; stack height compliance; airtight stenters; exhaust heat recovery; VOC capture	B (I-2)	Air/energy impacts are controllable; residual risks are site-specific and reversible.	PS1, PS2, PS3 & PS4

Through the Exclusion list (attached as annexure 1) screening, Environmental and Social Due Diligence (ESDD) process, supported by SIDBI's ESG risk rating tools, and site-level verification visits, the Environmental and Social Impact Assessment (ESIA) has been done for the textile sector. Risks have been considered and aligned with GCF standards.

Notwithstanding the potential triggering of PS 5–8 due to land-related aspects, the above-listed technologies, machinery, and projects shall be classified as **Category B** under SIDBI's Environmental and Social Risk Categorization framework **irrespective of the activity**, in the following scenarios:
(a) **Brownfield enterprises** undertaking expansion, modernization, or capacity augmentation of their existing operations through implementation of Energy Efficiency (EE) Projects / the establishment of renewable energy projects at a **new location**; and
(b)Setting up of **Greenfield enterprises** with the EE / RE technologies mentioned in this ESIA / ESMP .

Such classification is based on the nature and scale of impacts, which are generally **site-specific, reversible, and readily mitigable** through standard environmental and social management measures. Accordingly, these projects are subject to proportionate Environmental and Social Due Diligence (ESDD) in line with SIDBI's ESMS..

In addition to the EE projects set up / to be established in a new location or any RE Projects (solar, wind, hybrid, etc.) established by MSME units for captive or own consumption and located outside the borrower's operating premises may trigger IFC Performance Standards (PS) 5–8, primarily due to land-related considerations. These projects are typically developed on land classified as barren or dry land under applicable national land-use regulations, with no existing residential or commercial usage. The project site is generally selected based on technical considerations viz., systematic process balancing high resource availability (wind/solar) with proximity to grid infrastructure for power evacuation, no adverse environmental impact, and favorable topography.

Similarly, a Greenfield or brownfield enterprise setting up a standalone offsite RE project (solar, wind, hybrid, etc.) for non-captive purpose under GCF-FMAP Programme, shall be classified as "Category-B" as these projects involves land acquisition. In such cases, the PS 5–8 may be triggered due to land acquisition, SIDBI ensures that these risks are adequately identified, assessed, and mitigated within the scope of this ESIA & ESMP, ensuring no adverse environmental or social impacts i.e., land acquisition

for the project does not affect biodiversity-sensitive areas, indigenous communities, or cultural heritage. If the land acquisition affects any of the PS 5-8 triggers, SIDBI will not assist the project under GCF-FMAP Programme.

Prior to sanction and disbursement, SIDBI ensures that all statutory approvals and clearances related to land and project development are in place, including valid land registration or lease documentation and approvals from relevant authorities such as State Electricity Boards and local Distribution Companies (DISCOMs).

Land acquisition for such projects is undertaken strictly on a willing buyer–willing seller basis in compliance with applicable Indian laws. SIDBI verifies the reasonableness of land costs through third-party valuation by bank-empanelled valuers and validates title and ownership through legal due diligence conducted by empanelled advocates to identify any encumbrances, disputes, or litigation risks. Review of land records and plot maps forms part of the appraisal process stage.

Accordingly, while PS 5–8 may be triggered in these cases due to land acquisition and land-use aspects, SIDBI ensures that these risks are adequately identified, assessed, and mitigated within the scope of this ESIA& ESMP, ensuring no adverse environmental or social impacts i.e., land acquisition for the project does not affect biodiversity-sensitive areas, indigenous communities, or cultural heritage. If the land acquisition affects any of the PS 5-8 triggers, SIDBI will not assist the project under GCF-FMAP Programme.

Moving forward, the focus shifts to the documentation and implementation of the Environmental and Social Management Plan (ESMP). ESMP will operationalize the ESIA findings by translating them into actionable safeguards, including specific mitigation measures, monitoring indicators, and clear responsibilities for each Category B subproject under the textile sector.

Below are the tailored ESMPs for all Category B subprojects based on the outcomes of ESDD and site inspections. This ESMP plan will then be formally shared with the borrowers, accompanied by structured training sessions to build their capacity in implementing the safeguards. MSMEs will be required to provide a formal undertaking, committing to applicable compliance with the ESMP, including adherence to pollution control measures, occupational health and safety standards, gender and inclusion safeguards, and grievance redressal mechanisms.

This integrated approach ensures that risks remain site-specific, reversible, and effectively mitigated, while embedding ESG principles and inclusive practices into every financed project by the Accredited Entity.

Section 2:

2. Environmental and Social Management Plan (ESMP): Implementation Framework for Category B Sub-projects of textile sector

Under direct financing SIDBI is responsible for ensuring that all subprojects under the Program adhere to the Green Climate Fund (GCF) Environmental and Social Safeguards (ESS) and follow a proportionate, risk-based due diligence process. This responsibility is rooted in the GCF revised Environmental and Social Policy.

SIDBI shall ensure that every financed subproject; regardless of scale or sector—meets the GCF Environmental & Social Policy requirements. This includes:

- Applying GCF's risk screening and categorization system (A/B/C) to each subproject.
- Ensuring that the GCF ESS (aligned with IFC Performance Standards) are triggered, assessed, and managed based on the potential environmental and social impacts.
- Ensuring alignment with national regulatory requirements and ongoing compliance monitoring. GCF explicitly requires accredited entities to integrate the GCF ESP and safeguards into their due-diligence and project-approval processes.

SIDBI's own ESMS further strengthens this responsibility by requiring systematic identification, appraisal, risk classification, and monitoring of E&S risks across all financed MSME subprojects. SIDBI ensures that E&S assessments are proportionate to the level of risk and appropriately tailored to the specific attributes, scale, and sensitivities of the textile sector. This includes Fit-for-Purpose ESIA for the sub-projects mentioned in the Section 1.2.

2.1 Objective of the ESMP

- Identify potential Environmental and Social issues or threats associated with the proposed project activities and suggest procedures and measures to avoid, prevent, mitigate or compensate for them in line with the standard mitigation hierarchy.
- Integrate environmental and social safeguards into MSME financing as a mandatory standard for all Category B subprojects.
- Ensure that after ESDD, this tailored ESMP shared with MSME borrowers.
- Build capacity and awareness among MSMEs through structured training programmes on ESMP implementation.
- Obtain formal undertakings from MSMEs committing to full compliance with ESMP requirements.
- Align MSME's operations with National Environmental legislation and GCF Environmental and Social Policy, ensuring risks remain site-specific, reversible, and fully mitigated.

2.2 Screening and Categorization of Activities

- **Initial Screening:** All MSME proposals are screened against SIDBI's Exclusion List; Category A projects are rejected outright.

- **ESDD Process:** Category B projects undergo detailed due diligence using SIDBI's checklist, ESG risk rating tool, and site verification.
- **ESMP Preparation:** Based on ESDD findings, this project-specific ESMPs outlining mitigation measures, monitoring indicators, responsibilities, and timelines.
- **Sharing with MSMEs:** ESMPs are formally shared with borrowers, ensuring clarity on obligations.

2.3 Risk Identification and Assessment

- Risks identified during ESDD (wastewater discharge, hazardous waste, air emissions, OHS concerns, gender risks) are mapped into the ESMP.
- Each ESMP specifies:
    - **Mitigation measures** (ETP, Pollution control, PPE, safer chemicals).
    - **Monitoring indicators** (BOD/COD levels, emission compliance, PPE usage rates).
    - **Responsible people** within the MSME.
    - **Timelines** for implementation.
- MSMEs are trained to understand risk categories and mitigation pathways, ensuring ownership of safeguards.
- SIDBI stipulates that MSMEs must ensure standard working conditions and requisite worker amenities, consistent with the availability and operational requirements of all Category B MSMEs. These expectations are aligned with India's National Labour Code, which consolidates 29 existing labour laws into four comprehensive codes (1) Wages, (2) Social Security, (3) Industrial Relations, and (4) Occupational Safety—effective from 21 November 2025.
- These obligations are already embedded within several Environmental & Social (E&S) risk sections under Performance Standard 2 (PS 2), which mandates compliance with national regulations on fair wages, working hours, employee benefits, non-discrimination, and occupational health and safety.

2.4 ESMP Implementation

- **Training Workshops:** SIDBI organizes training sessions for MSMEs covering Environmental & Social Risk like pollution control, OHS, gender equality, SEAH prevention, stakeholder engagement, and grievance redressal.
- **Undertaking from MSMEs:** Borrowers sign a formal undertaking committing to implement ESMP measures, comply with national laws and GCF safeguards, and submit monitoring reports.
- **Suitable covenants:** Undertakings for ESMP implementation become part of loan sanction conditions, making compliance enforceable.

2.5 Mitigation Plan for Category B Subprojects for stakeholders understanding to adopt process specific mitigation plan

1. Pretreatment Dyeing

- **Risks:** Colored effluent, high BOD/COD, heavy metals, hazardous sludge, boiler emissions.

- **Mitigation:** Multi-stage treatment for the pollutant covers at ETPs biodegradable surfactants; dyeing; sludge disposal via Treatment, Storage, and Disposal Facility (TSDF) for hazardous waste; Personal Protective Equipment (PPE) training.
- **Validation:** measures on pollutant load and comply with discharge norms, where applicable.

2. Washing & Heat Setting

- **Risks:** High water use, thermal energy consumption, minor VOC emissions.
- **Mitigation:** water reuse/recycling; heat recovery; airtight stenters; vapor capture.
- **Validation:** Reduce excessive water consumption per unit output and further adoption of heat recovery systems such as low-carbon technology.

3. Bleaching & Mercerizing

- **Risks:** High alkalinity effluent (NaOH), oxidizing agents, water use.
- **Mitigation:** Closed-loop caustic recovery; effluent neutralization; chlorine-free bleaching; safe handling training.
- **Validation:** Comply with effluent standards, where applicable.

4. Dyeing & Printing

- **Risks:** Colored effluent, residual metals (Cr, Cu, Ni), hazardous sludge, boiler emissions.
- **Mitigation:** Restricted-substance lists; multi-stage treatment of pollutants, dyeing; sludge stabilization and TSDF disposal.
- **Validation:** Safer chemical procurement and chemical disposal.

5. Finishing (Stenter, Heat Setting)

- **Risks:** SO_2/NO_x emissions, energy use, minor VOCs.
- **Mitigation:** NOx burner, stack height compliance; cleaner fuels; VOC capture.
- **Validation:** Maintain air emission and adopt energy efficiency measures.

In addition to the subprojects assisted under the above mentioned activities which are already classified as “Category-B”, the subprojects which falls under activities such as Spinning, Stitching (including Knitting and Sewing), Texturizing and Twisting, and Weaving would also be classified as Category B when an MSME undertakes a Greenfield project / expansion project by a brownfield enterprise in a new location. Accordingly, the following process shall be followed w.r.t risks mitigation and validation.

1. Spinning

- Risks: Cotton/fiber dust, noise, high energy use, fire risk.
- Mitigation: Dust extraction and ventilation; noise control and PPE; energy-efficient motors; fire safety systems.
- Validation: Air quality and noise within limits; compliance with factory safety norms.

2. Stitching / Sewing / Knitting

- Risks: Ergonomic strain, minor noise, fabric/thread waste.
- Mitigation: Ergonomic workstations; worker training; waste segregation and recycling; machine guarding.
- Validation: Improved worker safety and proper solid-waste management.

3. Weaving

- Risks: Noise and vibration, energy use, oil and lubricant waste.

- Mitigation: Noise dampening and PPE; energy-efficient looms; safe collection and disposal of waste oil.
- Validation: Noise levels within statutory limits; compliant waste handling.

2.5.1 Asset-based Environmental & Social Mitigation measures

SIDBI has adopted an asset-anchored, risk-cluster approach, which aligns with FMAP's asset-specific financing model and SIDBI's experience under previous green-lending programme(s). This approach ensures consistent, practical and uniform application of mitigation requirements across all Category B MSMEs, regardless of location.

To operationalize this approach, risk clusters aligned with international textile E&S standards like IFC Performance Standards for pollution control, OHS, CHS, labour & GRM, gender & SEAH/POSH.

Detailed asset-based mitigation tables, summarizing:

(I) key E&S risk drivers linked to FMAP-financed assets, and

(II) mandatory mitigation and O&M measures to be included in sub-project ESMPs.

This structure reflects good international practice, ensures compliance feasibility for MSMEs, and provides a clear and scalable framework that can be uniformly implemented across India's diverse textile sector.

To ensure asset-specific environmental and social risk management across textile sub-projects, a consolidated asset-anchored mitigation has been added in table 3 down below. The table summarizes, for each key asset or technology, the associated process step, principal E&S risk pathways identified in the ESIA, and the minimum mitigation and O&M requirements to be included in sub-project ESMPs. This format aligns with internationally recognized good practice. The credit officers during sub-project appraisal and evaluation shall customize and expand the listed measures based on the actual technologies, scale, and site conditions.

Table 3: Asset Based Environmental & Social Mitigation measures

Assets / Technology	Process Step	Key E&S Risk	Mitigation Measures (to include in ESMPs)	O&M Requirements	Responsible Parties #
Dyeing Machines / Jet Dyeing / Soft Flow Dyeing	Pre-treatment, Dyeing	• Chemical exposure (dyes, auxiliaries) • Wastewater pollution • Heat stress • Slips/spills exposure • Safety gears such as Safety Shoes, Hamlet, Goggles, gloves and reflective jacket etc.	• Enclosed chemical handling • Spill trays & secondary containment • Local exhaust ventilation • Mandatory PPE • Safe chemical mixing protocols	• Routine inspection of valves, hoses • Housekeeping for spills • Chemical inventory management • Regular training for operators	MSME Owners / Promoters / Technician or Operation supervisor.

Assets / Technology	Process Step	Key E&S Risk	Mitigation Measures (to include in ESMPs)	O&M Requirements	Responsible Parties #
			• Emergency eyewash stations		
Boilers & Pressure Vessels	Heat setting, finishing, process heating	• Explosion risk • Steam burns • Air emissions • Noise • Safety gears • Such as Safety Shoes, Hamlet, Goggles, gloves and reflective jacket etc.	• Certified boiler installation • Pressure relief valves • Interlocks & emergency shutdown • Stack emission controls • Noise enclosures	• Annual pressure certification • Daily boiler logs • Stack monitoring as per SPCB norms • Operator licensing	MSME Owners / Promoters / Technician or Operation supervisor.
Effluent Treatment Plant (ETP) / CETP Connection	Wastewater treatment	• Discharge of untreated wastewater • Sludge mismanagement and Odour • Safety gears such as Safety Shoes, Hamlet, Goggles, gloves and reflective jacket etc.	• Correct chemical dosing • Online pH/flow monitoring • Proper sludge storage • ETP operator training	• Daily pH, COD/BOD checks • Monthly effluent testing • Sludge disposal to authorised vendors	MSME Owners / Promoters / Technician or Operation supervisor / ETP Operator
Stenter / Heat Setting Machines	Finishing, heat setting	• Fire hazards • Heat stress • Air emissions (VOCs)	• Fire suppression system • Thermal insulation • Stack monitoring • Exhaust ventilation	• Quarterly stack emission tests • Thermal insulation verification • Preventive maintenance	MSME Owners / Promoters / Technician or Operation supervisor / EHS Officer
Compaction & Other Finishing Machines	Finishing	• Crush injuries • Noise • Heat • Safety gears such as Safety Shoes, ear plug etc.	• Machine guarding • Lockout-Tag Out (LOTO) • Hearing protection	• Belt/roller checks • Noise monitoring	MSME Owners / Promoters / Technician or Operation supervisor / Production Manager/ Maintenance Team
Chemical Storage Rooms	All pre-processing and dyeing	• Chemical spills • Worker exposure • Fire risk • Safety gears	• Segregated storage (acids, alkalis) • Ventilation • Spill kits	• Monthly inventory reconciliation	MSME Owners / Promoters / Technician or Operation supervisor /

Assets / Technology	Process Step	Key E&S Risk	Mitigation Measures (to include in ESMPs)	O&M Requirements	Responsible Parties #
		such as Safety Shoes, Hamlet, Goggles, gloves and reflective jacket etc.	• Fire-specific storage	• Storage condition checks	Chemical Storekeeper;
Fabric Cutting & Sewing Machines	Cutting, Stitching	• Needle injuries • Dust • Noise • Ergonomic strain • Safety gears Such as Safety Shoes, gloves etc.	• Machine guards • Needle safety devices • Dust extraction • Ergonomic seating • Hearing protection	• Needle replacement logs • Quarterly dust filter cleaning	MSME Owners / Promoters / Technician or Operation supervisor / Production Supervisor; HR (worker training)
Spotting, Washing & Detergent-Based Treatments	Spotting, cleaning	• Chemical exposure • VOC inhalation • Liquid waste • Safety gears such as Safety Shoes, Hamlet, Goggles, gloves and reflective jacket etc.	• Fume hoods • PPE • Chemical substitution wherever possible	• Filter cleaning • Ventilation inspection	MSME Owners / Promoters / Technician or Operation supervisor /
Air Compressors	Utilities	• Noise • Pressure hazards	• Noise enclosures • Pressure relief valves	• Pressure checks	MSME Owners / Promoters / Technician or Operation supervisor /
Generators (DG Sets)	Utilities / Backup power	• Air emissions • Noise	• Acoustic noise enclosure • Stack height compliance • Fuel spill control	• Emission testing • Oil spill logs	MSME Owners / Promoters / Technician or Operation supervisor /
Warehousing & Material Handling Equipment	Raw material staging	• Fire risk (cotton) • Ergonomic strain • Forklift collision	• Fire extinguishers • Aisle marking • Forklift SOPs	• Equipment inspection • Fire drills	MSME Owners / Promoters / Technician or Operation supervisor /Warehouse Manager
Solar PV Panels (if applicable)	Renewable energy	• Electrical shock • Fall hazards • Safety gears such as Safety Shoes, Hamlet, Goggles, gloves	• Electrical isolation • Use of PPE for maintenance	• Annual electrical audit	MSME Owners / Promoters / Technician or Operation supervisor

Assets / Technology	Process Step	Key E&S Risk	Mitigation Measures (to include in ESMPs)	O&M Requirements	Responsible Parties #
		and reflective jacket etc.			/Maintenance Team
Worker Facilities (Toilets, Crèches, Women-Friendly Facilities)	All operations	• Gender safety risks • Hygiene risks • Safety gears such as Safety Shoes, Hamlet, Goggles, gloves and reflective jacket etc.	• Adequate, segregated toilets • Antiharassment committee • Grievance redressal system (GRS)	• Daily hygiene maintenance	MSME Owners / Promoters / Technician or Operation supervisor /HR; Welfare Officer
Fire Safety Systems	Entire unit	• Fire outbreaks • Worker injury • Safety gears such as Safety Shoes, Hamlet, Goggles, gloves and reflective jacket etc.	• Smoke detectors • Sprinklers • Hydrants • Fire exits	• Monthly fire equipment checks • Fire mock drills	MSME Owners / Promoters / Technician or Operation supervisor /EHS Team; Security

 # Responsible parties might not have Technical Environmental expert at Micro and Small -MSME. In such case, they may consider the unit head, and capable individual may be assigned as the responsible person.

Residual risks that remain after technology adoption include: chemical exposure, heat stress, noise, emergency preparedness gaps, labour welfare considerations, women-friendly facilities, and SEAH/harassment risks. These are addressed through unit-specific ESMP measures described in Section 2.5.2 below.

2.5.2 SIDBI's Activity-Wise Environmental & Social Management Plan (ESMP)

Section 2.5.1 outlines SIDBI's internal environmental and social management procedures for FMAP direct-lending operations. These steps form part of SIDBI's institutional ESMS and run parallel to the MSME-level ESMP requirements presented in Section 2.5.3.

Table 4: SIDBI's Activity Wise ESMP

Sl. No.	Activity	Description	Responsibility	Frequency
1	**Project Screening / E&S Risk Categorization**	Ensure projects listed in the FMAP Exclusion List are not taken up. Initial risk categorization is applied to screen out high-risk (Category A/I-1) proposals.	SIDBI	At project evaluation and loan application stage
2a	**Environmental and Social Due Diligence (ESDD)**	Evaluation of E&S risks, compliance gaps and identification of applicable mitigation measures. Projects not meeting E&S requirements will either be rejected or asked to strengthen compliance before appraisal.	Borrower (MSME)	With each loan application

Sl. No.	Activity	Description	Responsibility	Frequency
2b	**Review of ESDD Report**	Examination and verification of ESDD documents and evidence for completeness, adequacy, and alignment with FMAP requirements.	SIDBI	At loan application review
3	**Technical Assessment**	Assessment of energy/resource savings, pollution reduction, OHS improvements, and other E&S benefits of the proposed assets.	SIDBI	During loan appraisal
4	**E&S Rating**	Scoring of environmental and social performance using SIDBI's ESG/Green Rating Tool to support decision-making.	SIDBI	During loan appraisal
5a	**Environmental & Social Management Plan (ESMP) Review**	Based on ESDD findings, SIDBI reviews the MSME's ESMP or ESHS strengthening plan, ensuring inclusion of: (i) mitigation measures, (ii) monitoring indicators, (iii) responsibilities, (iv) timelines, and (v) residual-risk actions. ESMPs are shared with MSMEs during the lending process.	SIDBI + MSME	During loan appraisal
5b	**Training & Undertaking**	MSMEs receive guidance/training on ESMP implementation and submit undertakings committing to compliance with FMAP E&S requirements.	SIDBI / MSME	At ESMP rollout stage
6a	**E&S Supervision**	Site visits, document reviews and verification of ESMP implementation using M&V protocols, ESDD formats and the ESG Rating Tool.	SIDBI	At least once annually during project duration
6b	**Monitoring & Reporting**	Independent third-party monitoring (sample-based) may be undertaken to assess ESMP implementation, including checks on SEAH safeguards, labour and gender measures, and asset-specific mitigation. Findings will be integrated into FMAP programme-level reporting.	SIDBI / Third-Party Agency (if appointed)	Annually

2.5.3 MSME Stage-wise for Assets based monitoring under Environmental & Social Management Plan (ESMP)

This MSME stage-wise ESMP sets minimum E&S actions and responsibilities for each stage of the sub-project cycle screening/appraisal, installation, commissioning, routine operation, monitoring & reporting, and decommissioning.

Actions are explicitly linked to the risk clusters in Section 2.5 (Pollution & Resource Efficiency; OHS & Workplace Safety; Community Health & Safety; Labour & GRM; Gender, SEAH/ POSH & Inclusion) and anchored to FMAP-financed asset types (e.g., ETPs, washing ranges, stenters, boilers, rooftop PV, mobility).

SIDBI will apply its standard procedures for internal review, including onsite verification by Relationship Manager (RM), and use of structured tools (ESG Rating Tool, ESDD formats, and M&V protocols). Technical Assistance (TA) will support MSMEs to implement unit-level ESMPs, and sample-based third-party verification will provide independent checks at portfolio level.

Table 5: E&S Actions and Responsibilities by Project Stage

A. Screening / Appraisal Stage				
E&S Actions (Asset-anchored)	**Asset-Specific Conditions**	**Responsibilities**	**Evidence / Records to Maintain**	**Verification & Frequency**
Apply exclusion list; map applicable risk clusters; preliminary ESDD	Confirm the project is not on the exclusion list and all the Environmental & Social compliances are in place as per ESDD document.	MSME & RM	ESDD checklist; legal permits status; site layout; utility list	Pre-Sanction visit to the project site and during project appraisal
Legal and regulatory screening (SPCB consents, factory license);	Confirm Consent to Establish timelines;	MSME & RM	Copies of consents/ applications	Pre-Sanction visit to the project site and during project appraisal
Baseline OHS & HR due diligence: PPE, fire & emergency, labour contracts, women facilities & GRM	Verify (POSH), toilets/lighting, workers sanitation; contractor controls	MSME & RM	HR policies, GRM note, POSH constitution, floorplans	Pre-Sanction visit to the project site and during project appraisal
Residual-risk planning requirement listed in term sheet, as appropriate	Require unit-specific actions in ESMP for OHS, emergency, labour, women's safety/SEAH	MSME, RM and E&S Expert	Draft unit-specific ESMP outline	Project Appraisal stage
B. Installation Stage				
E&S Actions	**Asset-Specific Conditions**	**Responsibilities**	**Evidence / Records**	**Verification & Frequency**
Contractor OHS plan (LOTO, work at height, hot work, confined space, electrical safety); site induction & PPE	Green Technologies, Boiler placement & foundations; stenter ventilation; ETP bunding; Electric arc and hot work protection & isolators	Vendor/Installer; MSME oversight	Method statements: toolbox talk registers; Permit To Work (PTW) logs	Check at MSME end
Nuisance control dust, noise, traffic; safe chemical receipt/storage	Temporary storage for chemicals, spill kits; forklift movement plan	Vendor; MSME	Housekeeping & traffic plan; spill logs	Check at MSME end
Compliance with layout and clearances (fire lanes, exits,	Fire detection & suppression compatibility	MSME; Vendor	Layout as-built; fire system handover	Check at MSME end

extinguishers, hydrants)				
C. Commissioning Stage				
E&S Actions	**Asset-Specific Conditions**	**Responsibilities**	**Evidence / Records**	**Verification & Frequency**
Functional testing: ETP (flow, pH, COD), stenter/boiler stacks, DG/compressors acoustics, PV protection relays	Calibrate flow meters, pH probes; verify stack height	Vendor (tests); MSME (witness)	Commissioning reports; calibration certificates	Technical Official spot-check
Emergency preparedness drill; verify routes, alarms,	Simulate small spill; evacuation timing; assembly area	MSME; E&S Expert support	Drill records; emergency plan	Within 30 days of commissioning
Operator training & SOPs (ETP dosing, boiler operations, stenter settings	Vendor manuals translated; shift-wise SOPs	Vendor; MSME	Training attendance; SOPs; shift handover sheets	Post-commissioning at MSME end
D. Routine Operation Stage				
E&S Actions	**Asset-Specific Conditions**	**Responsibilities**	**Evidence / Records**	**Verification & Frequency**
Effluent & emissions compliance; sludge to authorised vendor; waste manifests	ETP daily pH, periodic COD/BOD; stack/ambient checks as per SPCB	MSME (Ops)	Lab reports; manifests; calibration logs	Annual review
OHS controls: PPE, machine guarding, LOTO, hot-surface insulation; periodic fire checks	Stenter guarding; boiler operator certification; confined space permits	MSME	PPE logs; PTW; incident/NMIS reports	Annual review
Community safeguards: traffic management; noise timing; stack dispersion	Vehicle routing; acoustic enclosures maintained	MSME	Traffic plan; noise checks	Annual review
Labour & GRM: contracts, wages, hours, GRM functionality; POSH functioning; facilities for women	GRM register; POSH training; toilets/lighting	MSME; HR/Welfare	GRM logs; POSH minutes	Annual review
Residual-risk actions: unit-specific SOPs and corrective actions	Upset conditions; legacy drains; battery handling	MSME	CAR (Corrective Action Register)	Annual review
E. Monitoring & Reporting Stage				
E&S Actions	**Asset-Specific Conditions**	**Responsibilities**	**Evidence / Records**	**Verification & Frequency**
Maintain M&V logs (effluent, emissions, energy, water), OHS	Metered ETP flows, boiler fuel data, PV	MSME	M&V sheets; training registers; drills	Monthly internal;

incidents, drills, training	generation, EV charging			annual to SIDBI
Internal audits against cluster measures & asset conditions	Short, MSME-friendly checklists	MSME; RM support	Audit checklists; photos	Quarterly
Third-party verification (sample-based) across	Evidence review; site checks; Corrective Action Plan	Independent agency; SIDBI PMU	Verification reports; CAPs	Annual / sample-based
Reporting to SIDBI/PMU; update MIS; track CAP closure	Align with FMAP reporting cadence	MSME; RM/ PMU	Periodic reports	As per loan conditions
F. Decommissioning Stage (recognising loan-tenure constraint)				
E&S Actions	**Asset-Specific Conditions**	**Responsibilities**	**Evidence / Records**	**Verification & Frequency**
Plan for end-of-life pathways at	PV module/battery recycling; boiler dismantling; chemical tank disposal	MSME (when End of Life arises); Vendor/EPR channels	Disposal certificates; handover to authorised recyclers	Verification feasible only if within loan tenure; otherwise, documented commitment at appraisal
Residual risks during dismantling: OHS, spills, traffic control	Dismantling method statements; PTW/LOTO	MSME; Contractor	PTW; spill & incident lo	At time of dismantling

This section outlines the minimum, stage-wise environmental and social (E&S) actions and responsibilities that MSME sub-projects are required to follow under FMAP. These actions are designed to be practical, asset-anchored, and implementation-oriented, helping MSME units translate FMAP safeguards into day-to-day operational practices.

This whole section, which describes SIDBI's internal ESMS procedures for appraisal, supervision, and portfolio-level reporting under FMAP's direct-lending modality.

Structure and Linkages

The stage-wise ESMP covers the full cycle of MSME sub-projects, including: screening/appraisal, installation, commissioning, routine operation, monitoring & reporting, and decommissioning.

Each action item is explicitly linked to the risk clusters identified in Section 2.5—

- Pollution & Resource Efficiency
- Occupational Health & Safety
- Community Health & Safety
- Labour & GRM
- Gender, SEAH/POSH & Inclusion

These requirements are aligned with the specific asset types financed under FMAP, such as ETPs, washing ranges, stenters, boilers, rooftop solar PV systems and mobility solutions. This ensures that MSMEs can clearly understand the E&S expectations related to the particular technologies they adopt.

Implementation and Verification
To support consistent and reliable implementation, SIDBI will apply its standard internal review processes, including onsite verification by the Relationship Manager and Technical Officials. SIDBI will also use structured assessment tools such as the ESG/Green Rating Tool, ESDD formats, and Measurement & Verification (M&V) protocols to ensure transparency and uniformity in evaluations.

MSMEs will receive Technical Training and Capacity Building (as TA workshop) to prepare and implement unit-level ESMPs or E&S strengthening plans. In addition, sample-based third-party verification will provide independent oversight across the programme, helping validate ESMP implementation and strengthen portfolio-level monitoring.

The responsibilities and actions described in this section apply to MSMEs, SIDBI, , technology vendors/contractors, third-party verifiers, and Technical Assistance providers only.

2.6 Management and Monitoring Requirements

Effective E&S management requires the SIDBI to implement continuous monitoring, reporting, supervision, and corrective-action mechanisms. These obligations are established under the GCF Environmental and Social Policy, the GCF Screening & Categorization Guidance, and SIDBI's own ESMS.

Environmental & Social (E&S) performance and compliance with the ESMP:

- Monitoring the implementation of ESMP measures for each subproject throughout the project lifecycle.
- Ensuring compliance with GCF Environmental and Social Safeguards (ESS), host-country regulations, and approved subproject-specific ESMPs.
- Maintaining systematic E&S performance records, including effluent monitoring, waste management, occupational health and safety (OHS) indicators, grievance redress data, and stakeholder engagement logs.
- Reporting to the GCF on the project's E&S performance through periodic progress reports.

The GCF Environmental & Social Policy explicitly requires accredited entities to ensure implementation, monitoring, and compliance with mitigation measures identified in ESIA/ESMP. SIDBI's ESMS additionally requires ongoing E&S risk management, including monitoring and reporting across subprojects through the entire project cycle.

Conduct periodic site audits, inspections, and impact assessments:
Regular site visits/audits at a frequency proportionate to risk category are conducted and the details are as under:

- High-risk subprojects - quarterly or more frequent monitoring
- Moderate-risk - semi-annual or annual monitoring
- Low-risk - annual or desk-based compliance checks.
- Track actual impacts versus predicted impacts identified in ESIA, adjusting mitigation measures as needed (adaptive management).
- Document non-compliances and ensure corrective action plans (CAPs) are implemented within agreed timelines.

SIDBI's ESMF and project cycle framework specify monitoring frequency, site audits, incident reviews, and corrective-action tracking as core components of E&S supervision.

The World Bank/IFC ESF and GCF guidance emphasize adaptive monitoring, disclosure, and ongoing reassessment of risks throughout implementation, requiring borrowers/accredited entities to adjust measures whenever impacts deviate from predictions.

At the varying levels of E&S capacity across MSMEs, technical assistance (TA), capacity-building and independent verification mechanisms form an integral part of FMAP's implementation strategy. SIDBI already applies similar models across its green financing lines, including external technical partners, third-party auditors, and structured reporting formats.

Technical Assistance (TA) providers will help MSMEs prepare site-specific ESMPs strengthening plans, aligned with the risk clusters and asset-specific mitigation requirements in Section 2.5.

Under the Technical Assistance (TA) plan, dedicated workshops will be organized to build the capacity of MSMEs, PFIs, and NBFCs on the application of environmental and social safeguards (the number of workshops can be increased as per requirement and size of participants). These workshops will provide structured knowledge on how E&S aspects are integrated during project screening, implementation, and monitoring & verification (M&V). A specialized agency will be engaged (as per the TA plan submitted during proposal) to design and deliver the workshops, preparing training materials and guidance aligned with the GCF's E&S standards and the FMAP programme. SIDBI EE team will be actively involved in the preparation, review, and finalization of these materials to ensure their relevance and quality. This initiative will strengthen institutional understanding and practice of E&S compliance, thereby supporting the effective adoption of low-carbon technologies within the MSME sector.

- MSMEs will receive guidance on documentation and residual-risk management, emergency preparedness, and labour/women-safety safeguards.
- ESG Rating Tool, ESDD checklists and M&V protocols will be used to standardise assessment and strengthen implementation.

Regarding Third-Party Monitoring and Sample Based Verification, SIDBI will engage independent agencies for sample-based verification across the MSME portfolio. Third party verifiers will review implementation of ESMP actions, conduct site visits, and check evidence records like pollutant load, effluent logs, OHS training, emergency systems, GRM functioning, POSH/SEAH. Verification findings will serve into portfolio level reporting, corrective actions, and capacity-building needs.

SIDBI's Technical Officials (E&S and Climate Expert) and Relationship Managers, will monitor progress at key applicable ESMP stages. TA workshop and third-party findings will be integrated into SIDBI's internal supervision, tracking, and periodic reporting to GCF as per FAA. This will strengthen alignment between implementation and program-level accountability. This combined approach ensures that MSMEs receive hands-on support to meet ESMP requirements, while SIDBI maintains a robust oversight framework consistent with FMAP safeguards and SIDBI's green lending standards.

3. Loan Processing Framework for direct lending operations[4]

3.1 Loan Screening and Approval Process (for direct loans)

The Loan Approval Process is a comprehensive three-stage procedure designed to rigorously evaluate loan applications and ensure adherence to the stringent criteria.

The first stage, Application and Initial Screening, is conducted at the branch level by the Relationship Manager of SIDBI. During this phase, applications are meticulously screened for completeness, including the submission of mandatory documentation such as climate-related, environmental, and social safeguards documents. Incomplete applications are promptly rejected/ hand holded to be completed, as the case may be, while only those deemed complete undergo initial screening against the exclusion list criteria. Further, at this stage, the individual proposals would be assessed for the following to ensure that they do not fall under the Cat. A/ I-1 activities of GCF:

1. Project outlay (if more than USD 60 million per project)
2. Whether the potential impact (environmental and/or social risks) are diverse, irreversible, or unprecedented
3. Whether the impact of the project be addressed through adequate policy implementation and workplace standards and suitable norms?

Based on the above assessment, if the project is found to be in the category Cat. A/ I-1 of, then the project will be screened out and will not be considered for financing.

Applications that meet the criteria are forwarded to the second stage, Due Diligence, while those that fall under the exclusion list (which includes the Category A/I1 projects) are rejected. The Due Diligence stage is executed in parallel at the branch level and involves several crucial assessments. The second level of screening will be done by means of the ESG rating tool (attached as Annexure 7 of ESMS). The Processing Officer conducts evaluations related to Know Your Customer (KYC) requirements, financial viability, credit due diligence and checking of ESDD checklist information (Annexure- 4 of ESMS). Concurrently, the Climate Expert, Technical Expert and E&S expert at the Project Management Unit (PMU) will perform climate-related, technical due diligence and will check the projects for ESS compliance (using the ESG rating tool) to ensure the soundness of the proposed project from a technical, E&S and climate perspective.

In the third stage, technically sound and financially viable applications proceed to the Credit Appraisal Memorandum preparation phase. The Processing team comprising Maker and Checker compiles a comprehensive Credit Appraisal Memorandum, which is then presented to the Loan Sanctioning Committee for final evaluation and decision-making. To maintain transparency and impartiality, no member involved in the Initial Application Screening and Due Diligence processes is permitted to be part of the Loan Sanctioning Committee.

[4] SIDBI, "Environment and Social Management System (ESMS) 'Financing Mitigation & Adaptation Projects (FMAP) in Indian MSMEs", Page 27-29, https://www.sidbi.in/assets/front/pdf/ESMS-FMAP-E.pdf

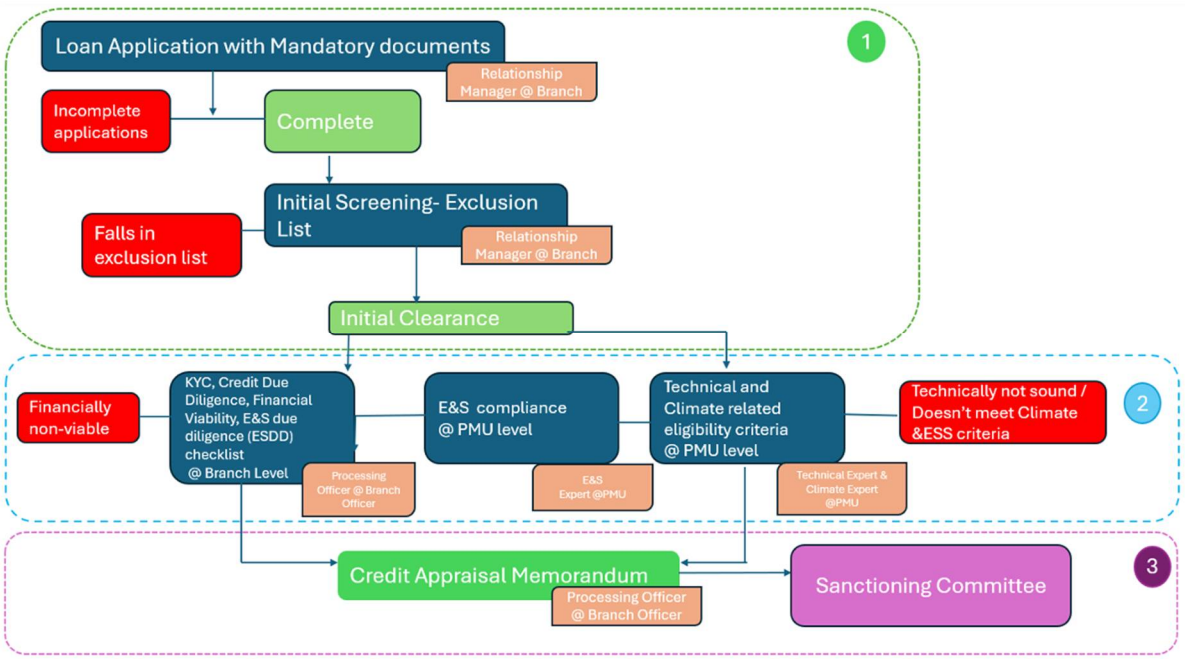

Figure 1: Loan Application Process

For direct loans, risk screening is carried out by SIDBI at the individual project level before financial approval. Each MSME proposal undergoes detailed checks against the exclusion list and Category A/I-1 criteria. Environmental and Social Due Diligence (ESDD) is performed, supported by the ESG rating tool, and project-specific ESMPs are prepared to ensure compliance with environmental and social, safeguards. This ensures that only technically sound and compliant projects are financed directly by SIDBI.

Risk management for the direct loans are focused on the individual project level. Each MSME borrower must demonstrate compliance with the sectoral ESIA/ESMP and ESMS, which outlines impacts/mitigation measures, monitoring indicators, and responsibilities. SIDBI, as the Accredited Entity (AE), directly screens proposals, by ensuring that MSME's submit a holistic Environment Social Due Diligence(ESDD) and ESG rating tool which encompasses environment and social risks like (Pollution control, Labour issues, Occupational health and safety, SEAH, Grievance Redressal, Gender), and ensures that every project meets environmental and social safeguards before financial approval.

3.2 Risk Identification & Mitigation Strategy

Table 6: Identification risk and its mitigation strategy

Type	Risks Identified	Mitigation Measures
Environmental	Toxic discharges, hazardous emissions, noise fury, waste chaos	Advanced pollution control (air, water & noise whatever applicable), Waste management, wherever applicable, clean tech retrofits, real-time monitoring, Statutory and regulatory clearances, climate-smart innovation, proper hands-on training be given to the operators before operation, regular inspections, Operation & Maintenance of machineries / equipment, Fire safety guidelines /manuals, Do's & Don'ts in the facility etc.
Social	Unsafe labour conditions, gender	Institutional safeguards, Personal protective Equipment (PPE) like Masks, Goggles, Gloves, Harness must be provided, Display boards

	inequity, SEAH, underpayment	with danger signs placed at electrical and hazardous areas, Wage enforcement, GRMs, Gender Action Plans
Community	Health deterioration, land stress, exclusion	Community consultations, inclusive benefits, shared infrastructure
Technological	Digital illiteracy, surveillance misuse, e-waste from sensors	Literacy drives, ethical tech use, green IoT design, traceable recycling chains

4. Grievance Redress Mechanism

The sectoral ESMP clearly outlines MSME-level expectations for grievance redressal. At the MSME/site level, each unit must prominently display the internal grievance focal point's details (name/phone/email) at entrances, shop floors, canteens, and dormitories. Worker induction and refresher toolbox talks will include a short briefing on internal grievance channels, escalation options to the Grievance Redressal Committee/Body, and access to the SIDBI GRM as described in SIDBI's ESMS-FMAP (Section 9.5 Awareness and Capacity Building) and GCF IRM.

Each MSME must maintain simple, accessible grievance channels such as a name of grievance officer as point of contact, complaint register/box and ensure basic logging, tracking, and timely resolution of labour / gender based, OHS, SEAH/POSH, and Environmental & Social grievances. SIDBI will verify MSME-level GRM performance during annual ESS Monitoring & Verification (ESS M&V) visits and through any third-party verification done under the Programme. MSMEs will also submit periodic reports to SIDBI summarizing grievance categories, acknowledgements, resolutions, open cases, and corrective actions taken.

In 2013, the Government of India notified the Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act (POSH Act). The Act aspires to ensure women's right to workplace equality, free from sexual harassment through compliance with the above mentioned three elements. It is important to note that the Act provides a civil remedy to women and is in addition to other laws that are currently in force. Consequently, any woman who wishes to report instances of sexual harassment at the workplace has the right to take recourse of both civil and criminal proceedings. As a public financial institution, SIDBI has adopted the POSH policy of the Government of India (Refer Attachment 2 of ESMS in page no 125 -135).

Grievance Redressal Policy (Refer Attachment 3 of ESMS) is based on the principles of customer service and customer satisfaction which would in turn broaden its customer base. SIDBI's policy on grievance redressal follows broadly the following principles:

- Customers are always treated fairly
- Grievances raised by customers are dealt with courtesy and on time
- SIDBI will treat all grievances efficiently and fairly as they can damage the Bank's reputation and business if handled otherwise
- SIDBI's employees must work in good faith and without prejudice to the interests of the customer
- Customers are fully informed of avenues to escalate their complaints/ grievances within the organization and their rights to alternative remedy if they are not fully satisfied with the response of the Bank to their complaints in keeping with the above policy, the GRM has the following provisions:

(a) Registration of complaint: Customer can lodge / register his grievance through any of the following channels:

- Complaint in Person
- Complaints through post / mail / email
- Online Registration of Complaints and
- Grievances lodged through the Public Grievance Portal such as Centralized Public Grievances Redress and Monitoring System (CPGRAMS) (www.pgportal.gov.in)

(b) Mandatory display/ disclosure requirements at SIDBI Offices: The following are displayed/ disclosed at the SIDBI offices for easy filing of grievances.

- Complaint Book/Register
- Complaints/Suggestion Box
- Complaint form at SIDBI website homepage
- Notice Board displaying contact details of Nodal Officers for grievances, escalation of unresolved grievances within 8 working days, and details of Chief Grievance Officer to be approached when not satisfied with the redress.

(c) Resolution of grievances / complaints: The process includes

- acknowledgement after receipt of complaint
- escalation matrix
- referring unsatisfied complaints to higher levels, etc.

Anonymous complaints are not entertained. All efforts are made to resolve each complaint received by the Bank generally within stipulated time as per the following escalation matrix:

Table 7: Escalation matrix at SIDBI

Level	SIDBI Office	Official In-charge
First	Branch Office	Nodal Officer at Branch level
Second	Regional Office	Nodal Officer at Regional level
Third	Head Office	Chief Grievance Officer

There may be some complaints which require deeper analyses from all possible angles. In such cases, the Bank will try to resolve the grievance within one month from the receipt of complaint. In case of unsatisfactory resolution, the resolution can be escalated to the higher level.

4.1 SIDBI's 3-Tier GRM

SIDBI has a three-tier grievance/ complaint redressal system which can be accessed @ https://www.sidbi.in/complaints The details are given below:

Level 1 – Branch Office Level

At the Branch Office, a complaint can be filed in person, post/ email to SIDBI and register online. When a complaint is registered, a unique Complaint ID will be generated/issued. The following complete details to be furnished while registering the complaints enabling them to address the concern(s) in a holistic and timely manner:

- Full name of Complainant
- Customer ID if an existing Customer
- Complainant's Contact details (address, telephone number and e-mail)
- Reference number of Transaction/Complaint ID, depending on purpose

In case of non-receipt of reply within 8 working days of registering the complaint or unsatisfactory reply, it can be escalated to Level 2, using Complaint ID.

Level 2 – Regional Office Level

In case of non-receipt of reply within 8 working days of registering the compliant or unsatisfactory reply, the complaint can escalate it to Level 2 (Regional In-charge), using Complaint ID.

Level 3 – Head Office Level
If registered complaint is not resolved satisfactorily within 5 working days from date of escalation at regional level (Level 2), the complainant can contact Chief Grievance Officer/ Alternate Chief Grievance Officer for redressal.

SIDBI has a functional and well-structured three-tier GRM in place. The existing GRM will be utilized for the bilateral / multilateral supported programs /project. SIDBI will ensure that its GRM is adequately advertised at the levels of all stakeholders.

Additionally, a focal point for the programme will be appointed or nominated who can be contacted to obtain any project-related information or for registering suggestions/grievances. Details of the focal point for each cases shall be made available on the SIDBI/project website.

To assess the overall effectiveness and efficiency of the project GRM, an evaluation will be conducted on an annual basis. Results will be shared with all concerned stakeholders to facilitate improvement in the performance of the GRM and provide necessary feedback. The following points may be assessed during such evaluations:

- Number of complaints/ queries received,
- Category of complainants (Type of stakeholder),
- Status of the complaints (rejected, closed, reopened, ongoing),
- Response time involved in the resolution of complaints,
- Feedback from the aggrieved/ complainants, if any

Further, GCF Independent Redressal Mechanism (IRM) can be accessed on the following link (https://irm.greenclimate.fund/) , wherein affected parties/person can directly file a complaint if they are negatively affected by the projects/programmes funded by Green Climate Fund (GCF).

4.2 Grievance Redressal for Customers & Stakeholders

SIDBI ensures grievance redressal through continuous stakeholder engagement. For non-customers, awareness of mechanisms under Govt. of India/SIDBI/GCF is created via consultations. Citizens may lodge grievances 24x7 through the **Centralised Public Grievance Redress and Monitoring System (CPGRAMS)**[5], accessible via web and mobile (UMANG/Google Play). Complaints can be tracked with a unique ID, and appeals filed if resolution is unsatisfactory.

4.3 Gender-Based Violence & SEAH risk identification and management

While section 4 covers about the labour vulnerabilities including gender safeguards and compliance with India's Sexual Harassment of Women at Workplace (Prevention, Prohibition & Redressal) Act, 2013; commonly known as the **POSH Act** and provides for SEAH/gender assessment under independent monitoring. Accordingly, SIDBI follows the POSH Act, ensuring zero tolerance for GBV/SEAH[6]. The Act mandates:

- Broad definition of workplace (including organized/unorganized sectors).

[5] https://pgportal.gov.in/
[6] SIDBI, "Environment and Social Management System (ESMS) 'Financing Mitigation & Adaptation Projects (FMAP) in Indian MSMEs", Page 71, https://www.sidbi.in/assets/front/pdf/ESMS-FMAP-E.pdf

- Internal & Local Complaints Committees.
- Defined complaint filing and inquiry process.
- Employer duties: safe environment, awareness programs, support to complainants, treating harassment as misconduct, and timely reporting.

MSMEs shall comply with institutional arrangements and report under programme mechanisms. As a Grievance/SEAH/POSH risk screening step, SIDBI will ensure that MSMEs undertake to follow Grievance/SEAH/POSH related information i.e., whether the unit have Internal Complaint Committee with respect to Grievance/POSH / SEAH and any cases registered / resolved. Further, Survivor-Centered Handling i.e., (confidentiality, non-retaliation, referral pathways) are followed as per POSH Act.

It is essential for MSMEs to institutionalize grievance redressal processes to enhance their accountability and stakeholder's trust. Accordingly, MSMEs shall maintain register/records covering the following details: -

i. Total number of grievances received
ii. Summary of grievances received
iii. Details of grievances resolved, pending, reasons for delay in addressing the pending grievances, etc.
iv. Details of number of sexual harassment complaints received and action undertaken to address such complaints.

In addition, Gender Assessment and Gender Action Plan under FMAP in GCF FMAP 241 has been captured in accordance with GCF requirement on Gender and Grievance. Reference Link:- fp241-gender-assessment-cover.pdf and fp241-gender-action-plan-cover.pdf

SIDBI explicitly stipulates that all Category B MSMEs must adhere to minimum labour and working-condition standards aligned with IFC Performance Standard 2, the GCF Environmental and Social Safeguards (ESS), and India's National Labour Code. The Labour Code—effective from 21 November 2025—consolidates 29 existing labour laws into four integrated codes covering:

1. **Wages**,
2. **Social Security**,
3. **Industrial Relations**, and
4. **Occupational Safety, Health and Working Conditions**.

These requirements are designed to identify and manage worker-related risks while ensuring that enterprises maintain safe, fair, and legally compliant workplaces.

In addition, SIDBI mandates that all MSMEs comply with India's statutory prohibitions on child labour and forced or bonded labour. Enterprises must also ensure the protection and fair treatment of vulnerable worker groups, including contract workers, migrant workers, and women workers, along with providing all necessary workplace amenities and welfare facilities in line with national regulations and international good practice.

At MSME site, Workers can access to Nodal officer (name/phone/email) regarding the POSH/SEAH through Prominent display board at entrances, shopfloors, canteens and dormitories/restroom for their Grievance Redressal Issues. Subsequently, worker induction & refresher toolbox talks are included with a short briefing on Internal Grievance Mechanism options, escalation to Grievance Redressal

Management Committee/Body. SIDBI's report on *ESMS- FMAP in Indian MSMEs* **- section 9.5 Awareness and Capacity Building** ESMP training already committed which covers ESMP implementation. Reference **Link:- SIDBI-ESMS-FMAP.**

Verification will be carried out during follow-up visits by SIDBI officers or by third party verification done under the programme, which the ESMP already prescribes. Periodic MSME submission to SIDBI covers various category like Labour/Gender/OHS/SEAH/environment and resolved within the given timeline with corrective actions taken etc.

4.4 Conflict Sensitivity Assessment[7]

- **Community Health & Safety:** OHS safeguards are checked via ESDD/ESG tools before lending. Annual audits ensure compliance. Borrowers must provide medical care, redress, and compensation in case of incidents.
- **Land Acquisition:** Projects are screened to avoid acquisition/resettlement affecting biodiversity-sensitive areas, indigenous communities, or cultural heritage.
- **Indigenous Peoples:** Projects will not be assisted affecting people in voluntary isolation.

5. Monitoring, Evaluation & Reporting Requirements

The FMAP programme adopts a **comprehensive, multilayered Monitoring and Evaluation (M&E) system** that integrates subproject-level ESMP implementation, programme-level oversight, and reporting to the Green Climate Fund (GCF). Monitoring responsibilities are shared across SIDBI, MSME borrowers, third-party agencies, and SIDBI's Programme Management Unit (PMU). The approach ensures continuous oversight of environmental and social performance, GHG emission reductions, and compliance throughout the project lifecycle.

5.1 Continuous Monitoring and Reporting Obligations

1. Monitoring Level (SIDBI)

SIDBI conducts **end-to-end monitoring** from project appraisal through implementation and closure. This includes:

- **Pre-Sanction visits** before loan sanction, where SIDBI verifies actual site conditions through:
  - On-site walkthrough inspections
  - Stakeholder interviews (workers, supervisors, management)
  - Photographic verification and geo-tagged evidence
  - Cross-checking compliance with the exclusion list
  - ESDD and ESG scoring
- **Verification of mitigation measures** listed in the project-specific ESMPs, including:
  - Pollution control infrastructure (ETP, APCD, caustic recovery, sludge handling)
  - PPE availability and OHS practices
  - Chemical management and hazardous waste disposal
  - Gender, SEAH, and labor compliance (aligned with new National Labor Codes, effective 21 Nov 2025)

[7] SIDBI, "Environment and Social Management System (ESMS) 'Financing Mitigation & Adaptation Projects (FMAP) in Indian MSMEs", Page 73- & 74, https://www.sidbi.in/assets/front/pdf/ESMS-FMAP-E.pdf

- **Annual supervision missions**, including site audits, documentation checks, and follow-ups on corrective actions. **Ensuring submission** by MSMEs, tied to undertakings signed during ESMP rollout (Section 3.4).

2. Third-Party Monitoring

During the initial six years of the programme:

- A **third-party M&E agency** develops monitoring tools, reporting formats, and conducts verification audits.
- From years **7–13**, SIDBI's PMU technical/M&E officer conducts field-level monitoring using the validated tools.
- Independent sample-based evaluations assess:
    - ESMP implementation on the ground
    - Gender and SEAH Action Plan compliance
    - E&S risk mitigation effectiveness
    - Climate benefits (GHG reductions, energy savings, water efficiency)

3. Programme-Level Monitoring by SIDBI

SIDBI monitors:

- Sub-loan performance and disbursements
- Co-financing mobilization
- Climate results (GHG reductions, energy savings)
- Progress towards outputs (beneficiaries, women-led MSMEs, EVs financed, solar projects, etc.)
- Institutional strengthening indicators

All findings feed into Performance Reports and the Annual Performance Report (APR).

5.2 Integration with GCF's Annual Performance Report (APR)

The APR consolidates monitoring results from all financing channels and fulfils SIDBI's obligations. Key elements include:

1. Subproject Disclosure & Reporting

- All directly financed subprojects are disclosed and included in APR submissions.
- APR includes:
    - Summaries of ESIA/ESDD/ESMP implementation
    - Significant changes or material variances post-disclosure
    - Portfolio-level corrective actions
    - Updates on safeguards, gender, SEAH, OHS, climate resilience, and pollution control compliance.

2. Climate & Results Reporting

SIDBI submits:

- **Traceable Excel-based GHG reduction calculations** annually, using:
    - Energy savings data from MSMEs
    - Internationally recognized methodologies (CDM, ISO standards)
- **Programme-level indicators**, including:
    - Core indicator 1 (GHG emission reductions)
    - Core indicator 2 (beneficiaries)
    - Core indicator 3 (value of climate-resilient assets)
    - Core indicators 5–8 (institutional strengthening, innovation, knowledge creation)

3. Compliance Confirmation

Every APR confirms that:

- Sub-loans comply with eligibility criteria
- Sectoral ESMP guidelines are met
- Co-financing ratios are maintained
- All monitoring data meets Evaluation Policy requirements
- Programme-level progress aligns with climate impacts, results framework, and ESMS commitments.

6. Conclusion

The ESIA and ESMP under FMAP is a commitment to responsible industrial transformation for Category B subprojects under direct lending component. These measures would safeguard our environment, uphold workers' dignity and safety, protect community health, and anchor our path toward a sustainable future.

Annexure 1- Negative / Exclusion List

SIDBI does not finance the following (Negative/Exclusionary List of projects) out of the GCF Proceeds:

i. Production or trade in any product or activity deemed illegal under Indian laws or regulations or international conventions and agreements.
ii. Production or trade in weapons and munitions.
iii. Production or trade in alcoholic beverages (excluding beer and wine).
iv. Production or trade in tobacco.
v. Gambling, casinos, and equivalent enterprises.
vi. Trade in wildlife or wildlife products regulated under CITES.
vii. Production or trade in radioactive materials.
viii. Production or trade in or use of unbounded asbestos fibers.
ix. Commercial logging operations or the purchase of logging equipment for use in primary tropical moist forest (prohibited by the Forestry policy).
x. Production or trade in products containing PCBs.
xi. Production or trade in pharmaceuticals subject to international phase outs or bans.
xii. Drift net fishing in the marine environment using nets in excess of 2.5 km. in length.
xiii. Production or trade in ozone depleting substances (ODS) subject to international phase out.
xiv. Production or trade in pesticides/herbicides subject to international phase outs or bans as agreed by GOI based on Stockholm convention.
xv. Production or activities involving harmful or exploitative form of child labour or forced labour.
xvi. Projects/ activities requiring land acquisition and/ or causing Loss of Land / loss of source of income / loss of livelihoods, impacts on community/ displacement of people or communities from private or public lands or any negative impacts on livelihoods.
xvii. Projects located in areas of significant settlement or impacting the natural and cultural resources of tribal people and adversely affecting the land, culture, livelihood, and way of life of tribal and indigenous people.
xviii. Projects located in sensitive ecological areas and natural/ cultural heritage locations. If any activities are proposed in these areas, then the beneficiaries must obtain the requisite permissions. These permissions are required if the activities are taken up within one km from the sensitive ecological areas or heritage locations.
xix. Category A Projects with potentially significant adverse environmental and/or social risks and impacts that, individually or cumulatively, are diverse, irreversible, or unprecedented and I1 i.e. when an intermediary's existing or proposed portfolio includes or is expected to include financial exposure to activities with potentially significant adverse environmental and social.
xx. Projects that affect in any way Indigenous Peoples with limited external contact, also known as peoples "in voluntary isolation", "isolated peoples" or "remote groups".
xxi. Production and distribution of racist, anti-democratic and/or neo-Nazi media.
xxii. Projects that involve the conversion or degradation of Critical Natural Habitats
xxiii. Large agricultural or forestry enterprises (>5,000 ha) producing palm oil or wood that do not comply with recognised international certification systems (e.g. RSPO or FSC) or equivalent regulations.
xxiv. Practices which prevent employees from lawfully exercising their rights of association and collective bargaining
xxv. Nuclear power plants (apart from measures that reduce environmental hazards of existing assets) and mines with uranium as an essential source of extraction.
xxvi. Prospection, exploration and mining of coal; land-based means of transport and related infrastructure essentially used for coal; power plants, heating stations and cogeneration facilities essentially fired with coal, as well as associated stub lines.
xxvii. Non-conventional prospection, exploration and extraction of oil from bituminous shale, tar sands or oil sands.
xxviii. Cross-border trade in waste products unless compliant with the Basel Convention and the underlying regulations.
xxix. Production or trade of persistent organic pollutants (POPs)
xxx. Prohibited transboundary trade in waste (under the Basel Convention)
xxxi. Investments which could be associated with the destruction or significant impairment of areas particularly worthy of protection (without adequate compensation in accordance with international standards).
xxxii. Production or trade in wood or other forestry products other than from sustainably managed forests.
xxxiii. Production, trade, storage, or transport of significant volumes of hazardous chemicals, or commercial scale usage of hazardous chemicals. Hazardous chemicals include gasoline, kerosene, and other petroleum products.
xxxiv. Production or activities that impinge on the lands owned, or claimed under adjudication, by Indigenous Peoples, without full documented consent of such peoples.

Annexure 2 - Environmental & Social Due Diligence (ESDD) Checklist

Name of the MSME enterprise:

Project Location with address:

S.No.	Particulars	Response	Remarks
A. Environmental Aspects			
1	Environmental Clearance from the regulatory authorities	Yes / No / Not Applicable / Applied For	• *If 'Yes', attach copy of the same.* • *If 'Applied For', attach copy of the application submitted by the MSME unit to the concerned SPCB or the receipt copy of the fee paid to the SPCB.*
2	Valid Consent(s) / Clearances from SPCB/CPCB	Yes / No / Not Applicable / Applied For	• *If 'Yes', attach copy of Consent to Establish (CTE) / Consent to Operate (CTO).* • *If 'Applied For', then attach copy of the application submitted by the MSME unit to the concerned SPCB or the receipt copy of the fee paid to the SPCB.*
3	Whether the unit has received any notice for regulatory non-compliance or violation of norms or consent conditions or faced any litigation or material settlement of convictions in court	Yes/No	*If 'Yes', state reasons, which led to industry being notified as 'non-compliant' and actions undertaken to become compliant. State clearly whether the issue has been resolved or not. If not, state reasons clearly.*
4	Compliance of consent - for eg. Installation of pollution control measure suggested as per consent	Yes / No / Not Applicable	*list out deviations if any*
B. Social Aspects			
5	Does the unit employ child and / or forced labor for its operations	Yes/No	
6	Does the unit follow minimum wages act / No discrimination on the grounds of religion/ethnicity/colour/ race/ gender and caste.	Yes/No	
7	Does the unit employ Occupational, Health and Safety related measures for its operations *[For example: Workers wearing Gloves, helmet, mask during operations (especially during welding*	Yes/No	

S.No.	Particulars	Response	Remarks
	operations), installation of fire safety measures (e.g. workable / usable fire extinguishers having pressure gauge needle in green zone), etc.]		
8	Does the unit comply with labour welfare requirements like ESI /EPF etc	Yes / No	
9	Does the unit have occupational facilities such as canteen / restroom / toilet for the worker	Yes/ No	
10	Does the unit employ women? If yes, whether separate facilities such as toilet / rest room provided to them	Yes / No	
11	Does the unit have a Grievance Redressal Mechanism (GRM) and Grievance Register to lodge complaints. *Details of Grievance received/pending/resolved are to be mentioned in remarks column.*	Yes / No / Not Applicable	
12	Does the unit have Internal Complaint Committee with respect to The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) POSH Act / Sexual Exploitation, Abuse, and Harassment (SEAH)	Yes / No / Not Applicable	
13	Do the unit received any complaint or any cases registered under POSH Act / SEAH till date	Yes / No	
14	Is there any provision for Physically handicapped/ Challenged person in the workforce despite of gender.	Yes / No / Not Applicable	
15	Does the unit have prominent display boards indicating GRM(MSME) contact person details /escalation matrix.	Yes / No / Not Applicable	
16	Does the unit have Emergency Preparedness Response Plan (EPRP).	Yes / No / Not Applicable	
17	Is there availability of First Aid at the site and tie up with the local hospital in case of emergency?	Yes / No / Not Applicable	

S.No.	Particulars	Response	Remarks
C. General Land Related Aspects – Common for all types of projects			
18	Does the project / unit is located in the notified industrial area & park / cluster / Special Economic Zone etc	Yes / No	*If "No", the following questions are to be answered (Question 19, 20, 21 & 22)*
19	Does the project require compulsory land acquisition causing displacement of the resident / Involuntary resettlement	Yes / No / Not Applicable	
20	Does the unit / project is located in, areas of significant settlement and / or collective attachment of tribal people / Indigenous People.	Yes / No / Not Applicable	
21	Does the project involve signification alteration / damage / removal of any critical cultural heritage	Yes / No / Not Applicable	
22	Is the project / unit located closer (within 10 KMs) to any eco sensitive zone such as national parks / reserved forests	Yes / No / Not Applicable	
D. Land-related Aspects *(Applicable only for* Brownfield enterprises going for expansion and modernization of their existing operations in a new location / premises; and (ii) Greenfield projects i.e., setting up of new enterprises**)**			
23	Land Status / use classification	• industrial area, industrial estate notified industrial zone, • special economic zones, • Land parcels approved by the Government for non-agricultural use, • solar / wind farms etc where all the necessary statutory permission / infrastructure are available	
24	Transaction Status - Mode of Land Access / Acquisition	• Purchased from Govt (outright / lease) • Privately purchased land	

S.No.	Particulars	Response	Remarks
		through willing buyer–willing seller transactions with clear title • Private Lease • Owned / inherited • Others (please specify)	

(Promoters Signature)

It is hereby certified that the information provided in the above ESDD report by the project proponent has been duly checked/ verified by the undersigned and is found to have sufficient environment and social safeguard measures in place and therefore may be considered for providing loan.

Signature :
Name of Person :
Designation :
Name of the SIDBI Branch :

For the use of SIDBI Branch

☐ Approved

☐ Conditional Approval (Specify the conditions)

☐ Not Approved, Reason(s) thereof

Annexure 3- List of Cross Functional Technology

The technologies mentioned below are used across all the industrial sectors which improves Energy Efficiency, results in cleaner production, enhances resource efficiency and would also result in reduction of GHG emissions which are aligned with the FMAP Programme objective. The E&S Risk Categorization of these technologies would depend on the industrial process as mentioned in this document.

Further, it is to be mentioned that these technologies are also used for projects with backward and forward integration within the eligible industrial sectors identified under the FMAP Programme.

In addition to the above, if the project includes both mitigation and adaptation measures, suitable bifurcation and tagging would be done for the purpose of inclusion in the project and reporting to GCF under the FMAP Programme.

The following cross-sectoral technologies would be funded under the FMAP Programme including the sector under reference.

Sr. No.	Technology Name
1	Variable Frequency Drives
2	Energy Efficient Transformers
3	Energy Efficient Fluorescent Lamps
4	Compact Fluorescent Lamps
5	Metal Halides Lamps
6	High Pressure Sodium Vapor Lamps
7	Light Emitting Diode
8	Microprocessor Based Intelligent Control
9	Exclusive Transformer for Lighting
10	Servo Stabilizer
11	Electronic Ballast
12	Energy Efficient Air Compressors & Blowers
13	Energy Efficient Fans & Pumps
14	Capacitors
15	Automatic Power factor Controller
16	Soft Starter for Motors
17	Maximum Demand Controller
18	Automatic Temperature Controller
19	High-frequency Induction Irradiation
20	High-frequency Melting Furnace
21	Highly Sensitive and Responsive Arc Furnace
22	High-performance Electrolytic Furnace
23	Electromagnetic Irradiation
24	Common Incinerator Alongwith Power Generation Facilities
25	Screw Compressor
26	Computer Desktop Virtual Machine
27	Cooling Towers (Fills with PVC Honey Comb)

Sr. No.	Technology Name
28	Wide Belt Sander
29	Spindle Moulder
30	Multi-boring machine
31	Visi cooler
32	Robot Arms
33	Enginator based on Natural Gas
34	CNC Router
35	Vacuum forming machine with thermostat control
36	Edge Bander Sprint with Power- PC Control
37	Enterprise Resource Planning (ERP) (with PPG module)
38	Automatic Book Sewing Machine
39	Tunnel Dryer for mosquito coil industry
40	Induction Lighting
41	SCADA system
42	Energy Management System
43	Water-tube Boiler (by replacing conventional Smoke-tube Boiler)
44	Condensate Recovery & Recycle System
45	Energy Efficient Boilers
46	Recuperators
47	Cogeneration
48	Heat Pumps
49	Energy Efficient Refrigeration System
50	Automatic Combustion Control for Boilers / Furnaces
51	Regenerative Burners for Furnace
52	Heat Recovery Systems for Boilers (Economizer, Air Pre- heater)
53	Outdoor Intake Control / Variable Air Volume / Heat exchanger
54	High Efficiency DG Set for Power Generation (Low Fuel Consumption with Pollution Control & Canopy)
55	Waste Heat Recovery Boiler
56	Thermal Insulation for Hot & Cold Systems
57	Dehumidification Dryer
58	Building Energy Management System
59	Municipal Solid Waste Based Power Generation
60	Building Energy Management System (BEMS) & Concentrated Solar Thermal Power (CSP)
61	Bioreactor with PLC
62	Batching Plant with Microprocessor Control
63	Wire Condensor Welding Machine equipped with PLC
64	2 Stations Auto Balancing Machine equipped with PLC
65	Standing Seam Roofing and Curving
66	Energy Efficient Air Compressors
67	Variable Frequency Drive for Screw Compressors
68	Heat of Compression Air Dryers (Replacing Desiccant Air Dryer)

Sr. No.	Technology Name
69	Variable Frequency Drive for Oil Pump in Hydraulic Power Packs
70	Energy Efficient Exhaust Fans
71	Variable Frequency Drive for Hot Air Circulation Fan for Preheating Furnace
72	Air Preheater (for Furnace Flue Gas Waste Heat Recovery)
73	CNC Cutting Machine with End Former
74	Fully Automatic CNC Return Bender
75	Automatic Ring Sizing and Loading Machine
76	CNC Vertical Machining Centre
77	Vacuum Holding for Non-Ferrous Components for High-Speed Milling
78	CNC Co-ordinate Measuring Machine
79	CNC Sharpening and Profile Grinding, Automatic Broach Sharpening Machine
80	Turning Machine with Variable Frequency Drive with Regenerative Braking System
81	Servo Electric Turret Punch Machine
82	Abrasive Assisted High Pressure Water Jet Cutting
83	Inverter Based Welding Machine
84	CNC Plasma Cutting Machine
85	Double Polishing Machine (with Inverter Control)
86	Pressure Die Casting Machine
87	Semi-Automatic Pillar Type Hydraulic Hot Moulding Press (with PLC Control)
88	CNC Electronic Spring Control Machine
89	Fully Automatic Hydraulic Hot Chamber with Diesel Burner
90	Rotary Table Machine for Surface Finishing and Polishing (with Inverter Speed Regulation)
91	CNC Punching Forming Machine
92	Open Back Double Point Press - PLC Controlled
93	Automatic Transfer Unit
94	CNC Garter Spring Former
95	Electro-Hydraulic CNC Punching Machine
96	Automatic NC Control Bending Machine
97	Sensor Oxy- Height Control (OHC) and Sensor Plasma Height Control (PHC)
98	Gasifier Based Heat Treatment Furnace
99	Insulated Gate Bipolar Transistor Based Inverter
100	Cylinder Block Boring and Milling Machine (with Variable Speed and Cycle Control)
101	Duplex Roller Polishing Machine
102	Nut Former Machine
103	Double End Chamfering Machine for Pipes
104	Heavy Duty Plano Milling Machine (using AC Variable Drive)
105	Heavy Duty Multi- Coil Electromagnetic Rectangular Chuck (with Variable Control Unit)
106	NC Hydraulic Shearing Machine
107	NC Flame Cutting Machine
108	CNC Spring Making Machine
109	CNC Wire Bending Machine
110	Plano Miller with 3 Cutting Head
111	Electro Permanent Magnetic - Plate Handling System

Sr. No.	Technology Name
112	Electro Permanent Magnetic - Telescopic Spreader Beam
113	Electro Permanent Magnetic - Tilting Plate Handling
114	Electro Permanent Magnetic - Billet Handling Machine
115	Modular Electro Permanent Magnets
116	Battery Operated Electro Permanent Magnetic Lifter
117	Heavy Duty EPM Systems for Rail Machining
118	EPM Modules for Fast Mould Clamping
119	Electro Permanent Magnetic Chucks (MAGNASLOT)
120	CMM Machine (Coordinate Measuring Machine)
121	High Speed Circular Sawing Machine 2, 3 & 4 Hole drilling SPM
122	15 Hole drilling SPM
123	4 Way U drilling & fine boring SPM
124	Multi spindle drilling head SPM
125	Three piller types drilling SPM
126	2Way fine boring SPM
127	CNC Rotary Draw tube bender
128	Electronic Servo
129	CNC Straightening and cutting machine
130	Single Axis NC Tube bender with linear and rotary indexing arrangement
131	Marine engine
132	Corner cleaning machine equipped with PLC control
133	Automatic end milling machine
134	Two Glazing Bead Saw with automatic control
135	High Alumina Brick Refractories
136	Servo driven Spring Coiling Lathe Machine
137	Cold Heading Machine
138	CNC Engraving Machine
139	Pick and Place Machine
140	NC Cutter and Rotary
141	Radial CNC Multi Spindle Drilling Machine
142	Electrically heated Nitriding Furnace
143	CAM Machine
144	Travelling head clicking machine
145	Aluminum Profiling Extrusion Machines (Hydraulic using Variable Pumps with PLC Controlled)
146	Single Spindle Vertical Honing Machine with VFD control
147	Slant Bed CNC Lathe
148	Panel Cutter machine (PLC controlled)
149	CNC machining centre with Inverter controlled
150	Laser Cutting machine
151	Cylindrical Grinding Machine (with Inverter control)
152	CNC Tool and Cutter Grinder
153	CNC Column Moving Horizontal Machining Centre

Sr. No.	Technology Name
154	Automatic end cutter
155	Intermix (with water cooled rotors)
156	Hydraulic Cone Crusher
157	5 axis CNC Tool and Cutter Grinding Machine
158	Flat Bed CNC Chucker
159	Vertical Sliding Head Machine
160	Turn Auto Loading and Unloading CNC Machine
161	Impregnating Plant with VFD controls
162	Automatic Vacuum Press
163	Fully Automatic Polishing Machine (with Frequency Converter)
164	Pilger Machine
165	Hydraulic Puller (with electronically controlled and brake hydraulic dynamometer)
166	Conveyor System
167	Polishing Machine
168	Hydraulic Deep Draw Press with Die Cusion complete with Hydraulic power pack (With PLC control)
169	Seam Welding Machine (with Microprocessor based weld control)
170	5 Axes Universal Milling Machine
171	Multi-wire Cutting Machine with Automatic control using PC
172	Fiber Laser Marking System
173	Gapframe Mechanical Press with PLC Control
174	Continuous Hardening and Tempering Line Furnace
175	Tube Straightening & Cutting Machine equipped with PLC
176	Serpentine Bending Machine equipped with PLC
177	Wire Flattering Mill
178	CNC/PLC based Sheet Metal Rolling and Forming Machine with VFD
179	Spooling Machines (with Variable Frequency Drive Control)
180	High Speed Metal cutting band saw with PLC and VFD control
181	AI&ML based IoT platform for Energy and Asset management
182	Air Pre Heater & Drying Bed in furnace
183	Automation and Control System
184	Automation of Withering Troughs
185	Back Pressure Turbine
186	BEE 5 Star Rated AC
187	Combustion Control System for Boiler
188	Condensate recovery system in boiler/jet dying machine
189	Desiccant-based cooling systems / DeVAP (Desiccant Enhanced Evaporative) HVAC
190	DeSuperheater for Chiller Compressors
191	Economiser in boiler/Thermic Fluid Heater
192	Electric annealing furnace
193	Electric Dry Vacuum Pumps
194	Electric Extrusion Melting
195	Electric Melting Furnace

Sr. No.	Technology Name
196	Electrical Servo Drives
197	Energy Efficient Brushless Direct Current (BLDC) Fan
198	Energy Efficient Pumps - 5 Star Rating Pumps
199	Energy efficient Refrigeration Compressor
200	Energy Efficient Screw Compressor
201	Energy Efficient Turbo Blower
202	Energy recovery ventilation (ERV)
203	ETEKINA (Heat pipe technology for thermal energy recovery in industrial applications)
204	Gas Engine based co-generation technology
205	Gas fired Annealing furnace
206	Gas-fired Reheating Furnace with WHR System
207	Gasifier for Electrical Application
208	Ground & Water source Heat Pumps (GSHP)
209	Hanger Shot Blast Machine
210	Heat Exchanger
211	Heat Pump
212	Hot Air Generator from Briquette
213	Hydrogen fired Vapour absorption machine
214	IGBT based Induction furnace
215	IGBT based temperature control
216	Infrared (IR) Heaters
217	Light emitting diode (LED) Lighting
218	Light Pipe
219	Low-Grade Waste Heat Recovery System (LGWHRS)
220	Magnetocaloric Refrigerator
221	Mechanical Vapor Recompression (MVR) Evaporator
222	Micro Turbine
223	Motors (IE3 or IE4 or IE5)
224	Oxy-fuel combustion in reheat furnace
225	PUF insulation
226	Recuperative burner for heat recovery for high medium temperature furnaces
227	Regenerative burners for high temperature furnaces
228	Screw Compressor with Permanent Magnet (PM) motor
229	Static Reactive Power Generator with Harmonics Filter
230	Steam operated pumping traps
231	Temperature controller for cooling tower fan
232	Thermo Compression
233	Tri-generation
234	Variable Frequency Drives (VFD)
235	Variable Refrigerant flow (VRF) in HVAC
236	Waste Heat Recovery for power generation
237	Compact Scan Digitizing System
238	Mechanical Press with PLC and VFD control

Sr. No.	Technology Name
239	Electric Overhead Travelling Crane with VFD
240	PLC based Fully Automatic Sawing Machine
241	PLC based Vertical Boring Mill
242	CNC Surface Grinder Machine
243	Harmonic filter
244	Ceramic Fiber Insulation for Batch Furnaces
245	TIG welding machine (using thyristorised control)
246	Infrared Irradiation
247	Hot Water Generator
248	Turbulators (for gas fired boilers)
249	Vertical Roller Mill (VRM)
250	Alternative Fuels & Raw Material (AFR) Utilization
251	Energy efficient impeller
252	Methane Capture technology
253	Replacement of steam turbine drive with high-speed motor drive
254	Electric Vehicles and Charging Infrastructure
255	Nano composite surface treatment for condenser in power plant
256	Torrefaction Technology
257	CNC Bending Machine
258	CNC Gear Hobbing Machine
259	CNC Grinding Machine
260	CNC Horizontal M/c Centre
261	CNC Machine (Special Purpose Machine)
262	CNC Milling M/C
263	CNC Turn –Mill Centre
264	CNC Turret Punch Machine
265	CNC Wire Cut Machine
266	Falling Film Evaporator (Re-refining of Lubricating Oil)
267	Wiped Film Evaporator (Re-refining of Lubricating Oil)
268	Fine Grinding (CBN Surface Grinding Machine)
269	Gas Fired / Oil Crucible Melting Furnace
270	CNC Wire Cut
271	CNC Milling
272	CNC Lathe
273	Gas Based Generator set
274	Computerized Automatic Electroplating / Zinc Plants
275	Heavy Duty Horizontal Machining Center
276	CNC Hydraulic Press Brake
277	Automatic Electrostatic Powder Coating Machine
278	CNC Milling Machine - Vertical Machining Centre
279	PVD (Multi-arc Ion) Coating Machine
280	CNC 3 Axes Hobbing Machine

Sr. No.	Technology Name
281	Sealed Quench Furnace (use of Thyristor Power Controller and PLC)
282	Paint Shop with Waste Heat Recovery System
283	CNC Hydraulic Guillotine Shearing Press
284	CNC Turret Punch Press
285	Continuous Gas Carburising Furnace with Endogas Generator
286	Electronic Spring Coiling Machines
287	CNC Gear shaving machine
288	Medium Frequency End- bar Heater
289	Electrical Annealing Bogie Furnaces
290	Gasifier for Melting and Reheating Process
291	Rotoberatory Furnace
292	Aeroseal duct sealing technology
293	Energy Efficient technology for ECBC/Eco-niwas Samhita
294	Radiant Cooling
295	VAM Chillers
296	High Efficiency Automatic Door
297	High Efficiency Automatic Revolving Door
298	Woody Textile Insulator
299	Other Building Material Contributing to Increased Heat Insulation Performance of Building Equipment
300	Hollow Heading Machine
301	Heading Machine with Semi Cover
302	Carbon Fiber Fan
303	Hydraulic Coupling
304	CNC Based Gear Tester
305	Conveyorised Powder Coating Curing Oven
306	Energy Efficient Air Conditioner
307	Energy Efficient Refrigerators (High Efficiency Compressors, Improved Insulation and Precise Temperature and Defrost Mechanisms to Improve Energy Efficiency)
308	Vapour Absorption Refrigeration
309	Fuel Cell Cogeneration System
310	Energy Efficient Elevators
311	Equipment, Machinery and Construction Material Contributing to Increased Energy Savings
312	Heat Reclaim Ventilation / Air Conditioning System
313	High Efficiency Escalator
314	Inorganic Textile Insulator
315	Forming Plastic Insulator
316	Heat insulating opening material
317	Air Sealing Support Material
318	Heat Absorbing Glass / Low Emissivity Glass (Window Panel)
319	Common Effluent Treatment Plant
320	Machine Fixed-film Bio Reactor ETP

Sr. No.	Technology Name
321	Membrane Bio Reactor ETP
322	Automatic Coil Winding Machine
323	Vacuum Impregnation plant
324	Semi-Automatic Press
325	Automatic CNC Core Cutting Machine
326	Hi Speed Precision Power Press with Computerized Control
327	Vacuum Impregnated Plant
328	Automatic/CNC Coil Winding Machine
329	Temperature Control Drying Oven
330	Amorphous Metal Core Transformers
331	CNC Core Cutting Machine
332	Natural Gas Based Oven
333	Microprocessor Based Electric Furnace
334	Plasma Cutting Inverter
335	Catalytic Enameling Machine
336	Extruder with Temperature Control, Pre- heating, Speed Control
337	XPLATE on FD Fan to improve boiler combustion efficiency
338	Solar PV Modules and Semi/Automatic Solar PV Module manufacturing Line
339	IGBT based welding machine
340	Windmills
341	Solar Photovoltaic
342	Micro Hydro
343	Biomass / Bagasse (Gasifier or Cogeneration)
344	Solar Water Heater
345	Wind Ventilator (Wind Powered Exhaust Fan)
346	Solar Power Inverters
347	Renewable Energy based Steam Boiler
348	Residual Derived Fuel (RDF) based Power Generation Plant
349	Powerless Ventilators
350	Renewable Energy Projects (Solar, Wind, biomass etc.) for both captive & non-captive purpose
351	Waste to Energy projects including Compressed Biogas Projects

***Note**- (i) The above list is indicative and not exhaustive; additional technologies/machines may be considered by the AE for funding only where they fall within the approved scope and eligibility criteria of FMAP, are screened and categorized in accordance with the ESMS, and comply with applicable E&S standards.*

(ii) The category indicated in the table reflects the typical risk profile of the technology/process itself. Where the same technology is proposed as part of (a) a brownfield enterprise expanding/modernizing in a new location, (b) a greenfield enterprise, or (c) an off-site RE/EE project, the final categorization of the overall subproject shall be determined through ESDD and site/legal screening. In such cases, the sub-project may be classified as Category B where land-related, siting, community health and safety, or other site-specific risks are assessed as moderate, site-specific, and manageable.