ASIAN INFRASTRUCTURE INVESTMENT BANK

Maharashtra Climate Resilient Distributed Renewable Energy Access Program

Project ID: P000880

Environmental And Social Systems Assessment

(ESSA)

Draft for Consultation

ASIAN INFRASTRUCTURE INVESTMENT BANK (AIIB)

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Acronyms

AIIB	Asian Infrastructure Investment Bank
ASI	Archaeological Survey of India
CEA	Central Electricity Authority
CGRF	Consumer Grievance Redressal Forum
DLI	Disbursement-linked Indicator
DLR	Disbursement-linked Result
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ES	Environmental and Social
ESEL	Environmental and Social Exclusion List
ESMS	Environmental and Social Management System
ESP	Environmental and Social Policy
ESSA	Environmental and Social System Assessment
GoM	Government of Maharashtra
GSDA	Groundwater Directorate of Surveys & Development Agency
MEDA	Maharashtra Energy Development Agency
MoEFCC	Ministry of Environment, Forest and Climate Change
MOP	Ministry of Power
MSEDCL	Maharashtra State Electricity Distribution Company Ltd.
MSKPY	Mukhyamantri Saur Krushi Pump Yojana Scheme
MSKVY	Mukhyamantri Saur Krishi Vahini Yojana Scheme
NOC	No Objection Certificate
OBC	Other Backward Classes
PESA	Panchayats (Extension to Scheduled Areas) Act, 1996
PM-KUSUM	Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan Scheme
POCRA	Project on Climate Resilient Agriculture
PPE	Personal protective equipment (PPE)
RBF	Results-based Financing
RBP	Results-based Project
RBP AP	RBP Action Plan
RF	Results Framework
RFTCLARR	Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013
RTI	Right to Information
SC	Scheduled Caste
SEIAA	State Environment Impact Assessment Authority
SIA	Social Impact Assessment
SIP	Solar Irrigation Pumps
ST	Scheduled Tribe

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Executive Summary

Overview and RBP Description

Maharashtra currently provides subsidized electricity to farmers for groundwater irrigation, but this approach causes financial losses for the state utility and unreliable nighttime power for farmers. To address these issues, the state encourages the adoption of off-grid solar-powered water pumps and gradually shift grid-connected pumps to solar energy.

To achieve this, Government of Maharashtra (GoM) is implementing the following initiatives: (a) ongoing Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM) scheme launched by the central government; (b) Mukhyamantri Saur Krushi Pump Yojna (MSKPY) launched by the Government of Maharashtra (GoM) in 2019 which concluded in 2022; (c) Magel Tyala Saur Krushi Pump Yojana (MTSKPY) which is a flagship initiative by the GoM that was launched in October 2024 that builds upon the MSKPY, and (d) Mukhyamantri Saur Krishi Vahini Yojana (MSKVY), which was launched by the GoM in 2017. Building on its success, the state government expanded the initiative into the currently ongoing MSKVY 2.0, which targets solarization of 30 percent of agricultural feeders by 2025. While PM-KUSUM, MSKPY and MTSKPY schemes focusses on installation of solar pumps (3 HP, 5 HP, and 7.5 HP) for farmers without grid connection; the MSKVY 2.0 provides support in installation of decentralized solar power plant projects of 0.5 MW to 25 MW near 5-10 kms radius of agriculture-dominated substations.

The proposed AIIB-financed RBP, the “Maharashtra Climate Resilient Distributed Renewable Energy Access Program”, builds on the ongoing GoM initiatives: MSKPY & MTSKPY and MSKVY 2.0. MSEDCL, which is the implementing entity for the programs (MSKPY & MTSKPY and MSKVY 2.0), will also serve as the implementing entity for this RBP. The program will be implemented state-wide, with solar pump deployment taking place across Maharashtra, excluding the districts of Mumbai and Mumbai Suburban. Substation upgradation and construction activities will be concentrated in six districts: Akola, Buldhana, Washim, Dhule, Nandurbar, and Jalgaon.

RBP Development Objective/s (PO) is to promote distributed renewable energy in Maharashtra by facilitating the adoption of off-grid solar pumps for farmers seeking new connections and by enhancing the climate resilience of the electricity distribution network through grid strengthening.

Program Activities: The RBP will be implemented in a Multi-Phase Program (MPP) Approach consisting of two sub-programs: Sub-program 1 and Sub-program 2. **Sub-program 1** to be implemented for three years (2026–2028) will include: (a) Installation of 300,000 solar PV pumps of 3 HP, 5 HP and 7 HP capacity; (b) Upgradation of 80 substations; (c) Construction of 45 new substations, including 33 kV transmission lines; (d) Recruitment of staff in the Project Management Unit (PMU). (e) Establishment of M&E Unit within the PMU through staff recruitment; (f) Conducting 1,500 training sessions to enhance capacity of farmers and local community members on the use and maintenance of solar irrigation systems. (g) Establishment of a mechanism to enhance coordination among relevant state departments, potentially involving production of annual coordination reports. **Sub-Program 2** which will cover the remaining two years (2029–2030), will focus on: (a) Installation of an additional 200,000 solar-powered water pumps (b) Conducting of additional training sessions to enhance capacity of farmers and local community members.

Objective of the ESSA and Methodology

Objective of the ESSA: An Environmental and Social Systems Assessment (ESSA) has been conducted for the proposed RBP to (i) assess the potential environmental and social (ES) risks and impacts of the proposed RBP; (ii) assess the adequacy of the systems proposed to be applied to the RBP for managing potential ES risks and impacts; (iii) assess the institutional capacity of MSEDCL and involved agencies in managing of ES risks and impacts of the RBP; and (iv) recommend actions to strengthen specific aspects of the capacity of involved agencies and these systems for mitigating ES risks and impact during the preparation and implementation of the RBP. This ESSA has been prepared for Sub-Program 1. An evaluation will be conducted in Sub-program 2. The evaluation will review the progress and effectiveness of the RBP Action Plans and agreed ES actions in this ESSA and address any outstanding ES issues from Sub-program 1 - and will update the RBP AP and ES actions where necessary.

Methodology: The ESSA relied on both secondary literature review and primary data collection. The Project Team reviewed the relevant secondary literature prior to and during the conduct of the ESSA. The key documents included applicable Acts, Rules, policies, Government Orders, Circulars, Gazette notifications, guidelines, standard bid documents, reports and studies commissioned as part of program preparation. As part of primary data collection, the Project Team held meetings and discussions with representatives of key government departments and agencies, vendors of solar pumps, contractors, field staff, and beneficiaries [including women and those belonging to scheduled tribe (ST) and scheduled caste (SC) communities]. Field visits were also conducted to sites with solar pump installations, substations, MSEDCL training center — in three districts namely Nashik, Aurangabad and Pune.

Expected ES Effects of the RBP

Based on the ES screening exercise carried out during ESSA preparation, the following environmental and social risks, impacts and benefits have been identified:

The RBP is expected to result in positive outcomes. The program will provide water and energy security to farmers through clean energy and help curb environmental pollution. Beneficiaries of solar pumps will have access to reliable daytime, high-quality electricity which will significantly enhance agricultural productivity. Daytime power supply is likely to result in improved health and time savings for communities, particularly women and children at large. Tribal and marginalized farmers including women will benefit from the subsidies and reservation related to the installation of solar pumps. With improved ES staffing and monitoring, RBP activities will result in enhanced transparency and accountability. The program will improve knowledge and awareness on sustainable irrigation, water conservation, and drought-resistant farming practices. It will promote the involvement of women and marginalized groups in training and community engagement. Furthermore, the program aims to optimize resource use and reduce duplication through inter-departmental coordination.

Environmental: Some RBP activities are likely to result in direct and indirect impacts on the environment. There are concerns related to exacerbation of depletion of groundwater resources in the state by encouraging over-extraction, switching to water intensive crops or leading to wastage of water due to assured power availability. However, the program has taken into cognizance of the issue and has mitigated this by excluding dark zones (overexploited, critical, or semi-critical areas). Moreover, the program has been designed considering the different schemes that are implemented in Maharashtra for conservation and protection of groundwater and hence there will be active monitoring to control/mitigate adverse impacts. The management of damaged or non-functional solar panels will be the responsibility of the vendors through the insurance period and thereafter governed by the law of the land. There are potential risks related to unlined/unguarded open wells, electrocution, slip and trip hazards, falling from height

due to construction and maintenance of work at substations and transmission lines. These risks will be managed through execution of procedures and management plans by contractors and supervision from MSEDCL PIU. The operation of substations may result in localized contamination, particularly from mineral oils containing polychlorinated biphenyls (PCBs) or other hazardous materials such as batteries or broken glass. Proper waste segregation, collection, and disposal systems must be enforced. Overall, these risks are considered limited, localized, and reversible, and can be effectively mitigated through measures outlined in the ESSA document.

Social: Potential social risks and impacts include (a) risk of exclusion of poor and marginalized farmers, particularly women from accessing the scheme on installation of solar pumps due to discriminatory practices in land titling, complexities in the application process, lack of awareness about the scheme, financial constraints, etc. (b) Private land acquisition for solar pump installation and upgradation of substation is not envisaged. The solar pumps under this program will be installed on land owned by beneficiary farmers. Further, upgradation of substations will be within the boundary of the existing substations, whereas construction of new substations will be on government land. (c) Upgradation/construction of substations will be carried out in tribal areas such as Jalgaon, Nandurbar, and Dhule districts which have Blocks that are either fully or partially covered under the Fifth Schedule of the Indian Constitution. Any activities causing relocation of the tribal population or having significant impact on them will be excluded from the RBP. (d) Labor deployment for construction related activities is likely to be moderate and local—not leading to labor influx and related sexual exploitation and abuse (SEA)/sexual harassment (SH) risks. (e) Grievance management is robust but is mainly confined to address grievances of MSEDCL consumers and not the “affected persons” of the program. Appropriate and adequate measures have been integrated in the ESSA document to mitigate these risks and impacts.

Program exclusion. The following are the criteria for exclusion of High ES risk activities applied on this RBP:

(i) All Category A activities.
(ii) All Category B activities that are likely to have significant adverse impacts that are sensitive, diverse, or unprecedented on the environment and/or Project-affected people.
(iii) Activities located in, adjacent to, or traversing along modified, natural, or critical habitats and forest areas (in the absence of clearance from the Forest Department)
(iv) Activities that would adversely affect places of cultural significance and protected historical/archaeological assets (both natural and human-made).
(v) Activities resulting in extraction of groundwater in dark zones/ GSDA notified areas (overexploited, critical or semi-critical areas), boreholes located in hard rock formations.
(vi) Activities which will cause relocation of tribal population or have significant impact on them.
(vii) Activities resulting in any physical displacement in government land and private land acquisition.
(viii) Activities that may involve or result in forced eviction.
(ix) Activities or items specified in the list set forth in the ESEL.

The assessment confirmed the activities do not include those which are not eligible for RBP financing. During the implementation, it will be required to ensure that all such activities ineligible for RBP financing remain excluded.

Assessment of Borrower's ES Management System

Policy and Legal Framework for Managing the ES Effects of the RBP: There are adequate laws and policies that provide avenues for access to information, accountability, and transparency. The Constitution of India, central and state laws ensure protection of the interest of Scheduled Caste (SC) and Scheduled Tribe (ST) population in the State. Laws such as the Equal Remuneration Act, 1976, Maternity Benefit Act, 1961, Persons with Disabilities Act, 2016 and Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013 elucidate a strong legal framework in India and the state for social inclusion, gender equity, safety for women in public spaces and workspace. There is central legislation on land acquisition and state-level land purchase policies which provide compensation at replacement cost and meet the necessary transitional expenses. For the protection and improvement of environment, the Environment (Protection) Act, 1986 and Environmental Impact Assessment (EIA) Notification, 2006 (amended till date) have been enacted. The Forest (Conservation) Act, 1980 (Amended 1988) and Rules 1981 (Amended 2003): the Wildlife (Protection) Act, 1972 (Amended 1993); the Biodiversity Act, 2002; the Water (Prevention and Control of Pollution) Act, 1972 (Amended 1988) and Rules 1974; the Air (Prevention and Control of Pollution) Act, 1981(Amended 1987) and Rules 1982; the Noise Pollution (Regulation and Control) Rules, 2000 (Amended 2002) and the Hazardous Waste (Management, Handling and Trans-boundary Movement) Rules, 2008 (Amended 2009 and 2016); Batteries (Management and Handling) Rules, 2022, and E-Waste Management Rules, 2016 (and amended thereafter) are other laws that are relevant under this RBP. For groundwater management, Maharashtra Groundwater (Development and Management) Act, 2009 and draft Rules, 2018 have been enacted. Maharashtra State Water Policy 2019 has also been developed to promote integrated water resource management, equitable distribution, and water quality protection. Several programs in Maharashtra have been implemented to promote sustainable water resource management, including the Godavari Basin Integrated Water Resources Management (IWRM) initiative, Atal Bhujal Yojana, and the Maharashtra Water Resources Regulatory Authority (MWRRA). The assessment also reviewed existing labor laws and codes related to labor welfare, wages, health and safety, rights and entitlements at national and state level to conclude that they are adequate to safeguard formal, informal, local, migrant, male and female workforce under the Program. MSEDCL also has robust guidelines on occupational health and safety. These guidelines are detailed in their safety manual and are enforced through various training programs and safety checks. India is also a party and signatory to several international and regional treaties, agreements and conventions relevant for ES safeguards. Overall, it may be concluded that the policy and legal framework is conducive and adequate for ES management.

Assessment of Institutional Capacity for Addressing ES Effects: MSEDCL has specialized departments to manage ES risk management. For instance, land acquisition is carried out by the Civil Department of MSEDCL. Staff trainings on occupational health and safety (OHS) are managed by the Trainings and Safety Department. Employee welfare, including workplace safety (SEA/SH) is under the Human Resource (HR) Department. Grievance management and feedback are handled through toll-free no. setup for consumers and designated Public Information Officers (PIO)/Assistant Public Information Officers (APIO)/Appellate Authority in each department and administrative level. Further, Consumer Grievance Redressal Forum (CGRF) have been established at the zonal level. For monitoring health and safety, Assistant Engineer (Admin) at the circle office, Additional Executive Engineer at the divisional office, and Assistant Engineer at the sub-divisional office are designated as Quality Check and Safety Officers, respectively.

Adequacy of institutional capacity (staff, budget, availability of implementation resources, training, etc.) to carry out defined responsibilities under RBP: The assessment identified the need for engaging specialized ES experts in the PMU and designating ES focal

persons at the circle levels to manage ES risks and impacts within the RBP. While staff and budget have been allocated for OHS trainings, land management and grievance redressal, other components such as ES screening and assessment, stakeholder engagement, preparation and implementation of ESMPs, including ES monitoring and reporting framework—have not been considered (except under the externally aided HVDS program implemented by MSEDCL). Further, staff, vendors and contractors including beneficiaries have limited resources to manage OHS and CHS risks during construction and operation phase. The legal and policy framework to address these risks are robust and stringent, but the challenge lies in implementation. While these requirements have been built into the conditions of contract of the bid documents of contractors and vendors for substations and solar pumps under the RBP, onsite monitoring and supervision of these ES requirements needs to be strengthened. Further, the existing grievance management system mostly focusses on consumer complaints and does not address grievances of those who are likely to be impacted/affected by the RBP. Overall, MSEDCL's systems and practices need to be strengthened to align with the core principles and elements outlined in the Bank's ESP and the Guidance Note on RBF.

Operational Performance in Managing ES Effects: MSEDCL has the experience of working with multi- and bi-lateral development banks (MDBs) such as the Asian Development Bank (ADB). Under the externally- aided Maharashtra Rural High Voltage Distribution System Expansion Program (HVDS), MSEDCL has committed resources (designation of E&S specialists, consultancy firm for ESIA, etc.) and implemented actions necessary for effective ES identification, assessment and management of impacts. For installation of solar pumps, RBP will rely on the government's experience of implementing PM-KUSUM, MSKPY and MTSKPY that have incorporated practices such as stakeholder feedback, grievance redressal, social inclusion and screening/due diligence for exclusion of areas posing high ES risks such as dark zones (overexploited, critical or semi-critical areas) and forest areas, without the NOC of relevant government departments/agencies.

Stakeholder Engagement and Grievance Redressal

During preparation of ESSA, several discussions and meetings were held from June 2024 to February 2025 with representatives from various government departments such as the Department of Agriculture, Department of Irrigation, Groundwater Surveys and Development Agency (GSDA), Department of Environment, and Pollution Control Board, including solar irrigation pump vendors, contractors, MSEDCL field staff, and program beneficiaries (including women and those belonging to ST/SC communities). The executive summary of the ESSA has been translated in *Marathi* and both the ESSA, and the Executive Summary will be disclosed by MSEDCL and AIIB on their website.

MSEDCL has multiple modes for registration of grievances, such as the Mahavitran Toll Free number 1800 102 3435/1800 233 3435, SMS to 9930399303, WhatsApp to 7875767123, Online using the MSEDCL consumer portal or mobile app, by email/post to the Consumer Grievance Redressal Forum (at zonal level), and walk-in (MSEDCL field office, consumer facilitation center). The existing MSEDCL consumer portal or mobile app will be strengthened to include options for receiving, responding and settling grievances related to planning, construction and operation of RBP activities.

AIIB's Policy on the Project-affected People's Mechanism (PPM) applies to this Program. Information on AIIB's PPM is available at: https://www.aiib.org/en/about-aiib/who-we-are/project-affected-peoples-mechanism/how-we-assist-you/index.html

Recommendations and Actions

The ESSA concludes that the Program's ES classification is **Category B** as ES impacts are minor and can be managed by the doable and feasible measures that have been discussed with and agreed by the client. The ESSA recommendations have been incorporated in the DLI and

RBP Action Plan (RBP AP) including the intermediate results framework— with specific details in respect to institutional responsibilities, timelines, indicators, and budget for the completion of actions.

Indicative Table for ES Actions and Measures

No	Identified Gaps	ES Actions	Institutional Responsibilities	Timing	Completion Indicators	Action Type (DLI/ AP)
1.	Resource allocation for ES in the PMU	Hire Environmental Specialist and Social Specialist in PMU supported by supervision officers designated at circle level	MSEDCL	Prior to effectiveness	Environmental Specialist and Social Specialist contracted for PMU. Environmental and social supervision officers designated at circle level.	DLI- 4
2.	ES monitoring and reporting	Adopt ES monitoring and reporting system	MSEDCL	Year 1 onwards	ES compliance report published bi-annually	Action Plan
3.	ES screening and management	Adopt and implement procedures to identify and manage ES risks (related to distribution system strengthening) and impacts of activities supported under the RBP.	MSEDCL	Within 1 month from loan signing	ES screening completed for each activity related to distribution system strengthening. ESMP prepared, disclosed and implemented.	Action Plan
4.	Non-compliance of labor working condition (LWC), occupational and community	Strengthen contractual obligations on LWC, OHS, CHS and waste management and incorporate	Contractors Vendors	Within 2 months from loan signing, or prior to commencement of civil work, whichever is later	C-ESMP prepared by contractors and vendors approved by MSEDCL for activities related to distribution	Action Plan

No	Identified Gaps	ES Actions	Institutional Responsibilities	Timing	Completion Indicators	Action Type (DLI/ AP)
	health and safety (OHS, CHS), waste management during construction/ installation and operation phase.	in the Contractor's Environmental and Social Management Plan (C-ESMP).			system strengthening. Ethical supply chain declaration signed by vendors (applicable in case of Solar-PV investments)	
5.	Exclusion of vulnerable groups during beneficiary selection for installation of solar pumps	Adopt criteria to ensure social inclusion in selection of beneficiaries under the RBP	MSEDCL	Year 1 onwards	% of women beneficiaries with access to solar-powered irrigation systems SC/ST beneficiaries provided with access to solar pumps % of female beneficiaries and staff among total trained participants.	Results Framework
6.	Grievance management	Strengthen grievance management system to address grievances during planning, construction and operation of RBP activities in culturally appropriate and gender inclusive	MSEDCL	Year 1 onwards	No. of grievances of project affected persons reported and resolved within stipulated time	Action Plan

No	Identified Gaps	ES Actions	Institutional Responsibilities	Timing	Completion Indicators	Action Type (DLI/ AP)
		manner				
7.	Groundwater management	Groundwater monitoring at regular interval	MSEDCL	Year 1 onwards	Percentage of SIP areas with active groundwater monitoring	Results Framework

RBP Implementation Support and Monitoring

MSEDCL is responsible for implementing the RBP, monitoring implementation progress, evaluating the indicators, and performing relevant commitments as per the legal documents, including the RBP Action Plan. Such responsibilities involve the MSEDCL keeping the ES management systems effective, implementing monitoring plans, and identifying and solving ES problems in a timely and effective manner. On the other hand, the Bank will review implementation progress and achievement of RBP results and DLIs. In addition, it will provide any support MSEDCL requires in relation to RBP's ES aspects during implementation of RBP.

1. Overview

1.1. Background

1.1.1 Maharashtra, a major agricultural state in India, relies heavily on subsidized or free electricity to farmers for groundwater irrigation. Grid-connected electricity is supplied for agricultural users on a rotational basis at off-peak times. Farmers must wait for unreliable nighttime power, as daytime electricity is prioritized for higher-paying commercial and industrial users. The inability to recover costs from agricultural consumers leads to significant financial losses for Maharashtra State Electricity Distribution Company Ltd. (MSEDCL), limiting its ability to maintain and upgrade the electricity grid for all users. To address these issues, the state plans to promote the adoption of off-grid solar-powered water pumps among farmers and shift the supply of grid connected pumps to solar power.

1.1.2 The proposed result-based program (RBP) is designed to address these financial challenges and boost solar energy integration into the grid. It consists of three key components: (i) financing 500,000 off-grid solar pumps over the next five years; (ii) strengthening the distribution system by upgrading equipment such as transformers, breakers, and feeders to optimize power distribution and accommodate the increasing influx of solar energy; and (iii) providing technical assistance and capacity building to enhance the capacity of the implementing agency and beneficiaries to deliver consistent benefits. The RBP will focus on four main results areas: (a) expanding access to solar-powered irrigation and daytime power supply; (b) strengthening the program implementation unit; (c) enhancing community benefits; and (d) promoting collaborative practices for groundwater management and improving public expenditure effectiveness.

1.1.3 This initiative aims to alleviate financial pressure on MSEDCL and reduce cross-subsidy burdens on commercial users. It will also support broader objectives of clean energy usage. The RBP will contribute to a more sustainable and environmentally friendly energy sector in Maharashtra by advancing solar energy adoption.

1.2. Objectives of the Environment and Social Systems Assessment (ESSA)

1.2.1 An Environmental and Social Systems Assessment (ESSA) has been conducted for the proposed RBP. The overall objectives of the ESSA are to (i) assess the potential ES risks and impacts of the proposed RBP; (ii) assess the adequacy of the systems proposed to be applied to the RBP for managing potential ES risks and impacts; (iii) assess the institutional capacity of MSEDCL and involved agencies in managing of ES risks and impacts of the RBP; and (iv) recommend actions to strengthen specific aspects of the capacity of involved agencies and these systems for mitigating ES risks and impact during the preparation and implementation of the RBP. Outcomes of the assessment would help the RBP to avoid, minimize, or mitigate ES adverse impacts; promote ES sustainability in the RBP design; help clients strengthen their ES systems and develop adequate capacity to manage the ES risks and impacts; and promote informed decision-making relating to a RBP’s ES effects.

1.3. ESSA Process

1.3.1 The following main steps and coverage applied to the ESSA:

- Review of the government program [particularly ongoing schemes such as Pradhan Mantri Kisan Urja Suraksha Evam Utthaan Mahabhiyan (PM-KUSUM), Mukhyamantri Saur Krushi Pump Yojana (MSKPY), Mukhyamantri Saur Krushi Vahini Yojana (MSKVY), etc. which are similar to the proposed activities under the RBP] including the ADB financed Maharashtra Rural High Voltage Distribution System Expansion Program (HVDS) implemented by MSEDCL to assess their ES performance, the extent to which relevant regulatory requirements are being appropriately enforced, and to identify any aspects that need improvement to align with the Bank's core principles for RBP.
- Screening and assessment of the potential ES effects of the activities such as installation of solar pumps, upgradation of substations, etc. supported by the RBP.
- Screening out of high ES risk activities as per the program exclusion list (refer to Section 2.3) and those not in line with Environmental and Social Exclusion List (ESEL), as per the Bank's Environment and Social Policy (ESP).
- Assessment of the existing ES management systems (ESMS) and performance of the MSEDCL which is applicable to the RBP.
- Assessment of the applicability of relevant national laws and legal frameworks relevant to ES management.
- Assessment of the institutional capacity and implementation practices of MSEDCL involved in the management of ES impacts within the RBP, including constraints (staffing, budget, etc.) that would affect ES management of the RBP.
- Assessment of the program system performance at all administrative levels, including those related to planning, implementation, and monitoring of the RBP.
- Recommendation of actions to improve the performance of existing systems to make sure they are adequate to identify, manage, mitigate ES risks and impacts for the BRP, consistent with the core principles of RBF modality[1].

1.3.2 The methodology for ESSA included both secondary literature review and primary data collection. The Project Team reviewed the relevant secondary literature prior to and during the conduct of the ESSA. The key documents included applicable Acts, Rules, policies,

[1] The core principles of RBF modality are **Core Principle 1**: Promote environmental and social sustainability in the RBP's design. **Core Principle 2**: avoid, minimize or mitigate adverse impacts and promote informed decision-making relating to the RBP's environmental and social impacts. **Core Principle 3**: avoid, minimize, or mitigate adverse impacts on natural habitats and cultural resources resulting from the RBP. **Core Principe 4**: protect public and worker safety against the potential risks associated with: (i) construction and/or operations of facilities or other operational practices under the RBP; (ii) exposure to toxic chemicals, hazardous wastes and other dangerous materials under the RBP; and (iii) reconstruction or rehabilitation of infrastructure located in areas prone to natural hazards. **Core Principle 5**: manage land acquisition and loss of access to natural resources in a way that avoids or minimizes displacement, and assist the affected people in improving, or at a minimum restoring, their livelihoods and living standards; Core Principle 6: give due consideration to the cultural appropriateness of and equitable access to RBP benefits, giving special attention to the rights and interests of Indigenous Peoples and to the needs or concerns of vulnerable groups. **Core Principle 7**: avoid exacerbating social conflict.

Government Orders, Circulars, Gazette notifications, guidelines, standard bid documents, reports and studies commissioned as part of program preparation. As part of primary data collection, the Project Team held meetings and discussions with representatives of key government departments and agencies, vendors of solar pumps, contractors, field staff, and beneficiaries [including women and those belonging to scheduled tribe (ST) and scheduled caste (SC) communities]. Field visits were also conducted to sites with solar pump installations, substations, MSEDCL training center — in three districts namely Nashik, Aurangabad and Pune. Details on meetings/consultations held are provided in Section 4.1 and Annex 3.

2. RBP Description

2.1. An Overview of Government Program

2.1.1 There are several ongoing and legacy government programs at the central and state-level, that promote renewable energy, enhance agricultural productivity, and support water conservation in Maharashtra. The proposed RBP operation aligns closely with some of these government initiatives, such as the (a) ongoing Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM) scheme launched by the central government; (b) Mukhyamantri Saur Krushi Pump Yojna (MSKPY) launched by the Government of Maharashtra (GoM) in 2019 which concluded in 2022; (c) Magel Tyala Saur Krushi Pump Yojana (MTSKPY) which is a flagship initiative by the GoM that was launched in October 2024 that builds upon the MSKPY, and (d) Mukhyamantri Saur Krishi Vahini Yojana (MSKVY), which was launched by the GoM in 2017. Recognizing its benefits, the state government expanded the initiative into the currently ongoing MSKVY 2.0, setting a mission 2025 target of 30 percent feeder solarization. While PM-KUSUM, MSKPY and MTSKPY schemes focusses on installation of solar pumps (3 HP, 5 HP, and 7.5 HP) for farmers without grid connection; the MSKVY 2.0 aims to upgrade the grid to accommodate future solarization of agricultural feeders.

2.1.2 The proposed AIIB-financed RBP, the "Maharashtra Climate Resilient Distributed Renewable Energy Access Program", builds on the two ongoing GoM initiatives, MSKPY & MTSKPY and MSKVY 2.0, optimizing existing resources to enhance renewable energy adoption and agricultural productivity. MSEDCL is the implementing entity for both the programs (MSKPY & MTSKPY and MSKVY 2.0) and will continue acting as the implementing entity for this RBP. By extending the impact of these two schemes, this RBP ensures sustained progress and aligns with national and state objectives, fostering long-term sustainability in the agricultural and energy sectors. Additionally, the RBP focuses on farmer training and improved coordination among state agencies to advance groundwater conservation efforts. It aims to address two key challenges: (1) promoting good practices in groundwater management among farmers and stakeholders and (2) strengthening institutional frameworks by fostering collaboration among groundwater-related agencies, ensuring a more integrated and effective approach. More specifically, the AIIB-financed RBP is subdivided into two main components: (i) financing of off-grid solar pumps (under MTSKPY), and (ii) financing of substation upgradation and new substations (to facilitate MSKVY 2.0) thereby integrating solar-powered irrigation systems and solarized agricultural feeders, with the focus on expanding off-grid solar pump adoption, solarizing existing grid-connected pumps, and strengthening the agricultural distribution network.

2.1.3 **Financing off-grid solar pumps.** The proposed RBP seeks to finance 500,000 solar irrigation pumps in a five-year period - from January 2026 to December 2030. The costs associated with this RBP component amount to USD 1,667 million. In terms of solar pump eligibility, all farmers in Maharashtra are eligible, apart from farmers who have already availed benefits from prior government programs and who do not have assured water availability. These measures are in place to ensure the RBP's sustainability, especially in relation to concerns over

groundwater extraction.

2.1.4 **Financing substation upgradation.** To support the objectives of the MSKVY 2.0 program, the RBP aims to finance the upgrade or construction of 125 substations (about 45 new and 80 upgrade) out of a total of 197 over a three-year period, from January 2026 to December 2028. The estimated cost for this component is USD 189 million. This component will cover both new and existing substations, with final selection to be made in consultation with MSEDCL.

2.2. Defining RBP Scope

2.2.1 **RBP Development Objective/s (PO):** To promote distributed renewable energy in Maharashtra by facilitating the adoption of off-grid solar pumps for farmers seeking new connections and by enhancing the climate resilience of the electricity distribution network through grid strengthening.

2.2.2 **RBP Boundary**: The boundary of the AIIB-financed RBP is covered in the table below. It includes the boundaries of the GoM programs and the AIIB-financed RBP, including their objectives, geographic coverage, costs, targets and achievements, and results areas.

Table 1: RBP Boundary

	GoM Programs	AIIB-financed RBP
Objective	**Solar Pump (MSKPY & MTSKPY):** To provide independent and sustainable irrigation solutions through solar-powered pumps with subsidized costs for farmers. **Distribution System (To facilitate MSKVY 2.0):** To upgrade/strengthen the existing distribution system to facilitate solar-power supply to agricultural feeders, ensuring stable power supply and reducing night-time dependence.	To promote distributed renewable energy in Maharashtra by facilitating the adoption of off-grid solar pumps for farmers seeking new connections and by enhancing the climate resilience of the electricity distribution network through grid strengthening.
Geographic Coverage	Maharashtra	RBP covers the entire state of Maharashtra. However, solar pump activities exclude Mumbai and Mumbai Suburban districts. Substation works are limited to six districts: Akola, Buldhana, Washim, Dhule, Nandurbar, and Jalgaon.
Program Cost /	**Solar Pump (MSKPY & MTSKPY):**	• USD 1,835 million (30% of

	GoM Programs	AIIB-financed RBP
Expenditures	• Combined Program Cost: USD 3,882 million • MSKPY Program Cost: USD 2,237 million • MTSKPY Program Cost: USD 1,645 million **Distribution System (MSKVY 2.0):** • USD 189 million	which will be provided from GoM) • Proposed AIIB result-based financing (RBF): USD 1,100 million (60% of RBP)
Targets / Achievements	**Solar Pump (MSKPY & MTSKPY):** • Cumulative Target: 600,000 solar pumps, out of which MTSKPY target is 500,000 solar pumps. • Achievements: 100,000 pumps under MSKPY installed. **Distribution System (MSKVY 2.0):** • Target: 197 nos. substations (new/ augmentation) • Achievements: 2 nos. of substations augmentation	Cumulative Target: • 500,000 solar pumps installation • 80 nos. substations upgradation and 45 nos. of new substations. [Total: 125 substations]
Timeline	**Solar Pump (MSKPY & MTSKPY):** • MSKPY: 2019 - 2024 • MTSKPY: 2024 - 2030 **Distribution System (MSKVY 2.0):** • 2024 - Ongoing	2026-2030
Results Areas	**Solar Pump (MSKPY & MTSKPY):** • Increased access to solar-powered irrigation. • Affordable solar pump solutions with long-term maintenance support. **Distribution System (MSKVY 2.0)** • Feeder solarization through decentralized solar projects near substations. • Increased renewable energy	• Increased access to solar-powered irrigation and reliable daytime electricity supply. • Support for farmers transitioning from subsidized grid electricity to off-grid solar pumps. • Preparing feeder networks to be equipped for localized, distributed solar energy generation • Strengthening of distribution systems and enhancement of

	GoM Programs	AIIB-financed RBP
	integration for agricultural consumption.	feeder capacity to enable the solarization of existing grid-connected conventional pumps. • Technical assistance and capacity building to support grid integration and renewable energy adoption.

2.2.3 **Integrating the RBP in a Multi-Phase Program (MPP) Approach**: An MPP approach will be adopted to implement the proposed RBF, which will be referred as RBF-MPP structure. The rationale for adopting this approach has been detailed in the technical assessment report (section 1.3). The MPP will consist of two sub-programs: Sub-program 1 and Sub-program 2.

2.2.4 **Sub-program 1.** It will span for three years (2026–2028), will support farmers applying for new electricity connections by financing the deployment of 300,000 solar-irrigation pumps. It will also include distribution system strengthening and capacity building activities.

2.2.5 **Sub-program 2.** This will cover the remaining two years (2029–2030), will focus on the installation of an additional 200,000 solar-powered water pumps, along with continued capacity building efforts. The duration of Sub-program 2 may be extended if deemed necessary by the state government.

2.2.6 **Results Areas (RAs)**: There are four results areas under the Program: RA (i) expanding access to solar-powered irrigation and daytime power supply; RA (ii) strengthening the Program Management Unit; RA (iii) creating community benefits; and RA (iv) Improving public expenditure effectiveness.

2.2.7 **Key Activities under the RBP (Sub-program 1):** The following activities will be carried out under Sub-program 1:

- **Installation of 300,000 solar PV pumps** of 3 HP, 5 HP and 7 HP capacity.
- **Upgradation of 80 substations** which includes— augmentation of power transformers, installation of additional transformers, 11kV and 33 kV lines upgradation, new distribution transformer centers and augmentation of existing distribution transformers— within the boundary of the existing sub-stations.
- **Construction of 45 new substation, including 33 kV transmission lines** out of which— MSEDCL is already in possession of land for 21 substations, whereas government land has been identified for an additional 24 substations.
- Full recruitment of staff in the **PMU.**
- Hiring of a **Project Management Consultant (PMC)** reporting to PMU.
- Conducting **1,500** training sessions to enhance capacity of farmers and local community members on the use and maintenance of solar irrigation systems, of which 10% are female beneficiaries.
- Establishment of a mechanism to enhance **coordination among relevant state**

departments, potentially involving production of annual coordination reports.

2.2.8 **Activities under the RBP (Sub-Program 2):** The following activities will be carried out under Sub-program 2:

- Installation of an additional 200,000 solar-powered water pumps
- Conducting of **additional training sessions** to enhance capacity of farmers and local community members on the use and maintenance of solar irrigation systems, of which 10% are female beneficiaries.

2.2.9 **Disbursement Linked Indicators (DLIs) – for Sub-Program 1**: There are expected to be 7 outcome level disbursement linked indicators (DLIs). These are:

i. Number of solar pumps installed annually and operational for at least 6 months
ii. Number of New Substations installed annually
iii. Number of Substations upgraded annually
iv. Number of pumps operational for over a year
v. Number of staff recruited and retained in PMU
vi. Number of people appointed and retained under PMC
vii. Number of training sessions conducted for the community annually
viii. Submission of reports on coordination among state departments that are supporting farmers.

2.2.10 **Geographical coverage:** The RBP will cover the state of Maharashtra, excluding the urban districts of Mumbai and Thane for installation of solar pumps. For distribution system strengthening through upgradation and construction of substations including 33kV transmission lines, two zones i.e., Akola (three circles- Akola, Buldhana and Washim) and Jalgaon (three circles- Jalgaon, Dhule, and Nandurbar) have been considered under the RBP. The zones cover the following six districts in Maharashtra: Akola, Buldhana, Washim, Jalgaon, Dhule, and Nandurbar. The project implementation period spans from March 31, 2026, to March 31, 2030.

2.2.11 **Key implementing agency:** MSEDCL is the implementing entity for the RBP and also serves as the implementing entity for ongoing GoM programs (i.e., MSKPY & MTSKPY and MSKVY 2.0). A Project Management Unit (PMU) will be established at the MSEDCL which will have overall responsibility for compliance, monitoring, and implementation of the Program. MSEDCL's role includes overseeing the installation and maintenance of solar irrigation pumps, managing procurement and contracts, monitoring program performance through digital platforms and remote systems, and coordinating with financial institutions and government agencies to facilitate subsidies and financial support for farmers. The PMU, headed by a Program Director, will include specialized technical personnel as well as environment, social, financial management, and procurement experts. The staff may either be brought in on deputation or hired from the private market. PMU will be supported by Project Management Consultancy (PMC)/M&E Unit for monitoring and evaluation and will provide technical guidance and support for integrating solar energy into agricultural practices, including capacity building for farmers and field personnel. At the district level, MSEDCL circle office will be designated for field level supervision. MSEDCL will also engage an Independent Verification Agency (IVA) to

measure and confirm the achievement of all DLIs under the RBP.

2.3. Screening and Exclusion of High ES Risk Activities

2.3.1 Activities which the Bank determines are of High ES risk are not eligible for financing under the RBF and are excluded from the RBP. The following are the criteria for exclusion of High ES risk activities applied on this RBP:

(i) All Category A activities.
(ii) All Category B activities that are likely to have significant adverse impacts that are sensitive, diverse, or unprecedented on the environment and/or Project-affected people.
(iii) Activities located in, adjacent to, or traversing along modified, natural, or critical habitats and forest areas (in the absence of clearance from the Forest Department)
(iv) Activities that would adversely affect places of cultural significance and protected historical/archaeological assets (both natural and human-made).
(v) Activities resulting in extraction of groundwater in dark zones/ GSDA notified areas (overexploited, critical or semi-critical areas), boreholes located in hard rock formations.
(vi) Activities which will cause relocation of tribal population or have significant impact on them.
(vii) Activities resulting in any physical displacement in government land and private land acquisition.
(viii) Activities that may involve or result in forced eviction.
(ix) Activities or items specified in the list set forth in the ESEL.

2.3.2 As part of the ESSA, the Project Team screened the activities under the proposed RBP. Based on the screening it confirms that the RBP does not include **any High ES risk activities, activities falling under the criteria for ES exclusion** and **activities under ESEL—** as defined in the ESP and the Interim Guidance Note. The criteria for exclusion have been discussed with and agreed by the MSEDCL and other involved agencies.

2.3.3 The RBP was screened to determine whether it would involve any associated activities following the criteria set out in the AIIB's ESP[2] . The screening revealed that there are no associated facilities under the Program. Expansion of distributed solar farms and small solar-powered grids by MSEDCL (mentioned earlier in the Program Summary) are not considered as associated facilities of the RBP, as MSEDCL confirms that these activities that were initially planned to be part of a larger program are no longer within the scope of the government program, thus not being implemented in tandem with the RBP. If these activities are implemented, the Bank will re-assess to determine whether they qualify as 'associated facilities' and are necessary for the Program to be viable and would not be carried out if the Program did

[2] AIIB' ESP (Para. 31.6) specifies that: Associated Facilities are activities that are not included in the description of the Project set out in the Legal Agreements governing the Project, but which, following consultation with the Client, the Bank determines are: (a) directly and materially related to the Project; (b) carried out, or planned to be carried out, contemporaneously with the Project; and (c) necessary for the Project to be viable and would not be carried out if the Project did not exist.

not exist. At present, the new/upgraded substations including 33 kV transmission lines are mainly intended to enhance the overall distribution infrastructure, while some will be linked to existing solar-grids setup under MSKVY to enable the solarization of existing grid-connected conventional pumps.

2.4. Identifying the Expected ES Effects of the RBP

2.4.1 When screening and describing the potential environmental and social effects of the RBP (see **Annex 1**), the ESSA considers the core principles and core elements[3] that are highlighted in the ESP and the Guidance Note on RBF. The ES effect screening for the RBP considered (a) likely ES risks, impacts and benefits of the RBP, (b) contextual risk, (c) institutional capacity and complexity and (d) reputational risks. The potential ES risks, impacts, and benefits (direct, indirect, induced, temporary, permanent, and cumulative) that are related to the RBP have been summarized below and highlighted in **Annex 1**. There are no contextual risks as the RBP is mostly aligned with the government-led programs (MSKPY & MTSKPY, MSKVY 2.0) that have resulted in positive outcomes. There are no institutional complexities that will result in ES risks as there is only one implementing agency. Further, MSEDCL has the experience of working with multilateral development banks (MDBs) and will leverage the experience of working on those projects. The RBP will also support strengthening of the PMU (Results Area-2) to enhance overall project management and execution in all sectors including ES. Lastly, there are no reputational and political realities that will result in ES risks.

2.4.1. Potential Environmental Impacts, Risks and Benefits

2.4.1.1 Based on the ES screening exercise carried out during ESSA preparation, the following environmental risks, impacts and benefits of the proposed RBP have been identified:

2.4.1.2 The RBP will finance installation of off-grid solar pumps, upgradation and construction of new power substations including 33 kV transmission lines, institutional strengthening, capacity building and community mobilization including interdepartmental coordination. The program will provide water and energy security to farmers through clean energy and help curb environmental pollution. However, some of the RBP activities are likely to result in risks to the environment if the mitigation measures as per the government regulations and policies are not adhered to. These include:

(a) Installation of solar pumps may attribute to additional stress on groundwater availability, particularly in dark zones (overexploited, critical or semi-critical areas)— as it incentivizes water-intensive behavior (e.g., cultivation of water-intensive crops) among farmers due to availability of water at all hours. However, this is considered outside the scope of the RBP. As per the National Compilation on Dynamic Groundwater Resources of India 2024, the central part of Maharashtra, which is a drought prone area, receives very less rainfall i.e., from 400 to 700 mm, but the geology is favorable for the ground water recharge. Hence, in

[3] The core elements of RBF modality are defined by the Section 4.4 of RBF Interim Guidance Note (June 23, 2023).

this area the dependency on groundwater is very high. Two-third of irrigation wells are from this area only. This primarily includes parts from Dhule, Nashik, Jalgaon, Ahmednagar, Pune, Satara, Sangli, Solapur, Osmanabad, Beed and Aurangabad districts. The stage of groundwater extraction is particularly high (70% and above) in four districts i.e., Solapur, Buldhana, Ahmednagar, and Amravati. The districts with over-exploited, critical and semi-critical Talukas are: Jalgaon (12), Nashik (6), Pune (5), Sangli (1), Satara (2), Buldhana (5), Aurangabad (1), Amravati (6), Akola (1) and Ahmednagar (10). The over withdrawal of groundwater in these districts is attributed to the water intensive cash crop like Sugarcane, Banana, Grapes and Oranges. Hence, installation of solar pumps in dark zones has been kept out of the purview of this program.

(b) While state has an extensive canal network spanning over 66,000 km, with major irrigation projects playing a vital role in agricultural water supply, groundwater remains the primary source of irrigation, accounting for nearly 71 percent of the state's agricultural water use. The readily available solar energy can incentivize farmers to pump more water than needed, leading to excessive groundwater depletion, particularly in areas with already stressed aquifers. Unlike with traditional pumps run by Diesel where fuel costs encourage water conservation, solar pumps may not have the same economic pressure to limit water usage. The same holds true for on-grid electric pumps, which have the same incentives to use as the electricity is free for agricultural purposes. To mitigate these risks, proper groundwater monitoring, awareness building, incentivizing crop diversification, availing schemes with drip and micro-irrigation subsidies and compliance with the Maharashtra Groundwater (Development and Management) Act, 2009 on water extraction, among others are crucial when implementing solar pump schemes. However, recent CGWB data has indicated the increase in groundwater recharge level in some States including Maharashtra. These could be attributed to concerted efforts made by the State in implementing various water conservation schemes and measures. (Refer to 3.3.1 for further details).

(c) Labor working conditions (LWC) and Occupational health and safety (OHS) risks during construction/ upgradation and operation of the substations include electrocution, cuts due to sharp edges, fall from height, heat stroke, fire hazards, exposure to hazardous materials, etc. Further, absence of labour working conditions such as provision of basic facilities like safe drinking water, health and sanitation, equal wages, working hours, leave and benefits, mechanisms for handling grievances of workers can have potential adverse impacts on workers. Similarly, health and safety risks such as electrocution, slip and trips and fall from height are envisaged in construction and maintenance of substations and transmission lines. Lastly, solar photovoltaic supply chain has also been linked with the risks related to labor working conditions. Thus, effective strategies need to be in place to ensure that solar PV panels produced for solar pumps do not invove risks related to labor working conditions. For instance, to mitigate these risks, form of Attestation Letter from the Bidder to the MSEDCL have been integrated in the contract/bid document for solar pump installation under the RBP. Whereas risks related to OHS can be mitigated through adoption of mitigation plans to ensure compliance with existing labor and OHS laws and regulations, including the health and safety guidelines issued by MSEDCL.

(d) Community health and safety risks (from vehicle traffic, land clearing activities, noise, vibration and material stockpiles) are likely during the construction/upgradation of substations and transmission lines— if sufficient measures such as dust suppression and noise reduction techniques, traffic control measures, and proper material storage are not implemented. Similarly, health and safety risks to humans and wildlife due to electrocution and accidents near water source (wells, ponds/tanks) particularly wells due to improper lining or protection wall— can be envisaged.

(e) Potential risks related to E-waste generation due to improper disposal of damaged solar panels is another aspect to be considered. Due to limited numbers of registered E-recyclers in the state, there remains a possibility of non-functional solar panels generated after the expiry of five (5) year operation stage which will not be disposed as per the regulations. Thus, complying with the requirements of E-waste Management Rules 2016 and amended thereafter— is crucial as it mandates solar PV module producers/manufacturers to also manage their waste (extended producer responsibility), encouraging recycling, reuse, and proper disposal. Further, India has drafted a guideline for management of damaged/non-functional solar PV panels (4 June 2025) wherein it is noted that producers and manufacturers shall devise a collection mechanism for consumers /bulk consumers which may include take back from different stakeholders. Solar waste recycling is a crucial circular economy strategy with significant socio-economic benefits. Recovering materials from solar waste allows for the manufacturing of new PV cells and modules, reducing the need for virgin materials and lowering the environmental impact of mining. Additionally, the entire process of solar waste management, including collection, transportation, and recycling, creates new employment opportunities. [4] Further, to encourage the establishment of e-waste recycling units, Government of India (GoI) is providing subsidies, tax benefits, and support under various programs like Startup India and Make in India. Specifically, the Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECS) offers a 25 percent financial incentive on capital expenditure for setting up e-waste recycling facilities. Thus, the concern for improper disposal of non-functional solar panels can be alleviated through the development of market that will propel the collection and dismantling for its own sustenance.

(f) Lastly, operation of sub-stations may cause soil and water contamination particularly if mineral oils used in the transformers have polychlorinated biphenyls (PCBs). Other toxic and hazardous waste materials include broken glass, other sharp objects, batteries, etc. Proper segregation, collection, and disposal of these materials are crucial for safety and environmental protection. However, these risks are limited, localized, reversible, and can be mitigated through integration of appropriate measures which are detailed in the ESSA document.

[4] https://www.ceew.in/sites/default/files/how-can-india-enable-circular-economy-with-solar-waste-management.pdf

2.4.2. **Potential Social Impacts, Risks and Benefits**

2.4.2.1 Based on the ES screening exercise carried out during ESSA preparation, the following social risks, impacts and benefits of the proposed RBP have been identified:

2.4.2.2 The social risk of the Program is expected to be minor and can be managed through mitigation strategies built into the RBP design as well as the RBP Action Plan. The operation is expected to result in positive outcomes. Beneficiaries of solar pumps will have access to reliable daytime, high-quality electricity which will significantly enhance agricultural productivity and increase their incomes from avoided fuel costs, particularly in areas where solar pumps are run by diesel. Further, increased access to solar irrigation and daytime power supply is likely to result in improved health, time savings for communities and safety, particularly of women and children at large. Since the geographical coverage of the program is the entire state (excluding Mumbai, Thane, and Sindhudurg districts for solar pump installation), all including tribal and marginalized farmers (poor and remotely located) will be benefitted from the RBP. Additionally, subsidies are provided to ST/SC beneficiaries of solar pump installation wherein they only contribute 5 percent as opposed to 10 percent of the total cost for installation. Program activities under Results Area 2 will enhance institutional capacity in managing ES risks and impacts with improved staffing in the PMU. Moreover, M&E and reporting on program activities will result in enhanced transparency and accountability. RBP will also contribute to increased knowledge and awareness on sustainable use of irrigation systems, water conservation and crop cultivation practices that require less water— through intensive trainings. The program will aim towards increasing inclusion and participation of women and other marginalized groups in such community engagement and trainings (Results Area 3). Further, inter-departmental coordination proposed under the RBP will optimize resource use, identify opportunities for synergy and reduce duplication efforts (Results Area 4).

2.4.2.3 However, there are certain risks and impacts identified, which includes:

(a) Although the solar pump installation scheme provides subsidies to ST/SC beneficiaries (5 percent contribution instead of 10 percent of total cost for installation; including 9 percent and 13.5 percent reservation for ST and SC beneficiaries, respectively), there are still risk of exclusion of people belonging to lower income groups and women from accessing the scheme. A pre-requisite for selection of beneficiaries for solar pumps is submission of land records (7/12 Extract or Record of Rights) with the name of the farmer in the document. However, discriminatory practices in land titling, complexities in the application process, lack of awareness about the scheme, financial constraints or physical barriers can contribute to the exclusion of vulnerable groups particularly those that belong to the Below Poverty Line (BPL) and women, from benefiting from the scheme. (Refer to 3.3.2 for further details). To ensure inclusivity, it's crucial to raise awareness about the scheme and make the beneficiary selection process equitable, addressing these barriers to the extent possible.

(b) Private land acquisition for (i) solar pump installation, (ii) substation upgradation and (iii)

construction of new substations including 33kV transmission lines— is not envisaged. The solar pumps under this program will be installed on land owned by beneficiary farmers. Further, upgradation of 80 power substations (upgrading of equipment like transformers, breakers, and feeders, etc.) will be within the boundary of the existing substations, thus no additional land will be required. Whereas for construction of 45 new substations, MSEDCL is already in possession of land for 21 substations. Out of the 21 substations, government land was transferred to MSEDCL for 20 substations, and 1 substation will be built on land already belonging to MSEDCL. Discussions with MSEDCL revealed that the government land transferred for 20 substations were free from encumbrances with no legacy issues. This is further substantiated by the 'feasibility certificate' jointly issued by the Executive Engineer (Civil) and the Executive Engineer (O&M) for each substation, confirming the land's suitability. For the remaining 24 substations, government land has been identified. In addition, 33kV transmission line spanning 15 kilometers from the new substations will be constructed along existing roadways.

(c) Upgradation/construction of power substations will be carried out in tribal areas such as Jalgaon, Nandurbar, and Dhule districts which have Blocks that are either fully or partially covered under the Fifth Schedule of the Indian Constitution.[5] However, the activities proposed under the Program would not have any adverse impacts on land and natural resources; nor will it cause relocation of tribal population, limit access to natural resources and have any impacts on scheduled tribe's cultural resources— as civil works will be carried out within the boundary of the existing substations or government land in case of construction of new substations. The construction activities may pose health and safety risks to tribal communities within the proposed activities' area of influence, including air pollution, increased traffic and noise, disruption of water sources, and potential for accidents. All proposed activities will be screened to ensure that any activity which will cause relocation of tribal population or have significant impact on them will be excluded from the RBP.

(d) Installation of off-grid solar pumps and upgradation of power substations are not labor intensive, requiring between 2-3 workers for installation and approx. 10-20 workers for substation upgradation and 30- 40 workers for new construction at each site. Thus, labor deployment is likely to be moderate and local—not leading to labor influx and related sexual exploitation and abuse (SEA)/sexual harassment (SH) risks. Labor influx, if any are likely to pose risks related to communicable diseases, social conflict, illicit behavior and crime, increased load on existing resources, among others.

(e) The existing grievance management of MSEDCL is robust but is mainly confined to address

[5]

District	Blocks with Fully Scheduled Areas	Blocks with Partially Scheduled Areas
Nandurbar	1.Navapur 2.Taloda 3.Akkalkuwa 4.Akrani	1.Nandurbar 2.Shahda
Jalgaon		1.Chopda 2.Yaval 3.Raver
Dhule		1.Saktri 2.Shirpur

grievances of MSEDCL consumers and not the “affected persons” of the program. For details, refer to Section 4.3.

3. Assessment of Borrower's ES Management Systems

3.1 The Bank's ESP and the RBF Guidance Note set out core principles and elements which provide a systematic guidance to assess the Borrower's systems and their capacity to plan and implement effective measures for ES risk management. The core principles and elements serve as a basis for the provision of the Bank's implementation support through the lifecycle of the RBP.

3.2 The scope of the ES systems assessment will depend on the RBP's context, sector, and the scope of the RBP activities. This section describes the Borrower's ES management systems in place to manage all identified ES effects, especially risks and adverse impacts. The section describes the main elements of applicable Borrower systems and provides an analysis of the acceptability of these systems, considering the level of risk and the extent to which Borrower systems and practices are aligned with core principles and elements outlined in the Bank's ESP and the Guidance Note on RBF.

3.3 The detailed comparison of Borrower systems against core principles and core elements is included as an annex to the ESSA Report, while the main text of the report summarizes the Bank's findings with regard to the adequacy and effectiveness of the Borrower's applicable ES systems to address the identified ES effects of the RBP.

3.4 Policy and Legal Framework for Managing the ES Effects of the RBP

3.4.1 **Description of the applicable ES policy and legal framework.** To review the applicability of policies to the RBP, national and state legal framework relevant to ES management were assessed. This included Acts, Rules, Policies, Schemes, etc. on land, citizen engagement, livelihood, inclusion, gender, labor, pollution control, resource conservation, waste management, and so on.

3.4.2 The Right to Information Act, 2005 and the Maharashtra Electricity Regulatory Commission (MERC) (Consumer Grievance Redressal Forum & Electricity Ombudsman) Regulations, 2006 provide avenues for access to information, accountability, and transparency.

3.4.3 The Constitution of India (including the Fifth Schedule) along with the Scheduled Castes and the Scheduled Tribes (Prevention of Atrocities) Act, 1989 and Rules, 1995 ensure protection of the interest of Scheduled Caste (SC) and Scheduled Tribe (ST) population in the State. Further, Maharashtra provides reservation for ST, SC, De-Notified Tribes (Vimukta Jatis), Nomadic Tribes, Special Backward Category and Other Backward Classes (OBC) in government jobs ensuring positive discrimination and opportunities for the vulnerable communities.6 Further, Panchayats (Extension to Scheduled Areas) Act, 1996 (PESA) which is applicable in Fifth Scheduled Areas (tribal belts) of Maharashtra mandates that tribal communities give their consent before land acquisition or transfer, and for other matters

[6] The Maharashtra State Reservation for Socially and Educationally Backward Classes Act, 2024

affecting their social and cultural life. This ensures tribal self-governance and protection of their rights. Laws such as the Equal Remuneration Act, 1976, Maternity Benefit Act, 1961, Persons with Disabilities Act, 2016 and Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013 elucidate a strong legal framework in India and the state for social inclusion, gender equity, safety for women in public spaces and workspace.

3.4.4 For land related impacts, Maharashtra government has adopted a policy to acquire private land for public purpose using direct purchase through negotiated settlement from willing landowners [Govt. Decision No. SANKIRNA-03/2015/Para.Kra.34/A-2 by the Government of Maharashtra of Revenue & Forest Department as of 12. 5. 2015.]. In addition, MSEDCL in 2015 issued a resolution on acquisition of private land through negotiation under various scheme projects (Dated 13 March 2015). Further, there are central legislations: Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (RFCTLARR) Act, 2013 & Rules 2015; Electricity Act, 2003 & Rules 2005; including the Indian Telegraph Act, 1885 & Rules, 1951 and the Ministry of Power (MOP) Guidelines issued on June 2024 on compensation related to ROW for Transmission Line7— which provides compensation at replacement cost and meet the necessary transitional expenses.

3.4.5 The principal law in India for the protection and improvement of environment is the Environment (Protection) Act, 1986 and key instrument for environmental assessment is the Environmental Impact Assessment (EIA) Notification, 2006 (amended till date). This notification makes EIA mandatory for certain industries and projects, ensuring environmental considerations are integrated into development planning. As per this notification, solar and wind projects are not listed as environmental sensitive projects and hence environmental clearance is not required for such projects. However, forest clearance from the State Forest Department is required in cases where any physical infrastructure is constructed on forest areas or requires cutting of trees in forest areas. Additionally, the Maharashtra Felling of Trees (Regulation) Act, 1964 regulates the felling of certain trees in the state, wherein prior written permission from a Forest Officer is required.

3.4.6 Other environmental acts and regulations relevant to the RBP are the Forest (Conservation) Act, 1980 (Amended 1988) and Rules 1981 (Amended 2003): the Wildlife (Protection) Act, 1972 (Amended 1993); the Biodiversity Act, 2002; the Water (Prevention and Control of Pollution) Act, 1972 (Amended 1988) and Rules 1974; the Air (Prevention and Control of Pollution) Act, 1981(Amended 1987) and Rules 1982; the Noise Pollution (Regulation and Control) Rules, 2000 (Amended 2002) and the Hazardous Waste (Management, Handling and Trans-boundary Movement) Rules, 2008 (Amended 2009 and 2016); Batteries (Management and Handling) Rules, 2022, and E-Waste Management Rules, 2016 (and amended thereafter).

3.4.7 For groundwater management, Maharashtra Groundwater (Development and

[7] https://powermin.gov.in/sites/default/files/webform/notices/Guidelines_for_payment_of_compensation_in_regard_to_Right_of_way_RoW_for_transmission_lines.pdf

Management) Act, 2009 and draft Rules, 2018 has been enacted wherein district authority has been given power to exercise a total prohibition on pumping of groundwater from the existing deep wells of a depth of 60 m or more, in the notified area. Whereas the Maharashtra State Water Policy 2019 emphasizes on promotion of integrated water resource management, equitable distribution, and water quality protection. As per the recent MoJS Guidelines (Notification dated 24.09.2020 with Amendment Notification dated 29.03.2023), agriculture sector is exempted from obtaining a No Objection Certificate (NOC) from the Central Ground Water Authority (CGWA) for groundwater extraction. However, states are encouraged to promote crop diversification and other strategies to reduce reliance on groundwater. Furthermore, areas classified as over-exploited, critical, or semi-critical will not be eligible for solar pump installations as per the Pradhan Mantri Krishi Sinchai Yojana (PMKSY) guidelines. Similarly, to address concerns related to overexploitation due to solar pumps at the state level, a key GR dated November 15, 2018, was issued by the Maharashtra Industries, Energy and Labour Department, which sets forth the criteria for allocating 7.5 HP solar pumps under the MSKPY (Phases 2 and 3) and is also extended to this proposed RBP. As per this resolution, solar pump deployment is prohibited in “overexploited”, “exploited” and “partially exploited” zones, particularly where borewells are situated in hard rock formations. Whereas, in designated "safe" zones, pumps are permitted in tube wells, but with restrictions to ensure groundwater sustainability. For instance, extraction cannot take place in areas where less than 60% of the annual replenishable groundwater resources have been developed; or in areas where well depths exceed 60 meters. This is part of the state's broader strategy to balance energy access with responsible groundwater management, aligning with the Maharashtra Groundwater Development and Management Act, 2009, and the guidelines of the Pradhan Mantri Krishi Sinchai Yojana (PMKSY).

3.4.8 Several programs in Maharashtra promote sustainable water resource management, including the Godavari Basin Integrated Water Resources Management (IWRM) initiative, Atal Bhujal Yojana, and the Maharashtra Water Resources Regulatory Authority (MWRRA). The Godavari IWRM focuses on integrated water budgeting, demand-side management, and conjunctive use of water. The Atal Bhujal Yojana emphasizes aquifer-based planning through Participatory Groundwater Management (PGWM). The MWRRA oversees basin-level water entitlements and audits. District-level water budgeting efforts, such as those in Aurangabad and Jalna, incorporate groundwater recharge planning, crop selection, and irrigation demand forecasts. Additionally, the Command Area Development Authorities (CADA) encourage optimized water use through localized irrigation scheduling in canal command zones.

3.4.9 The assessment also reviewed labor laws and codes[8] related to labor welfare, wages, health and safety, rights and entitlements at national and state level to conclude that they are adequate to safeguard formal, informal, local, migrant, male and female workforce under the Program. Further, the Electricity Act, 2003 covers requirements for general safety during construction, maintenance and operation of substations and distribution lines including reporting

[8] The Code on Wages, 2019; The Code on Social Security, 2020; The Industrial Relations Code, 2020; and The Occupational Safety, Health and Working Conditions Code, 2020

of electrical accidents. MSEDCL also has robust guidelines on occupational health and safety. These guidelines are detailed in their safety manual and are enforced through various training programs and safety checks.

3.4.10 India is also a party and signatory to several international and regional treaties, agreements and conventions relevant for ES safeguards. Overall, it may be concluded that the policy and legal framework is conducive and adequate for ES management.

(For further details, please see **Annex 2** of this document on Legislations and Policies relevant for ES management.)

3.5 Assessment of Applicable ES Policy and Legal Framework, ES Management System vis-a-vis Core Principles for RBF

3.5.1 The table below provides an assessment of the applicable ES policy and legal framework including ES management system against the seven core principles. Annex 4 includes a set of indicative guiding questions and checklists for each of the core principles and core elements.

Table 2: Comparison of Applicable ES Systems Against Core Principles of AIIB's RBF Policy

Applicable laws	Assessment against the Core Principles	Gaps
Core Principle 1: Promote environmental and social sustainability in the RBP's design.		
Environmental Protection Act **EIA Notification** **RFCTLARR Act, 2013**	Relevant ES laws, regulations, procedures, decrees, or other mandatory legal instruments (national, regional, and sectoral/program levels) that are applicable to the RBP activities and their associated risks and impacts have been listed in Annex 2. The legal framework on ES assessment is comprehensive, but since power distribution projects are not listed as environmentally sensitive projects, environmental clearance and EIA as per the EIA Notification, 2006 is not required. However, in case of construction of substation or installation of solar pump in the forest area, forest clearance from the Forest Department is a pre-requisite for diversion of forest land.	While laws and policies are adequate, MSEDCL needs to implement these provisions to ensure compliance with the statutory requirements.

Applicable laws	Assessment against the Core Principles	Gaps
	Additionally, social impact assessment (SIA) is a pre-requisite for private land acquisition through RFCTLARR Act, 2013. However, MSEDCL mainly uses government land or purchases land through negotiated settlement (refer to Core Principle 5 for details). Overall, regulatory frameworks were found to be sufficient to address ES risks and impacts under the RBP. No critical adjustments and measures are needed to the regulatory framework before the start of the RBP.	
Core Principle 2: avoid, minimize or mitigate adverse impacts and promote informed decision-making relating to the RBP's environmental and social impacts.		
Program Safeguard Systems Assessment of India: Maharashtra Rural High Voltage Distribution System Expansion Program. Right to Information Act, 2005 Maharashtra Electricity Regulatory Commission (MERC) (Consumer Grievance Redressal Forum &	In the ADB- funded Maharashtra Rural High Voltage Distribution System Expansion Program (HVDS) implemented by MSEDCL, an Environmental and Social Management System (ESMS) was designed which included an ES screening process, generic EMP and monitoring template. The assessment revealed that the screening process is comprehensive and provides for opportunities for stakeholder engagement. Screening also considers strategic, technical, and site-selection alternatives to avoid or minimize potential impacts and risks. Further, generic EMP are included in the contract documents of ADB financed activities. The ESMS also includes procedures for undertaking ES assessment referred to as 'due diligence'—depending on the level of risks. The MSEDCL has an existing grievance mechanism, details of which are provided in section 4.3 of the ESSA. Further, awareness-generation campaigns on government program such as PM-KUSUM and MSKPY have been conducted during local festivals such as	MSEDCL needs to screen all program activities and obtain the necessary information to enable exclusion of activities that are not eligible for financing under the RBP. The ES management system designed by ADB has only been applied to the ADB funded HVDS program and is yet to be adopted in other programs and activities implemented by MSEDCL. At present, MSEDCL does not have dedicated staff to manage ES risks and impacts. The MSEDCL grievance management system

Applicable laws	Assessment against the Core Principles	Gaps
Electricity Ombudsman) Regulations, 2006	*Pandarpur wari*. Further, distribution of pamphlets for PM-KUSUM, advertisements in local newspapers including camps and live demos by solar pump vendors and MSEDCL have been organized to raise awareness and ensure that stakeholders views, concerns, and suggestions are systematically considered. As per the requirements of Right to Information Act, MSEDCL has designated public information officer, assistant public information officer and appellate authority at the Head office, Zonal, Circle and the Division level offices. MSEDCL is also regulated by the Maharashtra Electricity Regulatory Commission (MERC) (Consumer Grievance Redressal Forum & Electricity Ombudsman) Regulations, 2006. Consumer Grievance Redressal Forum (CGRF) have been established at all zonal levels in accordance with the Act.	addresses complaints of consumers affected by the service; however, it does not extend to those who are impacted/affected by RBP. The existing GRM can be strengthened to extend the nature of complaints that can be filed and addressed. (Refer to Section 4.3 for details)
Core Principle 3: avoid, minimize, or mitigate adverse impacts on natural habitats and cultural resources resulting from the RBP.		
Environmental Impact Assessment (EIA) Notification 2006 under Environmental Protection Act, 1986 (EPA) Forest (Conservation) Act, 1980 (FCA) along with Forest Conservation	Sufficient protections are available under existing laws to ensure conservation of biodiversity and to protect critical habitats from development activities. Activities on forest lands are mostly regulated, with approval and permits being required for every manner of activity. Discussions also revealed that MSEDCL conducts consultations with forest department (where needed), local administration and other relevant management authorities when selecting locations for substations. Based on this, a 'feasibility certificate' is jointly issued by the Executive Engineer (Civil) and the Executive Engineer (O&M) for each substation, confirming the land is not designated as forest land and is	As construction of substations have not been listed in the list of environmentally sensitive projects and hence, no EIA and environmental clearance is required, as per the Environmental Impact Assessment (EIA) notification of 2006 and its subsequent amendments by the Ministry of Environment, Forest and Climate Change (MoEF&CC).

Applicable laws	Assessment against the Core Principles	Gaps
Rules (FCR) Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) Ancient Monuments & Archaeological Sites and Remains Act, 1958 MoJS Guidelines (Notification dated 24.09.2020 with Amendment Notification dated 29.03.2023)	free from other encumbrances. Within the RBP, locations for substations and solar pump installation resulting in potential impacts and risks on modified, natural, or critical natural habitats will be avoided. This is included in the exclusion list and will be screened out prior to implementation of any RBP activities. In Maharashtra, the key entities involved in groundwater management are the Maharashtra State Water Resources Department (WRD), the Maharashtra Water Resources Regulatory Authority (MWRRA), the Groundwater Surveys and Development Agency (GSDA), the Maharashtra Agriculture Department, the Maharashtra Jeevan Pradhikaran (MJP), and the Water Supply and Sanitation Department (WSSD). MWRRA and GSDA are the state's key players in groundwater governance. Additionally, many schemes and programs have been initiated by the Central and State government on groundwater management. Some of these include Jal Shakti Abhiyan, Amrit Sarovar Mission, Atal Bhujal Yojana (Atal Jal), and Ground Water Management and Regulation (GWM&R) scheme, Magel Tyala Shet tale Yojana, Dr Babasaheb Ambedkar Krushi Swavalamban Yojna, Birsa Munda Krishi Kranti Yojna, Project on Climate Resilient Agriculture (PoCRA).[9] Approximately Rs.925.77 Crores has been sanctioned for implementation of Atal Bhujal Yojana in Maharashtra. The scheme is being implemented in the 1,442 villages of 1133 Gram Panchayat from 38 blocks of 13 districts of the state.[10]	The MoEF&CC and the pollution control boards (CPCB - Central Pollution Control Board and SPCBs - State Pollution Control Boards) together form the regulatory and administrative core. Other Ministries/ Statutory Bodies/ Departments responsible for ensuring environmental compliance and granting various clearances includes state ministry /dept. of environment, regional offices of MoEF&CC and state forests/wildlife departments. To appropriately address groundwater challenges, MSEDCL must collaborate with MWRRA, GSDA and other concerned departments and entities, including the local bodies, to formulate policies, enforce regulations, and monitor groundwater usage.

[9] Refer to Annex 2 for details related to the Scheme.
[10] https://gsda.maharashtra.gov.in/wp-content/uploads/2023/09/atal-bhujal-project.pdf

Applicable laws	Assessment against the Core Principles	Gaps
	Consultations with different departments such as Agriculture, Energy, GSDA and MSEDCL revealed that: - Solar pumps are not distributed in GSDA notified areas/ dark zones (overexploited, critical or semi-critical areas). [11] - In areas notified by GSDA where the groundwater status has improved from semi-critical to safe, applications for solar pump connections typically require a No Objection Certificate (NOC) from the local district administration to be considered eligible for the scheme. This requirement is in place to ensure responsible groundwater management and prevent over-extraction, even in areas where the situation has improved. - To minimize the water usage for irrigation purpose, preference for installation of solar pumps is given to farmers using Micro irrigation systems or those covered under Micro irrigation schemes or who opt for micro irrigation system. - Water sources for the scheme may vary from surface water (tanks and ponds) to groundwater (dug wells/shallow wells, and borewells). Thus, groundwater is not the only source of water considered for the solar pump scheme. - The water abstracted is monitored live at different level by the state and central government agencies (MNRE). - GSDA monitors the groundwater level throughout the district. Discussions with GSDA revealed that Piezometer for instant data reporting have been installed in all 1133 GPs where Atal Bhujal Yojana scheme is being implemented. Further, Digital Water Level Recorders (DWLR) have been installed	

[11] There are taluka level notified and non-notified areas depending on the availability and quality of ground water.

Applicable laws	Assessment against the Core Principles	Gaps
	on 336 observation wells and 15 Piezometers. - Awareness building on water conservation is undertaken during installation of solar pumps. Further, as part of promotion of drip-irrigation techniques under POCRA, water conservation trainings were provided to farmers. Further, Groundwater Information Dissemination Centers have been setup in 13 districts (1133 GPs) of Maharashtra to share information and engage with community members to promote responsible water usage. Similarly, installation of solar pump in forest area is not considered, unless NOC from the Forest Department has been obtained and submitted to MSEDCL along with details of their 'right to usage'. Existing legislation also helps minimize or mitigate possible adverse impacts on archaeological sites and cultural resources. Area within the radii of 100m and 300m from the "protected property" are designated as "protected area" and "controlled area" respectively. No development activities (including building, mining, excavating, blasting) are permitted in the "protected area" and activities in the "controlled area" requires prior permission of the Archaeological Survey of India (ASI). To avoid any related impacts, activities that would adversely affect places of cultural significance and protected historical/archaeological assets (both natural and human-made) will not be eligible for inclusion in the RBP.	
Core Principle 4: protect public and worker safety against the potential risks associated with: (i) construction and/or operations of facilities or other operational		

Applicable laws	Assessment against the Core Principles	Gaps
practices under the RBP; (ii) exposure to toxic chemicals, hazardous wastes and other dangerous materials under the RBP; and (iii) reconstruction or rehabilitation of infrastructure located in areas prone to natural hazards.		
Four Labour Codes, namely, the Code on Wages, 2019, the Industrial Relations Code, 2020, the Code on Social Security, 2020 and the Occupational Safety, Health, and Working Conditions Code, 2020 Electricity Act, 2003 Central Electricity Authority (CEA) Regulations, 2010 and amendment Regulation 2015 CEA Regulation, 2011 Maharashtra Electricity	The existing legal framework mandate safe and healthy working conditions, equal opportunity, fair treatment, non-discrimination, freedom of association, right to collective bargaining and access to a workplace grievance redress mechanism — which is regulated by the State Labour Department. MSEDCL must also abide by the worker and public safety measures specified in the Electricity Act, 2003 and associated rules and regulations, including (i) the Central Electricity Authority (CEA) Regulations, 2010 (measures relating to safety and electric supply) and amendment Regulation 2015 (as amended time to time); (ii) CEA Regulation, 2011 (safety requirements for construction, operation and maintenance of electrical plants and electric lines); and (iii) Maharashtra Electricity Regulation Commission, Regulations, 2005 (electricity supply code and other conditions of supply). In addition to these regulations, the Training and Safety Department in MSEDCL has published a Safety Manual and IEC materials on public and worker safety for capacity building and awareness generation.[12] Discussions with site-operators revealed that safety trainings are provided by the MSEDCL department to all operators bi-annually. There is a risk related to labor working conditions in the global supply chain for manufacturing solar panels and solar components. There are sufficient labor laws including the Child Labour (Prohibition and Regulation) Act, 1986 and Bonded Labour System (Abolition) Act 1976	While there are sufficient laws and regulations in place, the site visits during the ESSA reinforced the need to strengthen enforcement of these laws and regulations by the contractors and the operators. For instance, basic safety equipment and PPE kits in substations were found to be either non-functional or expired. Lack of protection measures around water sources, particularly wells in locations where solar pumps are installed are other health and safety concerns noted. While review of bid/ contract documents for substation upgradation works under RBP revealed that E&S provisions have been embedded in the conditions of contract, what requires strengthening is the system to monitor compliance of these

[12] https://www.mahadiscom.in/en/training-safety-department-safety-guidelines-and-manual/

Applicable laws	Assessment against the Core Principles	Gaps
Regulation Commission, Regulations, 2005 Mahavitran Safety Manual Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016 Battery Waste Management Rules, 2022 E-waste (Management) Rules, 2022 Manufacture, Storage, and Import of Hazardous Chemicals (MSIHC) Rules, 1989	which are particularly relevant for solar photovoltaic (PV) investments under the RBP. Further, discussions with empaneled vendors have revealed that manufacturers of the solar PV panel must also obtain a Factory License in accordance with the Factories Act, 1948 to ensure that they comply with the applicable safety, health, and environmental laws and regulations. The existing regulatory framework adequately covers Hazardous materials handling, storage, and waste disposal handling. The waste generated will be disposed of through approved vendors in accordance with Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016. Additionally, batteries, electrical and electronic waste, including solar PV modules or panels or cells needs to be managed and stored according to the provisions of Battery Waste Management Rules, 2022 and E-waste (Management) Rules, 2016 (amended thereafter) and disposed through an authorized recycler. Further, the storage and handling of hazardous chemicals in the form of diesel and transformer oil will be carried out in accordance with the Manufacture, Storage, and Import of Hazardous Chemicals (MSIHC) Rules, 1989 and as amended.	provisions on site during the construction and operation phase. [Except in the Maharashtra Rural High Voltage Distribution System Expansion Program which is driven by the ES requirements of the external funding agency.] Form of Attestation Letter from the Bidder to the MSEDCL have been integrated in the contract/bid document for solar pump installation under the RBP to ensure that solar PV panels produced for solar pumps do not involve risks related to labor working conditions. Challenge exists in disposal of damaged solar PV panels after the end of 5 years commission period, where the onus to dispose of the panels to E- recyclers shift to the owners of the solar pumps.
Core Principle 5: manage land acquisition and loss of access to natural resources in a way that avoids or minimizes displacement, and assist the affected people in improving, or at a minimum restoring, their livelihoods and living standards		
Right to Fair Compensation and	India has robust laws to safeguard the rights of titleholders to fair compensation, rehabilitation and resettlement in case of land acquisition	The review of the MSEDCL Resolution on Direct Purchase indicates

Applicable laws	Assessment against the Core Principles	Gaps
Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 Electricity Act, 2003 Govt. Decision No. SANKIRNA-03/2015/Para.Kra.34/A-2 by the Government of Maharashtra of Revenue & Forest Department as of 12. 5. 2015. CEC/Corp. off. Mum/Tech/956 17-08-2013 CE(Dist)/D-III/Req. of Land/ 28792 dated 17-07-2015	[Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (RFCTLARR)]. However, there are no national and state legislative provisions related to rehabilitation and resettlement (R&R) benefits for non-titleholders in government land, who may be affected during the construction and upgradation of sub-stations. To avoid any related impacts, activities that would result in physical and economic displacement in government land and private land acquisition will be excluded from the RBP. Government of Maharashtra in 2015 adopted a policy to acquire private land for public purpose using direct purchase through negotiated settlement. [Govt. Decision No. SANKIRNA-03/2015/Para.Kra.34/A-2 by the Government of Maharashtra of Revenue & Forest Department as of 12. 5. 2015.] MSEDCL had also issued a resolution on direct purchase to ease the process of land procurement for all their projects including those related to construction of sub-stations (Resolution 368 dated 13.08.2015). Discussions with MSEDCL revealed that government-owned land is mostly considered for construction of new substations. In case of non-availability of government land, land is procured using direct purchase through negotiated settlement and seek alternatives if the owners are not willing to sell. The Electricity Act, 2003 as amended in 2007 also includes provision for payment of compensation for acquiring land and refers that land will be acquired as per Land Acquisition Act, 1984. [13] This is primarily relevant to the	certain shortfalls in terms of calculation of compensation vis-à-vis the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (RFCTLARR Act, 2013) and GoM land purchase policy [Government Decision No. SANKIRNA-03/2015/Para. Kra. 34/A-2 dated 12th May 2015 Revenue & Forest Department, Govt. of Maharashtra]. As per the MSEDCL land purchase policy, the final negotiated amount is maximum up to 3 times the agricultural ready reckoner rate or mean of Agricultural & N.A ready reckoner rate, whichever is less. [14] Whereas the compensation amount under the RFCTLARR Act, 2013 is four times the market value in rural areas, and twice the market value in urban areas, in addition to the value of any assets attached to the land and a

[13] Section 67 and 68 of Part-VIII and Section 164 of part-XVII.
[14] Ready reckoner rate is a government-set minimum property value for taxation purposes, while market value reflects the actual price at which a property can be bought or sold in the open market

Applicable laws	Assessment against the Core Principles	Gaps
	substations. The Electricity Act, 2003 has the provision for issuing notification to all the concerned villages and people prior to any construction activities. Overall, private land acquisition is not envisaged under the RBP. The solar pumps under this program will be installed on land owned by beneficiary farmers. Further, upgradation of 80 power substations will be within the boundary of the existing substations. For construction of 45 new substations, MSEDCL is already in possession of land for 21 substations (20-government land and 1- MSEDCL). For the remaining 24 substations, government land has been identified. E&S screening for 21 locations under possessions have already been carried out. The remaining 24 locations will be screened to confirm that the land is from encumbrances and legacy issues. The 33 kV transmission lines from the substations spanning 15 kms will be constructed along the existing roadways.	"solatium" (additional payment of 100% of the market value of land). Whereas the GoM direct purchase policy calculates compensation as per Sections 26-30 and Schedule I of the RFCTLARR Act 2013 and provides an additional 25% incentive over the market value to the landowner for voluntarily agreeing to sell the land for public purpose. This is equivalent to the replacement cost (i.e. the market value of the land and assets plus the transaction costs related to restoring these assets, without depreciation). Moreover, the MSEDCL circular is silent on the requirement of conducting a social screening or assessment, providing R&R benefits, entitlements to non-titleholders and preparation of resettlement plan. However, it does include a provision to ensure that the process does not lead to any adverse impact on *Adivasi/* Scheduled tribe community. To address some of these risks, ADB prepared a Guidelines for

Applicable laws	Assessment against the Core Principles	Gaps
		Voluntary Donation and Direct Purchase through Negotiated Settlement. Under the RBP, private land acquisition will not be considered. Screening will be undertaken to ensure that government land with no encumbrances and legacy issues is considered for new substations.
Core Principle 6: give due consideration to the cultural appropriateness of and equitable access to RBP benefits, giving special attention to the rights and interests of Indigenous Peoples and to the needs or concerns of vulnerable groups.		
Articles 275(1), 342 and 366 (25) of Indian Constitution (including the Fifth Schedule) PESA RFCTLARR Act Maharashtra State Reservation for Socially and Educationally	The geographical coverage of the RBP is the entire state for solar pump installation[15] and six districts for sub-stations and distribution lines[16].Thus, both solar pump installation and construction of substations will be carried out in Fifth Scheduled Areas (tribal belts) of Maharashtra.[17] Tribal and marginalized farmers (poor and remotely located) will be benefitted from the solar pump installation schemes. MSKPY like the PMKSY provide subsidies for ST/ SC population wherein they only contribute 5% as opposed to 10% of the total cost for installation.[18] MSEDCL also informed that out of the total application received for installation of solar pumps, 9% is reserved for ST beneficiaries, 13.5% is reserved	While adequate provisions (RFCTLARR and PESA) are in place for meaningful consultation during land acquisition, there are no provisions or system in place to ensure meaningful consultations are undertaken in a culturally appropriate manner during the implementation phase. As for land records needed for installation of solar pumps, it's possible

[15] Excluding Mumbai, and Mumbai Suburban districts.
[16] Akola, Buldhana, Washim Dhule, Nadurbar, and Jalgaon.
[17] In Maharashtra, Thane, Pune, Nashik, Dhule, Nadurbar, Jalgaon, Ahmednagar, Nanded, Amravati, Yavatmal, Gadchiroli, Chandrapur are either fully or partially covered districts that have been notified as fifth schedule areas.
[18] https://www.mahadiscom.in/wp-content/uploads/2024/08/ANNUAL-ADM.-REPORT-FY-23-24.pdf

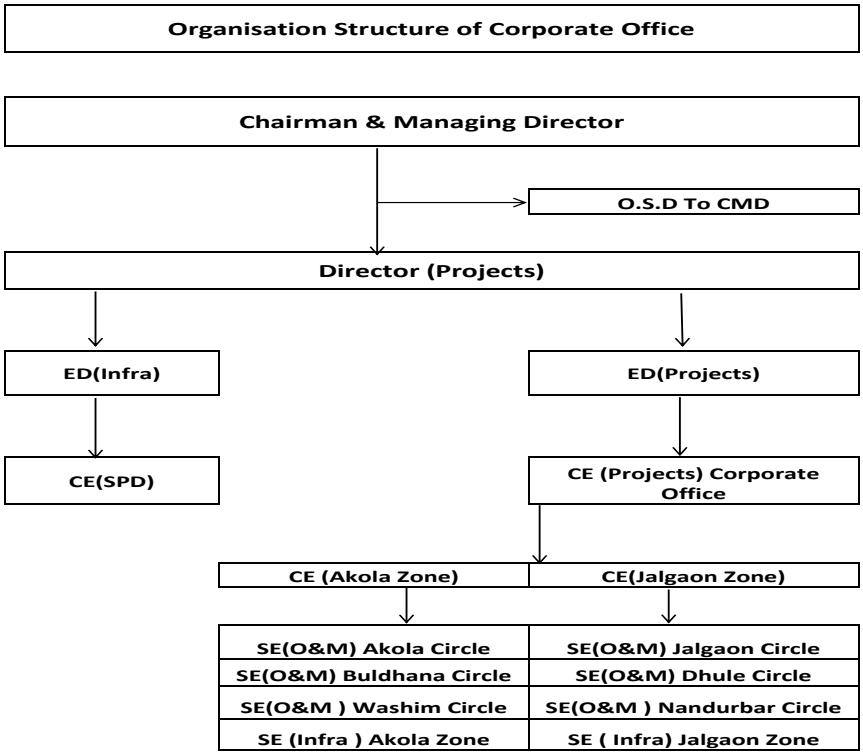
Applicable laws	Assessment against the Core Principles	Gaps
Backward Classes Act, 2024 Tribal Sub-Plan Other than Tribal Sub-Plan MSKPY	for SC beneficiaries and the remaining are for those belonging to general category.[19] Further, small and marginal farmers with land less than 2.5 acres are eligible for 3 HP solar pumps. The existing laws and regulatory framework applicable for this Program safeguard the rights and interests of vulnerable groups and provide several avenues for meaningful consultation. For instance, RFCTLARR Act, GoM and MSEDCL policy on Direct Land Purchase explicitly states that purchase of land belonging to ST should be done only as a demonstrable last resort. PESA also mandates that Gram Sabha or the Panchayat at the appropriate level are consulted, and their consent is sought— before acquiring any land for development projects in scheduled area. However, RBP will exclude any activity which will cause relocation of tribal population or have significant impact on them. The state also provides for reservation to vulnerable categories in recruitment for government jobs, and admissions to public as well as private educational institutions, in accordance with the Maharashtra State Reservation for Socially and Educationally Backward Classes Act, 2024. However, women famers often find it challenging to access government schemes such as the PM-KUSUM and MSKPY as they do not have land titles/record of rights in their name. To be eligible for solar pump installation, farmers must submit their land records (7/12 Extract or Record of Rights) with their names in the document. Similarly, BPL households and illiterate farmers are unable to access the scheme due to financial constraints and accessibility issues. Many small and marginal farmers, particularly those from	that some farmers may not have the requisite 'record of rights' due to discriminatory practices related to land titling. Or vulnerable farmers particularly those from Below Poverty Line (BPL) households, illiterate individuals and women are unable to access the scheme due to lack of awareness about the scheme, or physical barriers that can contribute to their exclusion.

[19] Under KUSUM-B, para no. 2 (2)

Applicable laws	Assessment against the Core Principles	Gaps
	BPL households, find the upfront cost of solar pumps unaffordable, hindering their participation in the scheme. Additionally, the lack of awareness and understanding about the scheme, coupled with illiteracy, can create barriers to accessing information about the scheme.	
Core Principle 7: avoid exacerbating social conflict.		
	Not applicable	

3.6 Assessment of Institutional Capacity for Addressing ES Effects

3.6.1 **Description of existing ES institutional setup.** The RBP will be overseen by the Project Management Unit (PMU) setup at the MSEDCL under the Special Project Department and the Projects Department, headed by their respective Chief Engineers. The Chief Engineer (Projects) and Chief Engineer (Special Project) is supported by a team of Executive Engineers and reports to MSEDCL's Project Director [Director (Projects)]. The MSEDCL circle offices led by the Supervision Engineers (O&M) will be designated as Project Management Unit (PMU) to supervise the implementation of the program at the field level. Under the program, PMU will be supported by the Project Management Consultancy (PMC) which will be placed at the M&E Unit for monitoring and evaluation (M&E) including technical assistance. PMC will engage E&S experts for monitoring E&S risks and impacts. Further, environmental specialist and social specialist will be hired at the PMU for ES risk management. At the PMU, existing staff (Executive Engineers) will be designated as focal points for managing and overseeing the environmental and social aspects at the ground level. The terms of reference (ToR) provided in **Annex 7** delineates the roles and responsibilities of E&S staff at the PMU.

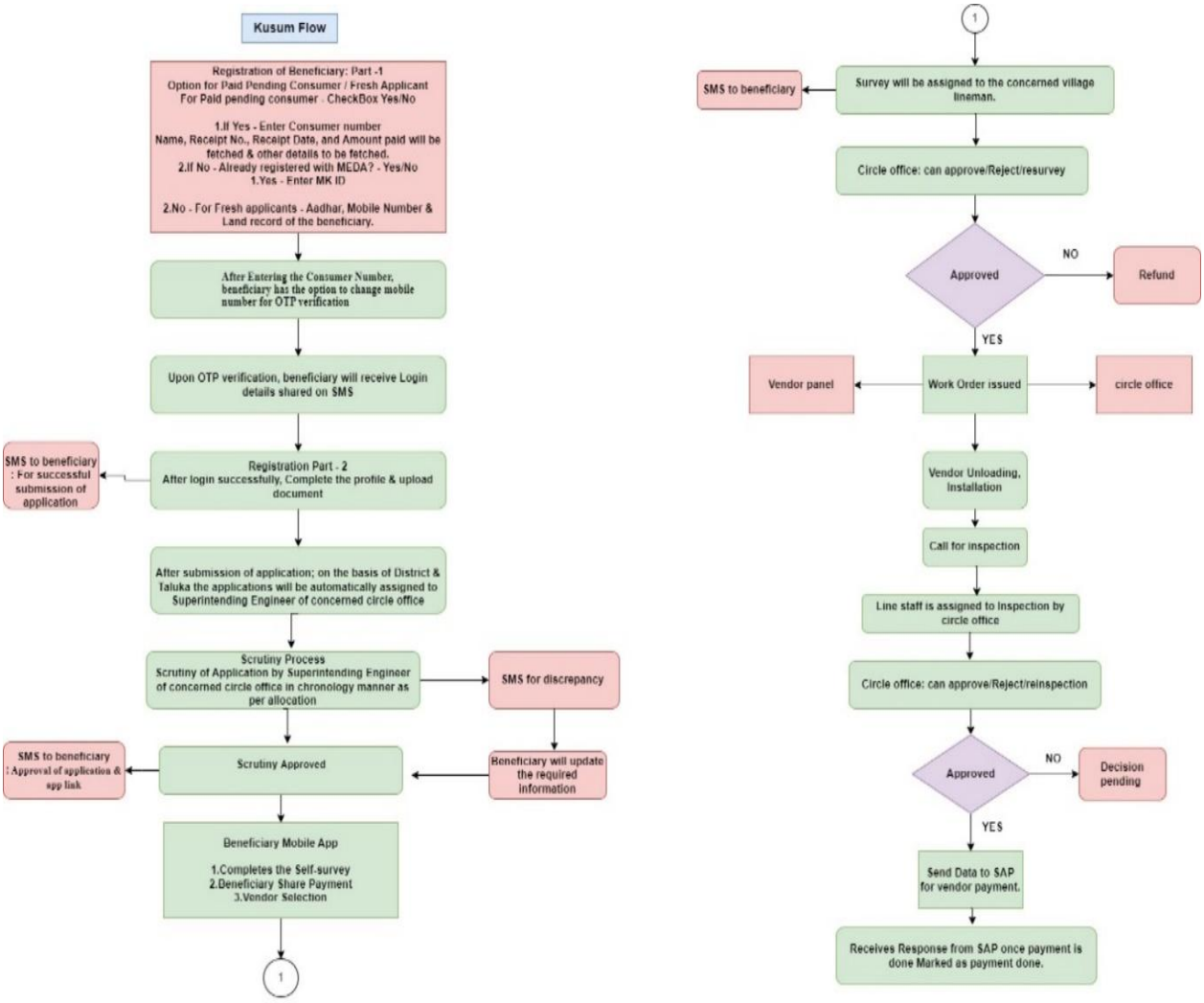


3.6.2 **Implementation Arrangements for Solar Pump Installation.** Special Projects Department is overall responsible for activities related to solar pump installation.[20] The Superintending Engineer at the MSEDCL circle office (district level) is responsible for overseeing the Program activities at the ground level. The circle office will scrutinize the solar pump applications received based on certain criteria[21]. The installation of solar pumps will be carried out by external vendors (competitively selected solar irrigation pump suppliers and competitively selected electrical equipment vendors and contractors for substation works), whose performance will be tracked and reported by MSEDCL. Under PM-KUSUM, 39 vendors were empaneled in Maharashtra. The vendors' responsibility is to deliver, install and commission the solar pump and to familiarize the farmer with the operational manual and the safety precautions to be observed. They also disseminate the Mahavitran toll free number 1800-102-3435/1800-233- 3435 and the Helpline number of the concerned supplier. Further, the vendors are mandated to provide Comprehensive Maintenance Contract (CMC) services to cover regular inspections, cleaning, and repairs for a period of 5 years including insurance coverage for the installed pump— against natural calamities and theft. The O&M cost for 5

[20] MSEDCL was the implementing agency for MSKPY. For the PM-KUSUM scheme, both MEDA and MSEDCL are the implementing agencies. While application for solar pumps is mostly received on MEDA portal, applications for solar pumps received in MSEDCL are for paid-pending consumers.

[21] 1. Farmers having farmland with assured source of water. 2.Farmers should not have conventional electricity connection.3. Farmer having farmland up to 2.5 acre is eligible for 3 HP pump and having farm land 2.51 acre to 5 acre farm land is eligible for 5 HP and having farm above 5 acre is eligible for 7.5 HP pump. 4.Personal or Group farm pond, well, borewell owner, Farmer having land nearby rivers or canals flowing for 12 months 5. Farmers which are not electrified through any scheme previously. 6. Applications received for solar pump, but Pump not yet installed 7. Priority to farmers from Remote & Tribal area. 8. Farmers from villages which are not electrified yet due to NOC from forest Dept 9. Paid pending consumer, applied for new electricity connection for agriculture pump and registered demand

years is inbuilt with the cost of installation. See diagram 1. for details. The same institutional setup will be applicable for the RBP. Under the AIIB Program, 42 vendors will be contracted for the solar pump installation.



3.6.3 **Institutional Arrangements for Distribution System Strengthening.** The Projects Department is responsible for activities related to distribution system strengthening. Under the RBP, two zones namely Akola and Jalgaon— will be considered. Each zonal office is headed by the Chief Engineer. Akola zonal office consists of three circles i.e., Akola, Buldhana and Washim. Jalgaon zonal office covers three circles i.e., Jalgaon, Dhule, and Nandurbar. Each circle office is headed by the Superintending Engineer who is responsible for monitoring and execution of the Program activities within its jurisdiction. The Executive Engineer (Admin) at the circle office is nominated for looking after the health and safety aspect under the Program.

3.6.4 **Assessment of the adequacy of institutional resources**

3.6.4.1 **Institutional organization and division of labor:** MSEDCL which is the implementing

agency for RBP has separate departments to manage different profiles including some components of ES risk management. For instance, land acquisition is carried out by the Civil Department of MSEDCL. Staff trainings on occupational health and safety (OHS) are managed by the Trainings and Safety Department— which has the main training center in Nashik, and regional training centers in five circles across Maharashtra. Employee welfare including workplace safety (SEA/SH) is under the Human Resource (HR) Department. Grievance management and feedback are handled through toll-free no. setup for consumers (1800-102-3435/1800-233- 3435) and designated Public Information Officers (PIO)/Assistant Public Information Officers (APIO)/Appellate Authority in each department and administrative level. Further, Consumer Grievance Redressal Forum (CGRF) have been established at the zonal level. For monitoring health and safety, Assistant Engineer (Admin) at the circle office, Additional Executive Engineer at the divisional office, and Assistant Engineer at the sub-divisional office are designated as Quality Check and Safety Officers, respectively.

3.6.4.2 **Adequacy of institutional capacity (staff, budget, availability of implementation resources, training, etc.) to carry out defined responsibilities under RBP**: There is a need for engaging specialized ES experts in the PMU and designating ES focal persons at the circle levels to manage ES risks and impacts within the RBP. While adequate resources (staff and budget) have been allocated for OHS trainings[22], land management and grievance redressal, other components such as ES screening and assessment, stakeholder engagement, preparation and implementation of ESMPs, including ES monitoring and reporting framework—have not been considered (except under the externally aided HVDS program implemented by MSEDCL). Further, staff, vendors and contractors including beneficiaries have limited resources to manage OHS and CHS risks during construction, upgradation, installation and operation phase. The legal and policy framework to address these risks are robust and stringent, but the challenge lies in implementation. While these requirements have been built into the conditions of contract of the bid documents for upgradation and construction of substations including transmission lines and design/ manufacture/ supply/ transport/ installation/ testing/ commissioning of solar pumps under the RBP, onsite monitoring and supervision of these ES requirements needs to be strengthened. Further, existing grievance management system mostly focusses on consumer complaints and does not address grievances of those who are likely to be impacted/affected by the RBP (See Section 4.3 for details). Overall, MSEDCL's systems and practices need to be strengthened to align with the core principles and elements outlined in the Bank's ESP and the Guidance Note on RBF. MSEDCL has the commitment and intention to address the identified key gaps and differences, as can be seen from its experience of implementing the ongoing ADB- aided Maharashtra Rural High Voltage Distribution System Expansion Program (HVDS) and proposed ADB-aided Maharashtra Power Distribution Enhancement Program to Facilitate Agricultural Solarization.

3.6.5 Operational Performance in Managing ES Effects

[22] Since April 2024-January 2025, a total of 12229 Engineers, Non-Tech staff, Technician / Vidyut Sahayyak, and Operators / Upakendra Sahayyak Technician have been trained on OHS.

3.6.5.1 MSEDCL has the experience of working with multi- and bi-lateral development banks (MDBs) such as the Asian Development Bank (ADB). Under the externally- aided Maharashtra Rural High Voltage Distribution System Expansion Program (HVDS), MSEDCL has committed resources (designation of E&S specialists, consultancy firm for ESIA, etc.) and implemented actions necessary for effective ES identification, assessment and management of impacts. For construction of substations, the ADB program had proposed the following actions: (a) implementation of ESMS which included ES screening, due diligence for activities with ES impacts and risks (including resettlement impacts), inclusion of EMP in bid documents, monitoring of ES risks and allocation of budget; (b) EMP implementation including waste management, dust & noise management and replanting measures, among others; (c) enhancement of OHS and CHS during construction and operation; and (d) implementation of guidelines for voluntary donation and/or direct purchase through negotiated settlement addressing the existing gaps in the MSEDCL circular. The ADB Safeguard Monitoring Report for HVDS (published in June 2022) confirms that these measures are being followed and good ES effects are being achieved in their project.[23]

3.6.5.2 For installation of solar pumps, RBP will rely on the government's experience of implementing PM-KUSUM, MSKPY and MTSKPY that have incorporated practices such as stakeholder feedback, grievance redressal, social inclusion and screening/due diligence for exclusion of areas posing high ES risks such as dark zones (overexploited, critical or semi-critical areas) and forest areas, without the NOC of relevant government departments/agencies. Moreover, to strengthen MSEDCL's capacity to implement these schemes, officials have been deputed from Maharashtra Energy Development Agency (MEDA) who are jointly responsible for implementing the PM- KUSUM scheme.

3.6.5.3 MSEDCL also coordinates with other departments and agencies such as district administration, GSDA, forest department, labor department, agriculture department and irrigation department for requisite clearances and NOCs needed to manage ES risks.

3.6.6 **Management of Environmental Effects of RBP**

3.6.6.1 This sub-section summarizes the past performance of MSEDCL to confirm whether rules and procedures are being followed, and good environmental effects are being achieved in relevant activities.

3.6.6.2 **Groundwater Management:** MSEDCL has safeguards in place to curtail over-exploitation of groundwater resources. For instance, applicants for solar pumps in dark zones or GSDA notified areas (overexploited, critical or semi-critical areas) are not considered under the PM-KUSUM and MSKPY scheme. Further, many central and state led scheme on water conservation have been implemented in Maharashtra. Pumping volume of water is being monitored through live feed at different level – state (GSDA) and center (MNRE). Additional measures such as water conservation related pep-talk during pump installation and water

[23] https://www.adb.org/sites/default/files/project-documents/50193/50193-003-esmr-en_0.pdf

conservation trainings to farmers as part of promotion of drip-irrigation techniques under POCRA— have also been provided. Under Pradhan Mantri Krishi Sinchai Yojana (PMKSY), drip and micro irrigation subsidy is being provided, and 25 percent extra subsidy is given to the farmers under GSDA notified areas. Further, additional 55 percent subsidy is given to small and marginal famers/ST/SC famers. Under Atal Bhujal Yojana and Jal Jeevan Mission, groundwater recharge activities such as watershed development, check dams, nala bund and artificial recharge structures (dug well recharge, etc.) are being implemented. Additionally, awareness generation and IEC activities have been carried out on adoption of micro-irrigation - drip / sprinkler among farmers and groundwater information dissemination centers (GIDC) have been setup in 13 districts. Discussions with GSDA also revealed that Piezometer for instant data reporting are in the process of being installed in all 1133 GPs where Atal Bhujal Yojana scheme is being implemented. National Hydrology Project, Jal Shakti Abhiyan, Amrit Sarovar Mission, Ground Water Management and Regulation (GWM&R) scheme, Jalyukt Shivar Abhiyan, Integrated Watershed Management Program (IWMP), Jal Kranti Abhiyaan/Jal Gram Scheme, Magel Tyala Shet tale Yojana, Birsa Munda Krishi Kranti Yojna are among other central and state sponsored schemes on water conservation that are being implemented in the State.

3.6.6.3 The latest Dynamic Ground Water Resource Assessment Report (2024) reveals that total annual groundwater recharge has increased (15 BCM) substantially and extraction has declined (3 BCM) in 2024 from 2017 in India. The State data mirrors the national figure to an extent. As compared to 2023 assessment, the annual groundwater recharge in Maharashtra has increased marginally from 32.76 BCM to 33.03 BCM and annual extractable groundwater resources in 2024 has increased from 30.95 BCM to 31.15 BCM. Whereas annual groundwater extraction has decreased marginally from 16.66 BCM to 16.50 BCM in 2024. The Stage of Ground Water Extraction has also decreased marginally from 53.83% to 52.99%.[24] The increase in groundwater recharge may mainly be attributed to increase in recharge from water bodies/tanks & water conservation measures adopted in the State. The annual variability in rainfall is another causal factor in groundwater availability.

3.6.6.4 At present, the GSDA focuses on groundwater management, including conducting surveys and monitoring groundwater levels. In its effort to improve groundwater monitoring, GSDA has recently introduced Digital Water Level Recorders (DWLR) and is working to establish a Decision Support System (DSS) and a Hydrological Information System (HIS) to enhance data collection, storage, and dissemination. Other groundwater monitoring techniques and measures to address overexploitation of groundwater in Maharashtra have been detailed in the Technical Assessment (2.2.21 and 2.2.22).

3.6.6.5 Groundwater monitoring by GSDA feeds into categorization of groundwater status [Safe (<=70 percent SoE), Semi-critical (>70 percent and <=90 percent SoE), Critical (>90 percent and <=100 percent SoE), and Over-exploited (>100 percent SoE)] at the regional level. In a situation where the status changes from “safe” to “semi-critical”, by the sheer design of the RBP the issuance of new permits for installation of solar pumps will not be provided. This would stop

[24] https://cgwb.gov.in/cgwbpnm/public/uploads/documents/17357182991031590738file.pdf

further abstraction of groundwater in the region.

3.6.6.6 The Agriculture Department of the state is already in discussion with Department of Water Resources, Water Supply and Sanitation and Water Conservation for planning crop diversification in the state in context of water availability in the state. The pro-active approach and measures undertaken by the state will help in better management of groundwater resources in the state.

3.6.6.7 Training and awareness building on water conservation, promotion of drip-irrigation techniques, diversification of crops, compliance with existing regulations, etc. are other measures adopted by the GoM to enhance sustainable water management in Maharashtra. Further, to ensure that solar pump installation does not have any adverse effects on groundwater, enhanced interagency coordination leading to adoption of initiatives in collaboration with other departments and agencies (GSDA, Irrigation and Agriculture Departments) is required. This will be facilitated through DLI 7 under the RBP.

3.6.6.8 **Management of Biodiversity Impact:** In India, cultivation is not allowed in the core zones of protected wildlife sanctuaries and national parks in accordance with the Forest (Conservation) Act, 1980. They are allowed to cultivate on barren forest lands that was assigned to them as “pattas’. Under the PM-KUSUM and MSKPY scheme, solar pumps are not distributed to applicants cultivating in forest areas, without the NOC from the Forest Department. Further, to determine feasibility of a location for setting up of new substations and 33 kV transmission lines, MSEDCL usually undertakes a screening to avoid forest land and other encumbrances, based on which a ‘feasibility certificate’ is issued for each selected site.

3.6.6.9 **Management of damaged solar panels:** Maintenance of the solar pumps will be covered by the vendors for a period of five years after its installation. During this period, damaged or non-functional panels are disposed by the vendors responsible for installation— in accordance with the requirements of the E-waste Management Rules, 2016 (and amended thereafter) which has introduced an extended producer responsibility (EPR) regime, shifting the responsibility of e-waste management to producers.

3.6.6.10 The primary E-waste management challenge is anticipated to arise after the five-year commissioning period. Currently, there are 43 registered E-waste recyclers authorized and licensed by the Maharashtra Pollution Control Board. The beneficiaries can directly reach out to the registered E-waste recyclers for processing damaged solar panels once the five-year commissioning period ends. In the absence of organized collection efforts, there's a significant risk that decommissioned solar panels might not be disposed of properly as per the regulations after their warranty or insurance period expires.

3.6.6.11 However, increase in quantity of damaged solar panels will trigger development of further new recycling units and collection centers since the processing of the damaged solar panels will yield revenue for the E-waste vendors. Many subsidies and incentives are being introduced by the GoI like the SPECS to provide financial support for setting up of e-waste

recycling facilities. GoI is actively promoting a circular economy for e-waste management through financial incentives and schemes, strict EPR policies, and the establishment of a supportive ecosystem for formal e-waste recycling, aiming to achieve socio-economic benefits while significantly reducing environmental impact through responsible waste management practices.

3.6.6.12 To address the concerns related to solar panel disposal within the purview of this program, the empaneled vendors should prepare an E-waste Management Plan as a part of C-ESMP and submit to the MSEDCL. The Plan should be applicable for the five-year operation period and must also cover an End-of-Life (EoL) strategy for solar panel disposal beyond this period. The Plan must outline responsibility of the vendor to (a) abide by the E-waste Management Rules, 2016 and amended thereafter for disposal of damaged solar panels, (b) collect damaged solar panel within a period of 30 days of reporting and not store the damaged panels for more than 180 days in accordance with the Rules. (c) disposed to only authorized E-waste recyclers and upload information on the portal, (d) 6 monthly and annual reporting to the Maharashtra Pollution Control Board.

3.6.6.13 **Disposal of transformer oil:** MSEDCL has provided an undertaking to ADB for HVDS that the mineral oils to be used in the transformers will be free of PCB.[25] This is being complied with as per the ADB Safeguard Monitoring Report. The same practice shall be adopted under this Program.

3.6.6.14 **Occupational Health and Safety:** As stated already, MSEDCL has a separate department that builds capacity on health and safety. Safety officers have also been designated at divisional level. Training materials have been developed, and bi-annual trainings are provided to all substation operators on OHS and accident management in accordance with the Electricity Act, 2003 and Rules. However, field visits to substations and solar pump installations revealed the need to stringently adopt, monitor and report on health and safety measures to ensure overall compliance with the laws. The bid documents of all civil works related to upgradation and construction of substations under the Program integrate clauses related to ES requirements including adhering to safety norms. The bid document also mandates submission of C-ESMP based on the actual site condition, once the contract is awarded.

3.6.6.15 **Community Health and Safety:** Currently, there are no mechanisms in place to manage community health and safety risks (from vehicle traffic, land clearing activities, noise, vibration and material stockpiles) during the construction/upgradation of substations and 33 kV transmission lines— except in cases of accident as specified in the Electricity Act, 2003 and Rules. It is recommended that the contractors embed these provisions in the C-ESMP. Further, there may be potential risks associated with unlined/unprotected wells making them vulnerable to contamination and posing risks to humans and wildlife. To understand the magnitude of such risks and the way forward, it is recommended that data for at least 50,000 solar pumps is

[25] PCB is banned under the Environment (Protection) Act, 1986 in line with the Stockholm Convention on Persistent Organic Pollutants which India has signed and ratified.

collected during the beneficiary selection process on the number of wells, on open or dug wells, that lack protection walls..

3.6.7 **Management of Social Effects of RBP**

3.6.7.1 This sub-section summarizes the past performance of MSEDCL to confirm whether rules and procedures are being followed, and good social effects are being achieved in relevant activities.

3.6.7.2 Land **Acquisition:** MSEDCL has a separate department to manage land procurement. Land is mostly acquired using the MSEDCL's direct purchase policy through negotiated settlement. Certain gaps noted in the MSEDCL circular have been bridged through detailed guidelines prepared by ADB and adopted under the High Voltage Distribution System Expansion Program (HVDS) on issues related to need for prior screening, willing transfer of assets, community consultation, documentation and special attention to vulnerable groups. The GoM has also notified a direct purchase policy that aligns with the RFCTLARR Act, 2013 wherein compensation is calculated at replacement cost as per market value and provides additional 25% incentive over the market value for voluntarily agreeing to sell the land. Under the HVDS, screening and due diligence of all investments have been undertaken prior to direct purchase of land. In most cases, government-owned land is considered for construction of new substations. Under this Program, private land acquisition is not envisaged. Installation of solar pumps will be on beneficiaries' land. Further, upgradation of 80 substations will be carried out within the existing boundaries of the substations. Additionally, 45 new substations will be established on government land and 33 kV transmission lines from each of these substations (spanning a distance of 15 kms) will be constructed along the existing roadways. Prior screening must be carried out to ensure that there are no encroachers or squatters resulting in physical displacement on the identified land parcels, and to rule out any legacy issues.

3.6.7.3 **Scheduled Tribals**: For solar pump installation, certain subsidies are given to ST/SC communities under the MSKPY and PM-KUSUM, thus ensuring that they have access to the scheme. Further, a clause is included under the MSEDCL's direct purchase policy and land selection/screening process to avoid displacement of ST communities. Three districts (Jalgaon, Dhule and Nandurbar) considered for the upgradation of sub-stations falls either partially or fully under the Fifth Schedule Areas (tribal belt). In the districts of Jalgaon, Dhule, and Nandurbar, the primary tribal communities include the Bhil, Gond, Pawra, Mawchi, and Konkani. The Bhil community is the largest tribal group in Maharashtra, particularly residing in West Khandesh (Dhule and Nandurbar). Other tribes in this region include Dhanka, Kotla, Peladi, and Ambude. The Program does not anticipate involuntary displacement of tribal communities and will not have significant impact on land, natural and cultural resources; thus, FPICon for broad community support will not be required. The risks anticipated by tribal communities are mostly related to community health and safety arising from construction and operation of substations and transmission lines. However, the Program needs to ensure that meaningful consultations are carried out with tribal communities in a culturally appropriate manner during the Program cycle— as such procedures are not currently applied in MSEDCL projects in tribal areas. If the

screening of proposed site for construction/ upgradation of substation including transmission line determines that tribal communities are present or have collective attachment to that area and are likely to be affected, MSEDCL should ensure that appropriate mitigation measures are embedded in the ESMP commensurate to the risks and impacts. During the detailed design phase, efforts should be made to avoid restricting access to or physically displacing tribal communities from protected areas and natural resources. Measures will also be integrated in the C-ESMP to ensure that contractors engage with affected tribal communities during the construction and operation phase in a culturally appropriate manner.

3.6.7.4 **Gender Aspects**. *Gender gap analysis*: Women farmers have also applied for installation of solar pumps under PM-KUSUM. Total application received as on date of 16 July 2024 under PM-KUSUM B scheme (on-going scheme) is 2,04,096— of which male beneficiaries are 1,64,610 and female beneficiaries are 39,486. Challenge mainly lies in women farmers not being able to easily access solar pump installation scheme, as one of the criteria for selection under the scheme is submission of land title/ record of rights with the beneficiaries' name on it. Only a small percentage of women have land titles/record of rights in their name. As per the 2021-2022 Annual Periodic Labour Force Survey, 62.9 percent of women in India's workforce are involved in agriculture, but the National Family Health Survey-5 (NFHS-5) indicates that only 8.3 per cent of women own land in India. Further, lack of awareness about the scheme can also hinder women from accessing the scheme.

3.6.7.5 *Mitigation measures:* Provisions need to be embedded in the beneficiary selection process to further investigate such extenuating circumstances to enable vulnerable groups from accessing the benefits of the program. For instance, joint-ownership between husband and wife and long-term lease agreements — can be examined to consider their application. To ensure women are benefited from the Program, RBP should mandate that at least 10 percent of the applicants to be considered for solar pumps are women. Further, female staff, potential and existing beneficiaries of solar pumps should constitute at least 25 percent of the recipient of training interventions proposed under RA 3.

3.6.7.6 *Potential benefits of Program*: Installation of the solar pumps does not only help increase household's income and yield positive effects on food security as well as household nutrition but also alleviate drudgery for women farmers, improve their health, enables them to allocate time on more economically favorable activities, and explore avenues of empowerment beyond agriculture. Further, day-time power through solar pumps have resulted in increased safety of women farmers, who otherwise had to access the water pumps at night for irrigating the fields.

3.6.7.7 **Indicators**: To measure gender benefits of the Program, the following two intermediate results (IR) indicators have been considered: IR 1.2: percentage of women beneficiaries with access to solar-powered irrigation systems and IR 4.2: percentage of female beneficiaries (potential and existing) of solar pumps and staff among total trained participants.

3.6.7.8 **Social Inclusion**. The existing criteria for beneficiary selection for solar pump installation under PM-KUSUM and MSKPY are (i) productive land in the name of the farmer

beneficiary; (ii) farm land up to 2.5 acre is eligible for 3 HP pump, farm land from 2.51- 5 acre is eligible for 5 HP pump and farm above 5 acre is eligible for 7.5 HP pump.; (iii) with existing water source; (iv) shadow free zone; and (v) land should not be present in notified water zones (dark zone). While the government scheme benefits all including marginal (up to 2.5 acres) and small (2.5-5 acres) farmers, there is a possibility that vulnerable farmers may be excluded from the program due to discriminatory practices in land titling, complexities in the application process, lack of awareness about the scheme, or physical barriers (mobility, safety, proximity, etc.) can contribute to the exclusion of vulnerable groups particularly those that belong to the Below Poverty Line (BPL), illiterate individuals and women, from benefiting from the scheme. To address these barriers, inclusive beneficiary selection process and awareness building on the scheme have been covered under the RBP. To measure the impact of social inclusion, three IR Indicators have been considered: 1.2- percentage of women beneficiaries with access to solar-powered irrigation systems; 1.3- SC/ST beneficiaries provided with access to solar pumps; and 4.2- percentage of female beneficiaries and staff among total trained participants.

3.6.7.9 **Labor Influx including SEA/SH risks**. While labor influx is not anticipated under the Program (refer to Section 2.4.2), the magnitude of impact can only be determined once the workers are mobilized by the contractors for the civil works. To address the risks of SEA/SH, clauses have been embedded in the bid document to implement measures that prevent and prohibit SEA/SH and any form of gender-based violence (GBV). Measures can be embedded in the C-ESMP to mitigate these risks and to ensure compliance with the contract agreements.

3.6.7.10 **Grievance Redress Mechanism**. MSEDCL has a robust and efficient grievance redressal system which is accessible to all, but it is designed for settling complaints of the MSEDCL's consumers rather than a mechanism to resolve the grievances of "*affected persons*" during project/program preparation and implementation. For details, refer to Section 4.3.

3.6.7.11 **Labour and working condition at solar panel manufacturers end**: E&S requirements have been integrated in the contract/bid document for solar pump installation works financed under the RBP to ensure that photovoltaic panels produced for solar pumps do not involve risks related to labor working conditions. E&S provisions have also been included in contract/bid documents for upgradation and construction of substations and transmission lines considered under the RBP. The ES provision in the contract/bid document mandates that the contractor must adhere to all labor laws and safety regulations, including the Environmental and Social Management Plan (ESMP) and the development of a Contractor-ESMP (C-ESMP). This C-ESMP, which includes aspects like OHS, CHS, labor management, etc. must be prepared after the contract is awarded.

3.6.7.12 MSEDCL officials have been designated at the zonal, divisional, and sub-divisional for occupational health and safety, however procedures related to onsite monitoring and reporting on labour and working condition needs to be strengthened through site visits and submission of periodic monitoring reports (quarterly, six monthly, etc.).

4. Stakeholder Engagement and Grievance Redress

4.1. Stakeholder Engagement during ESSA preparation

4.1.1 To develop a better understanding of implementation practices, procedures, standards, and the approach for this Program, in the period from June 2024 to February 2025, the Project team carried out site visits to seven locations with solar pump installations, two sub-stations, and one training center in three districts namely Nashik, Aurangabad, and Pune. The Project team also held meetings with representatives from various government departments [Department of Agriculture, Department of Irrigation, Groundwater Surveys and Development Agency (GSDA), Department of Environment, and Pollution Control Board], vendors, contractors, field staff, and beneficiaries (including women and those belonging to ST/SC communities). The site visits and stakeholder consultation meetings informed key ESSA findings, contributed to formulating the ES actions and measures, and affected the design of the Program. A summary of the consultations is included in **Annex 3**.

4.1.2 During implementation and operation phase of the Program, meaningful consultations will be carried out with all relevant stakeholders and beneficiaries including representatives of local governance bodies (particularly in Fifth Schedule Areas), tribal-focused NGOs, and the tribal development department. Consultations are needed to inform the stakeholders about the Program progress, for timely disclosure of relevant information, minimize misinformation and unsupported expectations, and seek feedback on the Program. Culturally appropriate consultations, and investment directed at training of participants from tribal districts will ensure affirmative action to ensure tribal inclusion. Further, information dissemination on the RBP needs to be carried out in a culturally appropriate format, accessible to all and in local language-understandable to all the beneficiaries.[26]

4.2. ESSA Disclosure and Consultation

4.2.1 The executive summary of the ESSA will be translated in Marathi and both the ESSA, and the Executive Summary will be disclosed by MSEDCL and AIIB on their website. In Fifth Scheduled areas, the ESSA summary will be translated into local language and will be disclosed in local MSEDCL offices that are accessible to all.

4.2.2 Project Team's responded to queries which were mostly related to the scope of the Program, activities considered under Program and process involved in addressing potential ES impacts, raised by the program stakeholders during the consultations held while preparing the ESSA (Annex 3).

4.3. Grievance Redress

[26] Measures related to meaningful consultation with tribal communities have been embedded in the ESMP for distribution system strengthening (Annex 5) and Section 5.3 on Implementation Support & Monitoring.

4.3.1 **Multiple Channels:** MSEDCL has a robust system that comprises of multiple modes for registration of grievances, such as the Mahavitran Toll Free number 1800 102 3435/1800 233 3435, SMS to 9930399303, WhatsApp to 7875767123, Online using the MSEDCL consumer portal or mobile app, by email/post to the Consumer Grievance Redressal Forum (at zonal level), and walk-in (MSEDCL field office, consumer facilitation center). The complainants can also lodge a complaint through the CM Helpline no. 1800 120 8040 or the registered vendors Helpline no. shared at the time of solar pump installation.

4.3.2 **Procedure:** Most complaints related to solar pump installation are registered through the Mahavitran Toll free number 1800 102 3435/1800 233 3435, online using the MSEDCL consumer portal or mobile app. On receiving the call, the complainant provides the Beneficiary ID no. Complaint is then auto assigned to the concerned vendor, who must resolve the issue within 7-10 days. Mainly five categories of complaints are received i.e., solar pump damage, pump not working, theft, low water discharge, and water pumping related issues. If the complaint is not resolved within the stipulated time, penalty of INR 100/- per day is imposed on the vendor for the first 3 days and then INR 500/- per day if the complaint has not been addressed beyond 10 days. The penalty amount is deducted from the vendor's performance bank guarantee (3 percent of the executed work). Once the issue is resolved, the vendor closes the complaint in the Mahatvitran web portal. Feedback is sought from the complainant wherein an SMS or an outbound call is made to the complainant— to confirm if the complaint has been addressed satisfactorily.

4.3.3 **Capacity:** MSEDCL has sufficient capacity and resources to manage complaints. There are 200 executives (each shift) working in three different shifts in a day who attend to grievances received through the Toll-free no. From 1st January 2024 till 15th June 2024, a total of 1495 complaints were received by MSEDCL, out of which 1366 complaints were resolved, and 129 complaints were still pending.

4.3.4 **Gap and Recommendation:** The existing grievance redressal mechanism addresses complaints of MSEDCL consumers; however, resolution of the grievances of "*affected persons*" during project/program preparation and implementation (such as compensation, economic and physical displacement, construction-related risks on workers and community, etc.) are not within their scope of redressal. It is proposed that the existing MSEDCL consumer portal or mobile app are strengthened to include option for receiving, responding and settling grievances related to planning, construction and operation of RBP activities. Further, MSEDCL officials and contractors on site must also be trained to ensure that the grievances are addressed in a culturally appropriate and gender inclusive manner, including maintaining confidentiality and respecting the complainant's right to remain anonymous if desired.

4.3.5 **AIIB's Grievance System:** AIIB's Policy on the Project-affected People's Mechanism (PPM) applies to this Program. The PPM has been established by AIIB to provide an opportunity for an independent and impartial review of submissions from Project-affected people who believe they have been or are likely to be adversely affected by AIIB's failure to implement the ESP in situations when their concerns cannot be addressed satisfactorily through the GRM

or the processes of AIIB's Management.

Information on AIIB's PPM is available at: https://www.aiib.org/en/about-aiib/who-we-are/projectaffected-peoples-mechanism/how-we-assist-you/index.html. As agreed with MSEDCL, the Bank's PPM will be disclosed on the MSEDCL's website as the main implementing agency and as the main counterparty to AIIB with a reference to Program activities.

5. Recommendations and Actions

5.1. Conclusions of ESSA

5.1.1 The ESSA concludes that the Program's ES classification is **Category B** as ES impacts are minor and can be managed by the doable and feasible measures that have been discussed with and agreed by the client. The Program does not anticipate land acquisition, and all high-risk activities [such as extraction of groundwater in dark zones/ GSDA notified areas (overexploited, critical or semi-critical areas), relocation of tribal population, forced eviction, etc.] which are likely to have significant adverse impacts that are sensitive, diverse, or unprecedented on the environment and/or people will be excluded from the Program. The legal and policy framework including the environmental and social management system were found to be adequate; however, there remain certain gaps from the perspective of actual implementation of such systems identified through this ESSA.

5.1.2 The assessment identified the following key areas that require further strengthening- (a) resource allocation for ES risk management at the PMU and M&E Unit; (b) ES screening, management, monitoring and reporting system; (c) grievance management system for the program, (d) due diligence of suppliers of photovoltaic panels (e) labor working conditions (LWC) including occupational and community health and safety (OHS, CHS), (f) beneficiary selection to safeguard against social exclusion (g) impacts on tribal communities and (h) groundwater management. While systems and procedures have been put in place to address these gaps under the ADB financed HVDS program, they are currently not applicable for other projects. It is proposed that these measures (with some variations) be extended to the activities proposed under the RBP operation. Templates for ES screening and ESMPs have been annexed to this report (Annex 5 and 6). These templates are designed to be adaptable to the specific circumstances of each project activity and are intended to be updated as needed.

5.1.3 The ESSA recommendations have been incorporated in the DLI and RBP Action Plan (RBP AP) including the intermediate results framework— with specific details in respect to institutional responsibilities, timelines, indicators, and budget for the completion of actions. Lastly, an exclusion list has been proposed to ensure that all high ES risks activities are not considered for financing under the Program.

5.2. ES Actions in the RBP AP

5.2.1 This subsection includes a summary of the actions and measures the Client is required to take during implementation to improve the ES systems performance of the RBP as and when applicable.

Table 3. Indicative Table for ES Actions and Measures

No.	Identified Gaps	ES Actions	Institutional Responsibilities	Timing	Completion Indicators	Action Type (DLI/ AP)
1.	Resource	Onboard	MSEDCL	Prior to	Environmental	DLI- 4

No.	Identified Gaps	ES Actions	Institutional Responsibilities	Timing	Completion Indicators	Action Type (DLI/ AP)
	allocation for ES in the PMU	Environmental Specialist and Social Specialist in PMU supported by supervision officers designated at circle level		effectiveness	Specialist and Social Specialist contracted for PMU. Environmental and social supervision officers designated at circle level.	
2.	ES monitoring and reporting	Adopt ES monitoring and reporting system	MSEDCL	Year 1 onwards	ES compliance report published bi-annually	Action Plan
3.	ES screening and management	Adopt and implement procedures to identify and manage ES risks (related to distribution system strengthening) and impacts of activities supported under the RBP.	MSEDCL	Within 1 month from loan signing	ES screening completed for each activity related to distribution system strengthening. ESMP prepared, disclosed and implemented.	Action Plan
4.	Non-compliance of labor working condition (LWC), occupational and community health and safety (OHS, CHS), waste management during construction/ installation and operation phase.	Strengthen contractual obligations on LWC, OHS, CHS and waste management and incorporate in the Contractor's Environmental and Social Management Plan (C-ESMP).	Contractors Vendors	Within 2 months from loan signing, or prior to commencement of civil work, whichever is later	C-ESMP prepared by contractors and vendors approved by MSEDCL for activities related to distribution system strengthening. Ethical supply chain declaration signed by vendors (applicable in case of Solar-PV investments)	Action Plan
5.	Exclusion of vulnerable groups during beneficiary selection for installation of solar pumps	Adopt criteria to ensure social inclusion in selection of beneficiaries under the RBP	MSEDCL	Year 1 onwards	% of women beneficiaries with access to solar-powered irrigation systems SC/ST beneficiaries provided with access to solar pumps % of female beneficiaries and staff among total trained participants.	Results Framework

No.	Identified Gaps	ES Actions	Institutional Responsibilities	Timing	Completion Indicators	Action Type (DLI/ AP)
6.	Grievance management	Strengthen grievance management system to address grievances during planning, construction and operation of RBP activities in culturally appropriate and gender inclusive manner	MSEDCL	Year 1 onwards	No. of grievances of project affected persons reported and resolved within stipulated time	Action Plan
7.	Groundwater management	Groundwater monitoring at regular interval	MSEDCL	Year 1 onwards	Percentage of SIP areas with active groundwater monitoring	Results Framework

5.3. RBP Implementation Support and Monitoring

5.3.1. **The Client's Role.** MSEDCL is responsible for implementing the RBP, monitoring implementation progress, evaluating the indicators, and performing relevant commitments as per the legal documents, including the RBP AP. Such responsibilities involve the MSEDCL keeping the ES management systems effective, implementing monitoring plans, and identifying and solving problems in a timely and effective manner. During the RBP implementation, MSEDCL needs to fulfill the below obligations:

- Implement the agreed ES actions as per the RBP AP and maintain the ES management systems and implementation capacity as recommended by the ESSA.
- Submit semi-annual progress reports on the RBP AP implementation to prove continuous compliance with the applicable ES management mechanism.
- Monitor, evaluate, and audit system performance regularly, if necessary.
- Conduct periodic meaningful consultations with relevant stakeholders particularly in tribal belts in a culturally appropriate manner during planning, construction and operation phase of distribution system.
- Collate information related to no. of unprotected/ unlined wells considered as water source during the beneficiary selection process for 50,000 wells to understand the magnitude of this issue and share the report with AIIB.
- Strengthen existing GRM to include provisions for addressing grievance related to ES risk management under RBP.
- Review GRM performance, procedures, and results regularly and include specific grievance cases in the progress reports.
- Consult the Bank for any change made to the ES systems during program implementation.
- Disclose the ESSA and the summary of ESSA in local language in a culturally appropriate manner.

5.3.2. **The Bank's Role.** The Project Team will work with the MSEDCL to structure the support that the Bank provides in relation to the RBP's ES aspects during implementation of an RBP. Implementation support will include the following:

- Disclose the ESSA and the summary of ESSA in local language in a culturally appropriate manner.
- Reviewing implementation progress and achievement of RBP results and DLIs.
- Helping MSEDCL resolve implementation issues and carry out institutional capacity building.
- Monitoring the performance of applicable ES systems, including the implementation of agreed ES strengthening measures in the RBP AP.
- Monitoring changes in RBP risks as well as compliance with the provisions of legal covenants.
- In collaboration with MSEDCL, adapting management practice in a manner consistent with RBF principles to improve the RBP implementation or to respond to unanticipated challenges.

Supporting Annexes and Reference Documents

Annex 1: Indicative matrix to define RBP and screen ES effects

Areas in Gov't programs	Activities in Gov't programs	Relevance to Key RBP Result Areas	Potential ES Effects (Risks, impacts and benefits)	ES Categorization	Conclusion	Justification
Area 1- Expanding access to solar-powered irrigation and daytime power supply	Activity 1: Installation of 500,000 off-grid solar pumps over the next five years Activity 2: Upgradation of 80 power substations (upgrading transformers, breakers, and feeders, etc.) Activity 3: Construction of 45 new power substations	The results area focuses on infrastructure investment to boost agricultural productivity and energy efficiency.	No land acquisition (LA) is anticipated under Activity 1 and 2 as solar pumps will be installed in beneficiaries' land and upgradation of substation will be within the boundary of the existing substations while new construction will be carried out within government land. Transmission lines will be laid along the existing roads to minimize disturbance and land take. Geographical coverage is the entire state, thus all including tribal and marginalized farmers (poor and remotely located) will be benefitted from the program. They will have access to reliable daytime, high-quality electricity which will significantly enhance agricultural productivity and increase their incomes while providing them with access to a clean energy source. Government scheme also provides subsidies for ST/SC population wherein they contribute 5% as opposed to 10% of the total cost for installation. Risk of exclusion of poor and marginalized farmers from accessing the scheme in the absence of 'record of rights. Occupational health and safety risks of workers including working at height and electrocution during construction/ upgradation and O&M of power substations. Community health and safety risks (e.g., from vehicle traffic, land clearing activities, noise, vibration and materials stockpiles) including labor influx and SEA/SH risks at construction sites. Additional stress on groundwater availability as	ES Categorization : B	To include Activity 1 and 2 in the RBP	Activities 1and 2 resulting in physical displacement including private land acquisition will be in the Exclusion List. Activity 3 resulting in physical displacement and acquisition of land area exceeding 5 percent of total productive landholding of any household will be in the Exclusion List. ES Actions will include measures on OHS and

Areas in Gov't programs	Activities in Gov't programs	Relevance to Key RBP Result Areas	Potential ES Effects (Risks, impacts and benefits)	ES Categorization	Conclusion	Justification
			installation of solar pump may incentivize water-intensive behavior among farmers. Potential risks related to waste generation due to improper disposal of damaged solar panels. Potential risks that mineral oils used in the transformers may have polychlorinated biphenyls (PCBs). Oil or fuel spills associated with construction equipment operation and fueling activities affecting soils and water bodies.			CHS, groundwater and E-waste management, and beneficiary selection.
Area 2- Strengthening the PMU	Activity 1: Recruit skilled staff within PMU Activity 2: Hiring of PMC by PMU for monitoring and documentation	Aim to enhance overall project management and execution, with benefits anticipated to extend beyond the project implementation period of five years.	Enhanced capacity in managing ES risks and impacts with the recruitment of ES specialists in the PMU. M&E and reporting will result in enhanced transparency and accountability.		To include Activity 1 and 2 in the RBP	Low ES risks with net positive ES impacts
Area 3- Creating Community benefits	Activity 1: Periodic training sessions to educate farmers & local community members on use and maintenance of solar irrigation systems	Aim to boosts community benefits by focusing on better awareness, engagement and training	Increased knowledge and awareness on sustainable use of irrigation systems, water conservation and crop cultivation that require less water. Inclusion and participation of women and other marginalized groups in community engagement and trainings.		To include Activity 1 in the RBP	Low ES risks with net positive ES impacts
Area 4- Improving Public Expenditure effectiveness	Activity 1: Setup interdepartmental coordination committee	Aim to boosts expenditure effectiveness by improving coordination among state departments which are allocating complementary resources for similar target groups Aim to build synergies	Optimize resource use, identify opportunities for synergy and reduce duplication.		To include Activity 1 in the RBP.	Low ES risks with net positive ES impacts

Areas in Gov't programs	Activities in Gov't programs	Relevance to Key RBP Result Areas	Potential ES Effects (Risks, impacts and benefits)	ES Categorization	Conclusion	Justification
		among relevant agencies to formulate policies, enforce regulations, and monitor groundwater usage				

Annex 2: Indicative list of ES regulations

Indicative applicable laws and regulations at national and regional levels:

- Applicable national laws and regulations related to biodiversity
  - The Environment Protection Act, 1986 and Rules, 1986 as amended till date
  - The Biodiversity Act, 2002
  - The Indian Forest Act, 1927 (IFA)
  - The Biological Diversity Act, 2002 (BDA)
- Applicable national laws and regulations related to critical/natural habitats
  - The Forest (Conservation) Act, 1980 (FCA) along with Forest Conservation Rules (FCR)
  - Maharashtra Felling of Trees (Regulation) Act, 1964
- Applicable national laws and regulations related to protected areas
  - The Wildlife (Protection) Act, 1972 (WLPA)
- Applicable national laws and regulations related to ecosystem services
- Applicable national laws and regulations related to land acquisition and resettlement
  - The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (RFCTLARR)
  - The Electricity Act, 2003
  - The Indian Telegraph Act, 1885
  - Ministry of Power (MOP) Guidelines issued on June 2024 on compensation related to ROW for Transmission Line
  - Government of Maharashtra's Direct Purchase Policy [Govt. Decision No. SANKIRNA-03/2015/Para.Kra.34/A-2 by the Government of Maharashtra of Revenue & Forest Department as of 12. 5. 2015.]
  - MSEDCL Circular on Direct Purchase through Negotiated Settlement [CEC/Corp. off. Mum/Tech/956 17-08-2013]
- Applicable national laws and regulations related to Indigenous Peoples/Ethnic Minorities
  - Articles 275(1), 342 and 366 (25) of Indian Constitution (including the Fifth Schedule)
  - The Maharashtra State Reservation for Socially and Educationally Backward Classes Act, 2024
  - The Panchayat Extension to Scheduled Areas Act, 1996 (PESA)
  - The Scheduled Caste and Scheduled Tribe (Prevention of Atrocities) Act, 1989
  - The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006
- Applicable national laws and regulations related to gender/gender based violences
  - The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013
  - The Maternity Benefit Act, 1961.
  - The Equal Renumeration Act, 1976
- Applicable national laws and regulations related to natural resource access
- Applicable national laws and regulations related to land or resources or restrictions on land use
  - The Maharashtra Tenancy and Agricultural Lands Act, 1948

- The Maharashtra Prevention of Fragmentation and Consolidation of Holdings Act, 1947
- The Maharashtra Land Revenue Code, 1966

- Applicable national laws and regulations related to cultural resources
  - Article 26 and Article 51 A(F) of the Indian Constitution
  - The Ancient Monuments and Archaeological Sites and Remains Act, 1958 read with the 1959 Rules
- Applicable national laws and regulations related to pollution assessment and management
  - The Air (Prevention and Control of Pollution) Act, 1981
  - The Water (Prevention and Control of Pollution) Act, 1974
  - The Noise Pollution (Regulation and Control) Rules, 2000 and the Noise Pollution (Regulation and Control) (Amendment) Rules, 2010
  - Guidelines to regulate and control groundwater extraction in India, 2020, as amended
  - The Maharashtra Groundwater (Development and Management) Act, 2009 and draft Rules, 2018
- Applicable national laws and regulations related to wastes management
  - The Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 as amended in 2019
  - The Explosive Rules, 2008
  - The Battery Waste Management Rules, 2022
  - The E-waste (Management) Rules, 2022
  - The Construction and Demolition Waste Management Rules, 2016.
  - The Manufacture, Storage, and Import of Hazardous Chemicals (MSIHC) Rules, 1989 and as amended
- Applicable national laws and regulations related to community health and safety
  - Electricity Act, 2003
- Applicable national laws and regulations related to occupational health and safety
  - The Electricity Act, 2003
  - The Factories Act, 1948
  - The Interstate Migrant Workers Act, 1979
  - The Contract Labour Act, 1970
  - The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996.
  - The Occupational Safety, Health and Working Conditions Code, 2019
- Applicable national laws and regulations related to labor influx
- Applicable national laws and regulations related to building safety
- Applicable national laws and regulations related to traffic and road safety
  - The Motor Vehicles Act, 1988 as amended and Rules, 1989
- Applicable national laws and regulations related to labor and working conditions, including child labor and forced labor
  - The Employees' Provident Funds and Miscellaneous Provisions Act, 1952
  - The Payment of Gratuity Act, 1972
  - The Employees' Compensation Act, 1923

- The Maternity Benefit Act, 1961
- The Employees' State Insurance Act, 1948
- The Workers Cess Act, 1996
- The Employees' Provident Funds and Miscellaneous Provisions Act, 1952
- The Employment Exchanges (Compulsory Notification of Vacancies) Act, 1959
- The Building and Other Construction Workers' Welfare Cess Act, 1996
- The Payment of Wages Act, 1936
- The Minimum Wages Act, 1948
- The Payment of Bonus Act, 1965
- The Equal Remuneration Act, 1976.
- The Unorganized Workers' Social Security Act, 2008
- The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996
- The Child Labour (Prohibition and Regulation) Act, 1986 and subsequent amendments
- The Bonded Labour System (Abolition) Act 1976

- Applicable national laws and regulations related to grievance redress mechanism
  - The Maharashtra Electricity Regulatory Commission (MERC) (Consumer Grievance Redressal Forum & Electricity Ombudsman) Regulations, 2006
  - The Right to Information Act, 2005
  - The Industrial Disputes Act, 1947

Sectoral/Program Level:

- The regulations on environmental and social screening or assessment
  - The Environment Protection Act, 1986 and Rules, 1986 as amended till date, EIA Notification
  - The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (RFCTLARR)
- The processes/procedures relating to environmental and social protection routinely
  - Process adopted under the India: Maharashtra Rural High Voltage Distribution System Expansion Program.
- Grievance redress mechanism under the program
  - Mahavitran Toll free number 1800 102 3435/1800 233 3435
- Documents on Sectoral/Program implementation practices (if any)
  - ADB Safeguard Monitoring Report for HVDS (published in June 2022)
- Relevant government schemes and programs
  - Jal Shakti Abhiyan: Central govt. scheme focuses on creation of artificial recharge structures, watershed management, recharge and reuse structures, intensive afforestation and awareness generation etc.
  - Amrit Sarovar Mission: Central govt. scheme focusses on developing and rejuvenating 75 water bodies in each district

- Atal Bhujal Yojana (Atal Jal): Central govt. scheme focusses on community-based planning, monitoring, sharing and use of groundwater data, capacity building of all stakeholders, community led groundwater management through a combination of demand side and supply side management.
- National Hydrology Project: Project focusses on improving the extent, quality, and accessibility of water resources information and to strengthen the capacity of targeted water resources management institutions in India.
- Ground Water Management and Regulation (GWM&R) scheme: Central govt. scheme includes aquifer mapping (NAQUIM) for the entire country and other activities of CGWB such as ground water level and quality monitoring and taking up few demonstrative artificial groundwater recharge projects in selected water stressed areas.
- Jal Jeevan Mission: Central govt. program on drinking water supply. It also implements water conservation measures such as awareness program on water conservation, rainwater harvesting, greywater management, bulk water transfer, etc.
- Bhoomijal Samvardhan Puraskar (Groundwater Augmentation Awards) and National Water Award for NGOs and local governments for adopting innovative practices that result in sustainability of groundwater resources.
- Pradhan Mantri Krishi Sinchayee Yojana (PMKSY): Central govt. scheme where micro irrigation is incentivized through subsidy.
- Integrated Watershed Management Program (IWMP): program was subsumed under the Pradhan Mantri Krishi Sinchayi Yojana (PMKSY) in 2015.
- Jal Kranti Abhiyaan/Jal Gram Scheme: Central govt. scheme in which integrated water security plan is created and implemented for each Jal Gram (water scarcity villages).
- JalYukt Shivar Abhiyan: GoM initiative focuses on water conservation, management, and effective utilization of water resources across the state.
- Magel Tyala Shet tale Yojana (GoM initiative- subsidy is given with priority to small & marginal farmers to create farm ponds for conservation of water in their farms)
- Dr Babasaheb Ambedkar Krushi Swavalamban Yojna (GoM initiative- Scheme is only for SC/Nav Bauddha caste farmers below poverty line or having income upto Rs 1.50 lakh to provide sustainable irrigation facility.)
- Birsa Munda Krishi Kranti Yojna (GoM initiative- Scheme is only for scheduled tribe farmers below poverty line or having income upto Rs 1.50 lakh to provide sustainable irrigation facility.)
- Project on Climate Resilient Agriculture (PoCRA) (GoM initiative- a program designed to enhance the resilience of agriculture practices in the state by implementing climate-smart technologies and infrastructure improvements, aiming to mitigate the impacts of climate change on farming communities, particularly in drought-prone areas.)
- Maharashtra State Water Policy 2019- Policy applies to all the line departments, semi-government agencies of the State Government related to water, local bodies, bulk water users (domestic, industrial/commercial and others) and the citizens of the State.

Annex 3: Summary of Public Consultation Events and Stakeholder Engagement during the ESSA

Consultations/ Stakeholder Activities	Date/Time	Summary of Consultation Results				
		Key issues with the ES systems related to the RBP	Potential ES risks and impacts of the RBP	Potential contextual and programmatic risks to the RBP	Institutional capacity issues to manage the ES risks and impacts of the RBP	Other issues
Meeting with MSEDCL officials: Project Director, Chief Engineer, SPD, Chief Engineer, Distribution, Executive Engineer, PM- KUSUM, Assistant Engineer, Deputy Engineer	15th and 16th July 2024	Program design and implementation process Screening process for selection of beneficiaries and the criteria for selection. Stakeholders relevant for the program.	Risks related to LA, labor management in upgradation of substations. E- waste management related to damaged solar PV panels.	-	Institutional capacity, resources and existing system to manage ES risks including land, LWC, OHS, CHS, GRM, and stakeholder engagement.	
Discussion with officials from MSEDCL Nasik Circle office	21st August, 2024	Subsidies provided to ST/SC applicants			Process of selection and approval of applications for solar pumps. Process of addressing grievances of beneficiaries at the circle level. Awareness building on scheme	
Discussion with beneficiaries of solar pump	21st August, 2024	Ease in seeking assistance and availing insurance amount in case of theft, during the 5-year maintenance period. Induction on safety precautions against electrocution during thunderstorm and other safety measures.	Long term financial benefits attributed to better agricultural yield.		Use of Setu Karyalay (Citizen Facilitation Centre) to seek assistance in filling the application form in the portal.	
Discussion with officials from MSEDCL	22nd August,	Process of reviewing and approving applications under			Capacity to manage grievance redressal	

Consultations/ Stakeholder Activities	Date/Time	Summary of Consultation Results				
		Key issues with the ES systems related to the RBP	Potential ES risks and impacts of the RBP	Potential contextual and programmatic risks to the RBP	Institutional capacity issues to manage the ES risks and impacts of the RBP	Other issues
Aurangabad circle office	2024	PM-KUSUM			Awareness building activities undertaken	
Discussion with beneficiaries of solar pump	22nd August, 2024	Safety and precautions related to maintenance of the solar panels. Support and regular interaction with the linesmen and vendor			Experience of grievance redressal process	
Discussion with empaneled solar pump vendor	22nd August, 2024	Awareness building through advertisement and live demos. Service within 5 years is covered whereas after 5 years, services can be done through a nominal fee prescribed by the agency.	Disposal of old or damaged photovoltaic cells		During the installation, the agency representative informs the beneficiary about safety precautions, care, how to start and close the pump, precautions against storm, including details related to toll free no. and the Insurance policy.	
Discussion with Contractor, Site in Charge and Operator of sub-station in Aurangabad	23rd August, 2024	Approximately 2.2 hectare for 1 MVA (approximately 25 Acres-8 MVA) required for upgrading the substation. Land Lease taken for 25 years-mostly government land. Upgradation works took almost 15 days to complete. A total of 15 workers were engaged (Crimping- 5-7 workers and Painter- 3 workers).	Workers provided with safety shoes, harness, helmets and hand gloves. Supervisor of contractor oversees health and safety of workers. Need for PPE, safety gears and first aid box.		During the upgradation work, consumers were informed about the outage. Outage in a particular area was between 2-3 hours in a day. Operators are provided with safety training twice a year. Four operators are working at the shift of 8 hours in the sub-station.	

Consultations/ Stakeholder Activities	Date/Time	Summary of Consultation Results				
		Key issues with the ES systems related to the RBP	Potential ES risks and impacts of the RBP	Potential contextual and programmatic risks to the RBP	Institutional capacity issues to manage the ES risks and impacts of the RBP	Other issues
Discussion with Senior Geologist, GSDA	13th February, 2025		Due to uninterrupted supply of electricity, there is potential risk of increase usage of groundwater.		It was suggested that solar pumps utilize sensors to monitor water levels. These sensors could automatically adjust the operation of the pump to prevent over-pumping and optimize energy usage. Further, multiple schemes are being implemented on water conservation and address the issue of overexploitation of groundwater. Maharashtra has shown slight improvement. There is a need to take stringent measures to avoid groundwater exploitation in places where solar pumps are being installed. Crop diversification, use of micro irrigation methods needs to be incentivized.	
Discussion with Krishi Upsanchalak	13th February, 2025	Production cost of cropping likely to reduce due to negligible cost of electricity thus leading to income maximization. However not much changes in cropping pattern have been noted, as cropping pattern is dependent on many factors such as MSP, infrastructure facilities (storage,	Safety was a major concern for female farmers as the supply of electricity for agricultural activities were restricted to night.		To enhance access to the scheme, irrigation potential needs to be increased. Many schemes such as Birsa Munda and Dr. Babasaheb Ambedkar Krishi Swawalamban Yojana provide grants to vulnerable farmers (ST/SC) for building wells,	

Consultations/ Stakeholder Activities	Date/Time	Summary of Consultation Results				
		Key issues with the ES systems related to the RBP	Potential ES risks and impacts of the RBP	Potential contextual and programmatic risks to the RBP	Institutional capacity issues to manage the ES risks and impacts of the RBP	Other issues
		processing, etc.), soil, climate, etc. and does not solely depend on irrigation.			repairing old wells, drip irrigation, etc. Most of these schemes have 40 percent reservation for women farmers.	
Discussion with Principal Secretary of Water Resources and Water Supply and Sanitation along with GSDA and MITRA	12 June 2025	Availability of groundwater, recharging, monitoring and future actions for conservation of groundwater	Groundwater depletion is a major concern in this program.		Strengthening of inter-departmental cooperation that will facilitate exchange of information	

Annex 4: Indicative checklists for assessing the ES management systems against core principles and core elements

Criteria set out in the ESP (Core Principles)	Criteria set out in RBF IGN (Core Elements)	Indicative Checklists
Core Principle 1: Promote environmental and social sustainability in the RBP's design.	(a) Operate within an adequate legal and regulatory framework to guide ES impact assessments, mitigation, management and monitoring at RBP level.	• What relevant ES laws, regulations, procedures, decrees, or other mandatory legal instruments (national, regional, and sectoral/program levels) are applicable to the RBP activities and their associated risks and impacts? **Refer to Annex 2**. • Are critical adjustments and measures to the regulatory framework needed before the start of the RBP? **No** • Do the relevant ES management systems include mechanisms, where appropriate, to ensure objective or independent assessment of ES impacts? **Yes**
Core Principle 2: avoid, minimize or mitigate adverse impacts and promote informed decision-making relating to the RBP's environmental and social impacts.	(b) Incorporate recognized elements of good practice in ES assessment and management, including: (i) early screening of potential impacts;	• Do the applicable ES management systems require early screening of potential ES impacts. **Yes** • Do relevant procedures require ES screening/assessment of activities associated with the RBP? **Yes** • Are ES screening procedures comprehensive? **Yes** • Does screening lead to ES assessments that are proportional in depth and scope to the identified adverse impacts and risks (e.g., does it apply ES risk categories?) **No** • Do screening procedures include opportunities for stakeholder involvement in the identification of priority ES risks and impacts? **Yes** • Do these requirements specifically apply to the Program to be supported by the RBP operation? Has screening for, and estimation of, ES effects been a part of the Borrower's program design? **The screening is being used for the ADB program only.** • Has RBP screening identified potential subprojects under the Environment and Social Exclusion List (ESEL)? If such activities have been identified, have the activities been excluded from the program? **Yes**
	(ii) consideration of strategic, technical, and site alternatives (including the "no action" alternative);	• Do the applicable ES management systems require the consideration of alternatives or other forms of options assessments to avoid or minimize potential impacts and risks? I.e., are strategic, technical, and site-selection alternatives considered, including a "do nothing" option? **Yes** • Which other forms of strategic planning, such as sectoral master planning, are used to identify ES risks and impacts? Do they consider relative ES costs and benefits? **N.A** • Has RBP screening considered site alternatives? **Yes**
	(iii) explicit assessment of potential, induced, and cumulative impacts;	• Do RBP procedures require the consideration of induced and cumulative impacts as part of screening, options assessment, and/or ES Impact Assessment? **No** • Do the procedures allow for, or promote, the use of tools (such as strategic ES impact assessments and/or strategic management plans) to help identify and evaluate such

Criteria set out in the ESP (Core Principles)	Criteria set out in RBF IGN (Core Elements)	Indicative Checklists
		impacts? **No** • Do the procedures include measures for evaluating critical environmental issues such as transboundary pollution, biodiversity loss, international waterways, and climate change? If so, do they consider the implications to and from RBP activities (i.e., double materiality)? **No** • Do RBP systems require assessing the risks from natural disasters and/or human emergencies? **Yes** • Does the RBF assessment provide adequate opportunities to engage stakeholders on induced, cumulative, and transboundary impacts? **Yes**
	(iv) identification of measures to mitigate adverse environmental or social risks and impacts that cannot be otherwise avoided or minimized;	• Do the applicable systems effectively promote the application of the mitigation hierarchy (e.g., avoid, minimize, mitigate, compensate/offset)? **Yes** • Are mitigation/management measures under the system relevant and realistic? Do they require time-bound actions, clear targets, and clear assignment of responsibilities for implementation? **No** • Do the applicable systems include clear and appropriate repercussions and remedies in case ES mitigation measures are not applied? **No**
	(v) clear articulation of institutional responsibilities and resources to support implementation of plans; and	• Are RBP entities responsible for ES aspects adequately resourced and staffed—in terms of skills, qualifications, and number of staff—to ensure effective administration, planning, design, implementation, and monitoring functions? **No** • If the RBP does not include sufficient in-house capacity for the Client, what other alternative arrangements (e.g., coordination with other agencies, use of consulting services) are available to promote program effectiveness? If present, what arrangements are in place to ensure effective and timely coordination? If none, what needs have been identified for supplementary support and/or capacity strengthening? **The Program will support strengthening of PMU, within which ES specialists will be designated to ensure effective ES management.** • Are the RBP entities effective at applying their ES frameworks in practice? Are "adaptive management" processes in place to respond to unanticipated ES management issues? **ES frameworks are being applied in other externally aided programs.** • Do RBP entities have access to contingency funds for unexpected impacts or budget shortfalls? **Yes** • With the screening results on potential ES impacts, if the agency has any issues with budget for managing the potential impacts. **No**
	(vi) responsiveness and accountability through stakeholder consultation, timely dissemination of the RBP information,	• What mechanisms do program entities use to ensure that stakeholders are identified and that their views, concerns, and suggestions are systematically considered? **Effective GRM is in place under MSEDCL and for KUSUM scheme.**

Criteria set out in the ESP (Core Principles)	Criteria set out in RBF IGN (Core Elements)	Indicative Checklists
	responsive grievance redress mechanisms and access to independent accountability mechanisms.	• Does the Borrower consult with stakeholders on various aspects of RBP design and operation? **Not yet.** • What are the implementation practices of the agency in disclosing of relevant RBF information. **RBF information is disclosed on the MSEDCL website.** • What are the implementation practices of the agency in managing if complaints/grievances. **Effective GRM have been setup, details of which are provided in Section 4 of the ESSA.** • Does the Borrower have specific laws or regulations on information disclosure and grievance address. **Yes, RTI and MERC have been enacted at the central and state level.**
Core Principle 3: avoid, minimize, or mitigate adverse impacts on natural habitats and cultural resources resulting from the RBP**.**	(c) Identify and screen for adverse impacts on potentially important biodiversity and cultural resource areas and provides adequate measures to avoid, minimize, or mitigate adverse impacts.	• Has RBP screening identified potential impacts on modified, natural, or critical natural habitats? If such impacts involve the significant conversion or degradation of critical natural habitats, have the activities been excluded from the program? **There will be no potential impacts on modified, natural, or critical natural habitats. This is included in the exclusion list and will be screened out prior to implementation of any RBP activities.** • Will the RBP activities affect environmentally sensitive habitat areas with local importance, such as streams, wetlands, ponds, and vegetated riparian areas? **No. This will be screened out prior to implementation of any RBP activities.** • Would RBP activities lead to the fragmentation of existing habitat areas, both at the level of localized Program activities and at larger landscape levels? **No.** • Do management plans require appropriate conservation and mitigation measures to be in place, including those required to maintain ecological services? **This will be embedded in the ESMP.**
	(d) Support and promote protection, conservation, maintenance, and rehabilitation of natural habitats; avoid significant conversion or degradation of critical natural habitats; and if avoiding the significant conversion of natural habitats is not technically feasible, include	• Does the RBP include management measures to protect, conserve, or rehabilitate habitats that are at risk? Are these measures consistent with recognized international good practice, including internationally recognized standards of sustainable forest management and use? **Currently, there are no measures. But these will be included in the ESMP.** • Are monitoring measures in place to determine the extent to which habitats are affected under the RBP? **Yes.** • Have the relevant management authorities and other key stakeholders for such protected areas been consulted or otherwise involved in decisions that may affect the legal status or habitat values of the area? **Yes.** • If RBP activities may cause conversion or degradation of non-critical natural habitats, do Environmental Impact Assessment procedures include consideration of measures to avoid or minimize the severity of impacts? **Power distribution projects are not listed**

Criteria set out in the ESP (Core Principles)	Criteria set out in RBF IGN (Core Elements)	Indicative Checklists
	measures to mitigate or offset the adverse impacts of RBP	**as environmentally sensitive projects, and thus environmental clearance is not required.** • Do plans require appropriate conservation offset measures to be in place, including measures to maintain ecological services? **Yes**
	(e) Take into account potential adverse impacts on cultural resources and provide adequate measures to avoid, minimize, or mitigate these impacts.	• Does the screening review involve careful attention to avoiding impacts on resources of archaeological, paleontological, historical, architectural, religious, or cultural significance? **Yes** • Is the mitigation hierarchy principle applied in the management of potential adverse impacts on physical cultural property, such as management measures to avoid, minimize, or mitigate? **Yes** • Do Borrower systems include "chance find" procedures to take effect whenever RBP activities result in discovery of, or disturbance to, physical cultural resources? **Yes**
Core Principe 4: protect public and worker safety against the potential risks associated with: (i) construction and/or operations of facilities or other operational practices under the RBP; (ii) exposure to toxic chemicals, hazardous wastes and other dangerous materials under the RBP; and (iii) reconstruction or rehabilitation of infrastructure located in areas prone to natural hazards.	(f) Promote adequate community, individual, and worker health, safety, and security, through the safe design, construction, operation, and maintenance of the RBP or, in carrying out activities dependent on existing infrastructure, incorporate safety measures, inspections, or remedial works as appropriate; promote measures to address child and forced labor.	• Does the RBP have a legal framework that addresses and promotes workplace safety? Are there mandatory measures that compel contractors and facility operators to operate equipment and facilities in a manner that protects individuals and communities? **Yes** • Does the Borrower require measures to help protect individuals and/or communities from violence, intimidation, harassment, criminal activity, or other negative interactions with contractors, laborers, operators, or other workers associated with a Program activity? **No** • Does the Borrower have specific laws or regulations to avoid the use of child and forced labor in the implementation of Program activities? **Yes**
	(g) Promote the use of recognized good practice in the production, management, storage, transport, and disposal of hazardous materials generated under the RBP.	• Does the Borrower have specific laws, regulations, procedures, standards, etc., to effectively evaluate and manage the potential effects of hazardous or toxic materials in the workplace? **Yes** • Does the RBP include safety measures and standards for pre-existing civil works or works under construction that pose potential hazards to people or the environment? **Yes** • Are emergency preparedness plans implemented and periodically reviewed? If plans are deficient, what safety measures or remedial works do Program entities need to undertake? **No**
	(h) Promote the use of integrated pest management practices to manage or reduce pests or disease vectors;	• Where relevant, do RBP systems promote the use of integrated pest management practices to manage or reduce pests or disease vectors? **N.A** • Does the RBP include appropriate technical guidelines and training for the safe

Criteria set out in the ESP (Core Principles)	Criteria set out in RBF IGN (Core Elements)	Indicative Checklists
	and provide training for workers involved in the production, procurement, storage, transport, use, and disposal of hazardous chemicals in accordance with the relevant international guidelines and conventions.	production, storage, transport, use, and disposal of hazardous pesticides or other chemicals? **Yes**
	(i) Include adequate measures to avoid, minimize, or mitigate community, individual, and worker risks when the RBP is located in areas prone to natural hazards such as floods, hurricanes, earthquakes, or other severe weather or affected by climate events.	• As relevant, does the RBP include measures to ensure that people or the environment would not be put at increased risk from natural hazards? **Yes** • Does the Borrower assess the climate change risks associated with RBP activities, such as the estimation of the RBP's GHG emissions or the inclusion of appropriate mitigation and/or adaptation measures under the RBP operation? **TBC**
Core Principle 5: manage land acquisition and loss of access to natural resources in a way that avoids or minimizes displacement, and assist the affected people in improving, or at a minimum restoring, their livelihoods and living standards.	(j) Avoid or minimize land acquisition and related adverse impacts; identify and address economic and social impacts caused by land acquisition or loss of access to natural resources, including those affecting people lacking full legal rights to resources they use or occupy; provide compensation sufficient to purchase replacement assets of equivalent value and to meet any necessary transitional expenses, paid before taking land or restricting access; provide supplemental livelihood improvement or restoration measures if taking of land causes loss of income-generating opportunity (e.g., loss of crop	• Does the RBP screen all planned activities to determine if they may require involuntary land acquisition, relocation of residences or businesses, or restrictions to natural resources? **Yes** • Do RBP processes require identification and mitigation of all land-related impacts? Significantly, do systems adequately protect individuals and communities against "forced evictions"? **Yes** • As relevant, does screening consider impacts on various property regimes, including common property resources, customary or traditional rights to land or resource use, those who lack title or any recognizable claim, and Indigenous Peoples rights? Accordingly, do the processes require identification and mitigation of all significant impacts affecting informal users or occupiers of land (or other resources)? **No** • Do the RBP systems support livelihood restoration and support measures, including the necessary institutional provisions to ensure the effective implementation of such measures **Yes** • If not, can the RBP provide supplemental payments to meet this requirement? **Yes, this was done in externally aided program.** • Does the Borrower's system recognize the need to restore or replace public infrastructure lost because of RBP activities? If not, what mechanisms are in place to address such concerns? **Yes** • Do land acquisition procedures include appropriate requirements for the informed participation of affected people? Does information on land acquisition and/or

Criteria set out in the ESP (Core Principles)	Criteria set out in RBF IGN (Core Elements)	Indicative Checklists
	production or employment); restore or replace public infrastructure and community services that may be adversely affected by the RBP; and include measures in order for land acquisition and related activities to be planned and implemented with appropriate disclosure of information, consultation, and informed participation of those affected.	resettlement provide sufficient notification of the rights of those affected, including rights to timely resolution of grievances? Yes
Core Principle 6: give due consideration to the cultural appropriateness of and equitable access to RBP benefits, giving special attention to the rights and interests of Indigenous Peoples and to the needs or concerns of vulnerable groups.	(k) Provide for identification, analysis and promotion of measures to address gender aspects (including children) and disability in RBP consultations, design and implementation processes.	• Do ES impact screening procedures include participation of females, children, disable persons? **Yes** • Do the conducted consultations on the RBP include females, children, and disable persons? **Yes** • Does the stakeholder engagement on the RBP have separated consultations with females, children, and disable groups. **Yes** • Is the RBP AP include any actions to address the identified gender aspects and the issues of children and disable persons. **Yes** • Are there any gender indicators in the DLIs of the RBP? **TBC**
	(l) Provide for meaningful consultations if Indigenous Peoples are potentially affected (positively or negatively), to determine whether there is broad community support for the RBP.	• Do consultations include a representative cross-section of groups affected by the RBP (including women, Indigenous People, the poor, or other groups that might be underrepresented)? **Yes** • Does screening identify different property regimes, including common property resources, customary or traditional rights to land or resource use, and the rights of Indigenous Peoples? **Yes** • Are issues and concerns raised during the consultations resolved and documented systematically? **Yes**
	(m) Provide for participation by the Indigenous Peoples in devising opportunities to benefit from exploitation of customary resources or indigenous knowledge.	• Do RBP entities regularly review and consider consultation results to obtain or broaden community support? **Yes** • Does the RBP exclude activities involving: adverse impact on natural resources to which Indigenous Peoples have traditional ownership or customary use rights; resettlement from or restriction to such communities' access to such lands; or the commercial

Criteria set out in the ESP (Core Principles)	Criteria set out in RBF IGN (Core Elements)	Indicative Checklists
		exploitation of Indigenous Peoples cultural heritage? **Yes**
	(n) Give attention to vulnerable groups and, if necessary, take special measures to promote equitable access to RBP benefits.	• Is there consideration of distributional equity, affordability, and cultural, racial, ethnic, or gender constraints to access or participation? **Yes** • Does the incentive structure within RBP agencies promote outreach measures to encourage equitable and affordable access to Program benefits? **Yes** • Does it consider how to alleviate cultural, racial, ethnic, financial, or physical barriers that hamper the participation of socially marginalized or disadvantaged groups? **Yes**
Core Principle 7: avoid exacerbating social conflict.	(o) Consider conflict risks.	• Is the RBP being implemented in areas of recognized fragility or in post-conflict zones? **NO** • Do the screening and design of RBP activities consider the risks of creating or exacerbating social conflict, including conflicts with ethnic or racial dimensions? **NO** • Are RBP agencies open to discussion with the Bank and consultation with stakeholders on potentially sensitive issues? **N. A**

Annex 5: Sample of Environmental and Social Management Plan (ESMP) for Distribution System Strengthening to be Annexed in the Contract Agreement. [Note: Sample prepared based on ongoing similar projects in India and has been tailored to meet the requirements of the proposed activities under this program. This can be further adjusted to fit the site-specific requirements of a particular location.]

S. No.	Environmental/ Social Aspects	Impacts	Mitigation/ Management Measures	Implementation	Supervision/ Monitoring
PRE-CONSTRUCTION					
1.	Consents/ Permits/ Approvals/ Compliances	Non-compliance to various Environmental/ social/ regulatory requirements pertaining to the proposed project could lead to legal Implications to Contractor/ PMU/ MSEDCL Zone/Circle Office	• Obtain permissions for all construction related activities such as for establishing and operating batching/ workers camps, PUCs, labour licenses, surface water/ groundwater withdrawal permits, tree cutting permissions, etc. • Permissions from Forest Department in case physical infrastructure is constructed near forest areas or requires cutting of trees in forest areas. This needs to be obtained by MSEDCL.	Contractor/ MSEDCL Circle Office	PMU MSEDCL Zone
2.	Construction ESMP (C-ESMP) Preparation and Implementation	Inadequate preparation and implementation of C-ESMP by Contractor can leave environmental and social issues unattended	• C-ESMP to be prepared before civil/ construction work commences and approved by MSEDCL Zone/Circle and PMU. • C-ESMP to provide details on how contractor plan to implement the construction mitigation measures specified in this ESMP. • Contractor's EHS staff to be deployed on the site before the work starts.	Contractor	MSEDCL Zone/ Circle Office
3.	Identification of land for material storage yard/ construction camp/ labour camp	Discharges from yards/ camps to pollute the surroundings and lead to social tension.	• Identify suitable land for storage yard/ construction camp/ labour camp. The land shall not be closer to the water bodies, or waterlogged areas to avoid any impact on the water sources and the associated fauna. • If identified land is agricultural, then care should be taken to cause minimum loss in productivity and the land will be handed over to the owner in an 'as was condition'. • Compensation to be paid for loss of production, if any	Contractor	MSEDCL Zone/ Circle Office
4.	Supply of Construction Material	Sourcing materials from unauthorized sources.	• Procurement of construction material only from approved quarries and sites and licensed/ authorized vendors/ manufacturers.	Contractor	MSEDCL Zone/ Circle Office
5.	Water	Pollution of surface and groundwater sources.	• Arrangement of adequate supply of water for the entire construction period—preferentially sourced from surface water bodies. For drilling of any tube wells, the contractor will obtain permissions. • Minimize wastage of water during construction	Contractor	MSEDCL Zone/ Circle Office
6.	Appointment of EHS staff and Safety Supervisor	Inefficient and incompetent supervision by contractors may lead to negative	• Prepare OHS plan and other required plans, as a part of C-ESMP	Contractor	MSEDCL Zone/ Circle Office

S. No.	Environmental/ Social Aspects	Impacts	Mitigation/ Management Measures	Implementation	Supervision/ Monitoring
		impacts on environment, health and safety.	• Appoint qualified and experienced EHS officers, including Health and Safety Supervisor who will dedicatedly work and ensure implementation of occupational health and safety issues at camps and construction work sites.		
7.	Identification of OHS Hazard and risk categorization	Non-identification of preventive measures for implementation and communication to prevent harm in the workplace	• Conduct OSH risk assessments and systematically identify all relevant hazards. • Measure performance of OHS during implementation	Contractor	MSEDCL Zone/ Circle Office
8.	Other Construction Vehicles, Equipment and Machinery	Vehicles and equipment not complying with regulations may lead to pollution of environment.	• Vehicles, equipment and machinery procured for construction work will conform to the relevant Bureau of Indian Standard (BIS) norms/ CPCB standards. • Discharge standards promulgated under the Environment Protection Act, 1986 and Motor Vehicles Act, 1988 will be strictly adhered to. • Soundproof DG sets as per regulations will be used at the project site. • Maintain records of Pollution Under Control (PUC) certificates for all vehicles used during the contract period.	Contractor	MSEDCL Zone/ Circle Office
9.	Tree Cutting	Loss of green cover and biodiversity	• Minimize the number of trees proposed to be felled by adopting suitable on-the-spot adjustment of engineering designs. Trees shall be removed before the commencement of construction. Prior Permission shall be obtained from the concerned officials for the felling of trees. • The trees cut shall be disposed of through auction (inclusive of tree stumps).	Contractor	MSEDCL Zone/ Circle Office
10.	Damage to existing eco-system due to borrowing activities	Indiscriminate borrowing activities may damage the eco-system and lead to unproductive environment	• Borrow area selected considering minimum loss of productive land and feasibility of restoration to productive use. • No borrow areas shall be opened within 500m of wildlife movement zones and forest areas. Borrow area should be located at a minimum distance of 300m from the residential/ settlement area. Proper fencing should be provided and access to the borrow areas should be restricted for the locals.	Contractor	MSEDCL Zone/ Circle Office
11.	Identification of construction material transportation route	Inconveniences and safety issues to the public due to the material transport vehicles.	• Material transport route should be planned and approved by the local transport authorities. • Local communities need to be consulted with prior information on any likely inconveniences.	Contractor	MSEDCL Zone/ Circle Office
12.	Identification of sites for debris disposal or wastes	Pollution due to indiscriminate dumping of	• Identifying a suitable area in consultation with local administration to dispose of the wastes from labour camps,	Contractor	MSEDCL Zone/ Circle

S. No.	Environmental/ Social Aspects	Impacts	Mitigation/ Management Measures	Implementation	Supervision/ Monitoring
	generated from construction site	wastes.	construction sites and site offices.		Office
13.	Relocation of Utility and Common Property Resources (CPR)	Loss of services from utilities and common property resources for the public	• Shifting of utilities/ common property resources in consultation with the communities and with least inconvenience to the public, and with prior approval of the concerned agencies.	Contractor/ MSEDCL Circle	MSEDCL Zone / PMU
14.	Identification of gender-based violence (GBV) hotspots	Incidence GBV in the project localities	• Mapping vulnerable areas and hotspots in the project influence area. • Conducting training and capacity building on GBV with workers. Develop Code of Conduct (CoC) for workers to abide by. • Building awareness on grievance mechanism among communities.	Contractor	MSEDCL Zone/ Circle Office
15.	Tribal communities (for Fifth Schedule area)	Risk of social conflict	• Conduct meaningful consultations periodically to inform affected persons about planned activities and the impacts of the proposed project in a culturally appropriate manner. • Display all relevant information including GRM related to the project in an accessible place in local language. • Provide trainings to workers on Code of Conduct (CoC) and adopt other measures (e.g. labor camps separated from local communities, strict protocols for interaction with local communities to avoid project impacts from labor influx, etc.) to minimize risks of social conflict.	Consultant/ MSEDCL Circle	MSEDCL Zone/ Circle Office
CONSTRUCTION					
16.	Crushers	Impacts due to establishment and operation of plants and equipment	• Crushers (if any) shall comply with requirements and specifications of the relevant current emission control legislation and contract specifications. • Plants located at least 1 km away from residential/ settlements, forests, wildlife movement areas, and commercial establishments, preferably in the downwind direction. • Submit a detailed layout plan for all such sites and seek prior approval/legal clearances from competent authorities before entering into a formal agreement with a landowner for setting-up such sites. • Arrangements to minimize dust pollution through the provision of windscreens, mist spray units, and dust encapsulation shall have to be provided at all such sites.	Contractor	MSEDCL Zone/ Circle Office
17.	Storage of chemicals and fuel	Soil pollution due to oil and fuel spills from construction equipment and plants.	• Storage and handling of hazardous chemicals in the form of diesel and transformer oil will be carried out in accordance with the Manufacture, Storage, and Import of	Contractor	MSEDCL Zone/ Circle Office

S. No.	Environmental/ Social Aspects	Impacts	Mitigation/ Management Measures	Implementation	Supervision/ Monitoring
			Hazardous Chemicals (MSIHC) Rules, 1989 and as amended. • Assign authorized person to handle hazardous tasks and ensure the safety of processes. • Oil interceptor will be installed at construction site. • Mineral oils to be used in the transformers will be free of PCB. • The equipment and process should not use chlorofluorocarbons or halon. Their use (if any) in existing process should be phased out and disposed of in a manner consistent with the required statutory guidelines. • Septic tank will be constructed for safe disposal of waste.		
18.			• Municipal domestic waste generated at site to be segregated onsite • Ensure hazardous waste containers are properly labeled and stored onsite provided with impervious surface, shed and secondary containment system • Ensure routinely disposal of hazardous waste through approved vendors in accordance with Hazardous and Other Wastes (Management and Trans-boundary Movement) Rules, 2016 and records are properly documented		
19.	Soil erosion	Soil erosion from exposure of soil to rain and wind	• Topsoil from excavated areas/borrow pits to be saved, reused in re-vegetating the areas/pits. • Land clearing and grubbing to be conducted during dry season. • Avoid removal of vegetation and trees to the extent possible. • Protect all vegetation not required to be removed against damage. • Apply best engineering practices to minimize soil structure damage and adhere strictly to design specifications.	Contractor	MSEDCL Zone/ Circle Office
20.	Clearing of vegetation	Vegetation loss	• Minimize tree cutting to the extent possible. • For unavoidable falling of trees, plantation will be taken as per requirement under the guidance of State Forest Department • Regular maintenance of all trees planted. • Where cutting or trimming of trees is necessary, the activity will be done in accordance with safety clearance requirements.	Contractor	MSEDCL Zone/ Circle Office
21.	Generation of Debris	Indiscriminate disposal of	• Any debris generated due to construction activities should	Contractor	MSEDCL

S. No.	Environmental/ Social Aspects	Impacts	Mitigation/ Management Measures	Implementation	Supervision/ Monitoring
		debris will cause nuisance and pollution of soil and water	be stored at a designated place sufficiently away from water bodies and habitats. Re-use debris efficiently if found suitable as fill materials without limiting to the project activities.		Zone/ Circle Office
22.	Air Pollution – Dust generation due to earthwork or transportation of material	Dust generation will cause air pollution and will have impacts on health and safety.	• Suppression of dust by sprinkling of water within the work area and stack the loose soil and contain it with covers if required. • Ensure that all vehicles, equipment and machinery used for construction works are regularly maintained and confirm that pollution emission levels comply with the relevant requirements of CPCB and/Motor Vehicles Rules. • Submit PUC certificates for all vehicles/ equipment/machinery used for the project. • DG set to be provided with vertical opening chimney of adequate height as per CPCB guidelines. • LPG shall be used as fuel for cooking of food, instead of fuel wood.	Contractor	MSEDCL Zone/ Circle Office
23.	Water requirement for project	Over extraction or exploitation of groundwater will lead to water scarcity.	• During construction only permitted quantity of water from approved sources should be used in construction activity. • Contractor to ensure optimum use of water; discourage labour from wastage of water. • Prior written permission from authorities for use of water for construction activity should be submitted to MSEDCL. • Any drilling of tube wells will need permission from authorities and the extraction need to be monitored.	Contractor	MSEDCL Zone/ Circle Office
24.	Noise from vehicles, plants and equipment	Noise from construction vehicles, plant and equipment will lead to noise pollution and cause health and safety issues	• Construction operations should be undertaken primarily during daytime, i.e., 6:00 am-6:00 pm only to minimize noise impacts. • Equipment shall strictly conform to the MoEF&CC/ CPCB noise standards and shall have latest noise suppression mountings. • All vehicles and equipment's used in construction will be fitted with exhaust silencers. • Noise level monitoring during the daytime near the construction sites, sensitive receptors and on the material transportation routes. • Provision of temporary noise suppression devices/noise barriers should be used around the boundary of the substation. • Hearing Protection devices (earplugs or earmuffs) should be provided to workers exposed to noise.	Contractor	MSEDCL Zone/ Circle Office

S. No.	Environmental/ Social Aspects	Impacts	Mitigation/ Management Measures	Implementation	Supervision/ Monitoring
			• DG sets and other construction equipment and machinery, as far as practicable, should be fitted with acoustic enclosures to control the noise levels from these sources.		
25.	Occupational Health and Safety	When Occupational Health and Safety are compromised the associated risks from accidents and incidents could affect health and safety of the workers and others on construction/ project sites.	• Periodic health check-ups of all construction workers. • Adequate drainage, sanitation and waste disposal to be provided at the site. Removal of silt and trash choking the drainage from the substation land. • All workers and staff should be provided with Personal Protective Equipment (PPE) including safety boots, helmets, ear plugs appropriate to their job on-site. • Respiratory protection devices shall be provided to all workers at the occurrence of fumes, dust, or toxic gas/ vapor. • Use of any paint containing lead or its products or material containing asbestos should be prohibited. • Smoking should be prohibited near areas of fire or explosion risk. • Accidents or incidents should be reported immediately. Prepare detailed reports of such incidents/accidents. • Sufficient supply of potable water, and first aid kits available at work areas, supplied with adequate material to treat common workplace injuries. Dedicated transport should be provided at work sites to take injured persons to hospitals if needed. • Provide health/accident insurance for workers for the duration of their contract. • Special consideration will be given to risks associated with working at height and with electrical components. • Impart periodic training on OHS particularly on electrical safety measures to all workers. • Conduct awareness programs on HIV/AIDS and other sexually transmitted diseases for workers periodically. • Conduct regular safety audits on safety measures adopted during construction. The audit will cover manpower and their safety, machinery, temporary works, equipment and vehicles, materials storage and handling, construction procedures, environment, site safety guidelines, and miscellaneous services.	Contractor	MSEDCL Zone/ Circle Office
26.	Community Health and Safety		• Plants and equipment will be installed sufficiently away from the settlements. • Construction equipment and vehicles will conform to the emission standards stipulated by the CPCB.	Contractor	MSEDCL Zone/ Circle Office

S. No.	Environmental/ Social Aspects	Impacts	Mitigation/ Management Measures	Implementation	Supervision/ Monitoring
			• Proper caution signage, barricading, etc. will be installed around charged component. • General public/ residents shall not be allowed to any of the risk areas of the substation, including construction sites and areas where heavy equipment is in operation. • Advance notice to the public about the time and the duration of the utility disruption (if any arises), project construction activities, and possible health and safety risks. Refer to S No. 15 under Pre-Construction for process related to consultation and disclosure in tribal areas.		
27.	Emergency Response	Human suffering and financial losses	• Prepare an Emergency Response Plan • Conduct awareness campaigns among the workers on Emergency Response Plan.	Contractor	MSEDCL Zone/ Circle Office
28.	Risk of Natural Hazards	Risk from fire, lightning, flooding and earthquakes, etc.	• All reasonable precaution to be taken to prevent danger of the workers and the public from fire, lightning due to thunderstorm, flooding, etc.	Contractor	MSEDCL Zone/ Circle Office
29.	Hygiene	Impacts related to unhygienic surroundings	• At every workplace, good and sufficient water supply shall be maintained to avoid waterborne /water-related / water-based diseases to ensure the health and hygiene of workers. • Adequate drainage, mobile toilets shall be provided at workplace. • Preventive medical care shall be provided to workers.	Contractor	MSEDCL Zone/ Circle Office
30.	GBV-SEA/SH Risks	GBV-SEA/SH risks may arise due to labour influx	• Sensitization trainings and awareness building of workers and local communities on SEA/SH prevention and response. • Workers to sign and abide by the Code of Conduct (CoC). • Setup and build awareness among workers on Internal Complaints Committee (ICC) as mandated by the Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013. • Identify GBV service providers to establish referral mechanism. • Sourcing of local workforce, wherever feasible.	Contractor	MSEDCL Zone/ Circle Office
31.	Social Inclusion	Exclusion and discrimination against female workers and other vulnerable groups.	• Adopt Equal Opportunity Policy in accordance with the Persons with Disabilities Act, 2016 • Ensure recruitment policies, payment of wages, work timings, and camp facilities (creche, toilets, resting areas) cater to the requirements of women workforce as per the	Contractor	MSEDCL Zone/ Circle Office

S. No.	Environmental/ Social Aspects	Impacts	Mitigation/ Management Measures	Implementation	Supervision/ Monitoring
			law. • Representation of women in committees established by the contractor (e.g. GRC, ICC, Health and Safety)		
32.	Labour Working Condition	Poor working conditions, lack of facilities including risks of discrimination, unequal wages among workers.	• Ensure compliance with all relevant labour laws such as Building and other Construction Workers Act 1996, Employee Compensation Act 1923, Payment of Wages Act 1936, among others. • Ensure all (a) basic facilities (water, sanitation etc.) are provided in camp sites, (b) labour/attendance/wage registry is maintained(c) forms and notices are displayed, and (d) monitoring systems are in place for periodic or incident-based reporting. • Construction workforce facilities to include proper sanitation, water supply and waste disposal facilities. (IFC/EBRD- Worker's Accommodations: processes and standards or its equivalent will be followed) • Setup grievance redressal mechanism for workers. Widely disseminate information on GRM and ensure timely redressal of grievances	Contractor	MSEDCL Zone/ Circle Office
33.	Site clearance and Excavation works	Chances of finding archaeological /cultural artifacts	• Instruction should be given to the workers not to remove such articles (if found any) and immediately inform to the Supervisor (Contractor) and MSEDCL Zone/ Circle office and further to the PMU. • The find should be assessed by a competent local District Office of Culture and Fine Arts official, and procedures to avoid, minimize or mitigate impacts to such physical cultural objects should be developed. • Work should not begin until the procedures to avoid, minimize or mitigate impacts to the physical cultural objects have been implemented. • Where avoidance is not feasible, no alternatives to removal exist, and the Project benefits outweigh the anticipated cultural heritage loss from removal, the physical cultural objects should be removed and preserved according to the best available technique. • Any removal should be conducted in accordance with relevant provisions of national heritage protection decrees and laws. • Records should be maintained of all finds, including chain of custody instructions for movable finds. • All Project workers and staff should be made aware of the	Contractor	MSEDCL Zone/ Circle Office PMU

S. No.	Environmental/ Social Aspects	Impacts	Mitigation/ Management Measures	Implementation	Supervision/ Monitoring
			chance-find procedure.		
34.	Monitoring	Monitoring environmental attributes like Air, Water, Noise & soil microbiology and social attributes like grievances, accidents/ incidents, labor standard compliance, and other statutory requirements.	The parameters to be monitored, frequency and duration of monitoring as well as the locations to be monitored.	Contractor	MSEDCL Zone/ Circle Office
OPERATION AND MAINTENANCE					
35.	Oil Spill	Risk of oil spill and contamination	• Licensed company to collect the transformers. • All oil storage drums to be located on impermeable bases with an impervious bund capable of retaining at least 110 % of drum volume. • Tank couplings to be located within bund. • All drums to be stored safely in site compounds and protected from vehicle impact. • Adequate oil absorbent and containment materials to be held in areas on all parts of the site and staff briefed on how to use this effectively. • Oil contaminated water from bunded areas and drip trays to be removed by means of a manually controlled positive lift pump, or other measures (such as oil-absorbent pads, for drip trays) to be agreed in advance with the relevant local authority. • Contaminated water/materials to be disposed off-site to appropriate disposal site with necessary paperwork in place. • Mobile fuel and lubricant servicing units to have quality delivery hoses with trigger type delivery nozzles. • All staff to be aware of necessary emergency procedures in case of spill.	Site in charge/ Operator	MSEDCL Zone/ Circle Office
36.	Occupational health and safety	Impacts on occupational health and safety due to exposure to live power lines, working in heights, and risks of accidents	• Allow only trained and qualified workers to have access to work on electrical equipment • MSEDCL shall ensure adherence to electrical safety standards as per MSEDCL safety manual and applicable laws.	Site in charge/ Operator	MSEDCL Zone/ Circle Office

S. No.	Environmental/ Social Aspects	Impacts	Mitigation/ Management Measures	Implementation	Supervision/ Monitoring
		(electrocution, lightning, fires and explosion)	• Ensure proper grounding and deactivation of live power distribution lines during maintenance work or if working near the lines. • Provide PPE for workers, safety guidelines and other precautions • Test the structural integrity of the pole prior to proceeding with the work • Use fall protection measures, i.e. all workers are required to wear body harness when working at a height. • Require workers to observe the minimum approach distances for excavations, tools, vehicles, pruning, and other activities when working around power lines. • Provide adequate trainings on OHS and emergency preparedness to the technicians, operators and other staff members. • Maintain data and reports on incidents and accidents and report them immediately. Facilitate in availing compensation as per the Workmen's Compensation Act, and any other provisions applicable.		
37.	Waste Management	Municipal waste and hazardous waste generated during plant maintenance	• Municipal domestic waste generated at site to be segregated onsite. • Ensure hazardous waste containers are properly labeled and stored onsite provided with impervious surface, shed and secondary containment system. • Ensure routinely disposal of hazardous waste through approved vendors and records are properly documented. • Use of spill control kits to contain and clean small spills and leaks during O&M activities.	Site in charge/ Operator	MSEDCL Zone/ Circle Office
38.	Community health and safety	Impacts to community health and safety such as electrocution and lightning strikes, explosion and fire, etc.	• MSEDCL to provide public information / awareness campaign on risks and hazards related to the project. • Conduct regular inspections of the distribution system to ensure that the minimum vertical clearance and protection is maintained, and that missing or corroded part are immediately identified and replaced • Provide lightning arresters along the line • Provide warning signages to the public about safety distances from the transformers. • Disseminate and display information on grievance redressal management in a visible and easily accessible place in the substation. • Provide advance information to locals through the village	Site in charge/ Operator	MSEDCL Zone/ Circle Office

S. No.	Environmental/ Social Aspects	Impacts	Mitigation/ Management Measures	Implementation	Supervision/ Monitoring
			heads and other means such as SMS about the schedule of maintenance work.		

Annex 6: Sample of Environmental and Social Management Plan (ESMP) for Solar Irrigation Systems for the Vendors. [Note: Sample prepared based on ongoing similar projects in the region and has been tailored to meet the requirements of the proposed activities under this program. This can be further adjusted to fit the site-specific requirements of a particular location.]

S. No.	Environmental/ Social Aspects	Impacts	Mitigation/ Management Measures	Implementation	Supervision/ Monitoring
PRE-CONSTRUCTION					
1.	Consents/ Permits/ Approvals/ Compliances	Non-compliance to various Environmental/ social/ regulatory requirements pertaining to solar pump installation could lead to legal implications to Vendors/ PMU/ MSEDCL Zone/Circle Office	• Obtain permissions for surface water/ groundwater withdrawal permits, tree cutting permissions, etc. as required. • Permission from Forest Department in case installation is near forest areas or requires cutting of trees in forest areas.	Beneficiary MSEDCL	PMU MSEDCL Zone
2.	Land availability	Risk of land related disputes and encroachment	• No public lands will be used for the installation of solar pumps. Private land which is disputed or have encroachments on them (informal settlers, non-titled entities) will not be considered. • Need to be ensured that (i) productive land is in the name of the farmer beneficiary/es (single or joint); (ii) farm land up to 2.5 acre is eligible for 3 HP pump, farm land from 2.51- 5 acre is eligible for 5 HP pump and farm above 5 acre is eligible for 7.5 HP pump.; (iii) with existing water source; (iv) shadow free zone; and (v) land should not be present in notified water zones (dark zone).	MSEDCL Zone/Circle office along with Vendor	PMU
3.	Water source	Exacerbating the risk of groundwater depletion	• Applications from groundwater-stressed regions—classified as dark zones or GSDA-notified (critical, semi-critical, or overexploited) not be considered under the scheme. • Provide training on water-efficient practices and guidance during pump installation on water conservation. • Facilitate access to schemes such as PMKSY, etc. to avail drip and micro-irrigation subsidies • with active groundwater monitoring and recharge plans		
4.	Supply of Construction Material	Sourcing materials from unauthorized sources.	• Procurement of construction material only from approved/licensed/ authorized vendors/ manufacturers.	Vendor	MSEDCL Zone/ Circle Office
5.	Supply of photovoltaic solar panels	Risk related to labor working conditions in the PV solar panel supply-chain	• Sign ethical supply chain declaration and undertake due diligence of its suppliers of photovoltaic panels to ensure that solar PV panels produced for solar pumps does not involve risks related to labor working conditions including	Vendor	MSEDCL Zone/ Circle Office

S. No.	Environmental/ Social Aspects	Impacts	Mitigation/ Management Measures	Implementation	Supervision/ Monitoring
			forced labor and/or child labor.		
6.	Identification of construction material transportation route	Inconveniences and safety issues to public due to transportation of materials	• Material transport route should be planned and approved by the local authorities. • Local communities need to be consulted with prior information on any likely inconveniences.	Vendor	MSEDCL Zone/ Circle Office
7.	Tribal communities (for Fifth Schedule area)	Risk of exclusion of tribal communities	• Ensure MSEDCL provides adequate awareness on subsidies given to ST/SCs to avail the solar pumps and benefits under other relevant schemes. • Ensure vendors are well-versed in tribal languages to offer adequate consultation on maintenance and proper usage of pump offered. • Tailor the awareness raising, mobilization and training campaigns and demonstrations related to solar irrigation systems to the needs of the tribal communities in the relevant locations. • Display all relevant information on health and safety including GRM in an accessible place in local language.	MSEDCL Zone/Circle Office Vendors	MSEDCL Zone/ Circle Office
8.	Gender	Risk of exclusion	• Identify and ensure women beneficiaries are trained in O&M, OHS, and assembling of modules and maintenance	MSEDCL Zone/Circle Office Vendors	PMU
CONSTRUCTION					
9.	Clearing of vegetation	Vegetation loss	• Minimize tree cutting to the extent possible. • Where cutting or trimming of trees is necessary, the activity will be done in accordance with safety clearance requirements.	Vendor	MSEDCL Zone/ Circle Office
10.	Generation of Debris	Disposal of debris will cause nuisance and pollution of soil and water	• Any debris generated due to construction activities should be stored at a designated place sufficiently away from water bodies and habitats. Re-use debris efficiently if found suitable as fill materials without limiting to the project activities.	Vendor	MSEDCL Zone/ Circle Office
11.	Occupational Health and Safety	When Occupational Health and Safety are compromised the associated risks from accidents and incidents could affect health and safety of the workers and others on site.	• Allow only trained and qualified workers to have access to work on electrical equipment • Workers to be provided with Personal Protective Equipment (PPE) including safety boots, helmets, appropriate to their job on-site. • Signpost any slippery areas, ensure proper footwear with a good grip is worn for personnel working within slippery areas. • Day and night-time safety protocol at the site and near water source. The design and implementation of safety	Vendor	MSEDCL Zone/ Circle Office

S. No.	Environmental/ Social Aspects	Impacts	Mitigation/ Management Measures	Implementation	Supervision/ Monitoring
			measures should take into consideration the presence of children, old people and women in the vicinity. • Use of any paint containing lead or its products or material containing asbestos should be prohibited. • Accidents or incidents should be reported immediately. Prepare detailed reports of such incidents/accidents. • Sufficient supply of potable water, and first aid kits available at work areas, with adequate material to treat common workplace injuries. • Provide health/accident insurance for workers for the duration of their contract. • Impart periodic training on OHS particularly on electrical safety measures to all workers. • Conduct regular safety audits on safety measures adopted during construction. • Fire extinguishers should be located at identified fire points around the site. The extinguishers shall be appropriate to the nature of the potential fire. • Communicate emergency response procedures considering such things as specific foreseeable emergency situations.		
12.	Community Health and Safety		• Ensure panel is installed sufficiently away from the residential area • Construction equipment and vehicles to conform to the emission standards stipulated by the CPCB. • Proper caution signage, barricading, etc. to be installed around the solar panel installation and the water source (open well, pond, etc.). • General public/ residents should not be allowed to any of the risk areas where installation work is being carried out. • Create awareness among beneficiaries on use of safety gears while operating the pump and emergency response measures, including grievance management process.	Vendor	MSEDCL Zone/ Circle Office
13.	Risk of Natural Hazards	Risk from fire, lightning, flooding and earthquakes, etc.	• All reasonable precaution to be taken to prevent danger of the workers and the public from fire, lightning due to thunderstorm, flooding, etc.	Vendor	MSEDCL Zone/ Circle Office
14.	GBV-SEA/SH Risks	GBV-SEA/SH risks may arise due to workers' interactions with the community	• Sensitization trainings and awareness building of workers and local communities on SEA/SH prevention and response. • Workers to sign and abide by the Code of Conduct (CoC).	Vendor	MSEDCL Zone/ Circle Office

S. No.	Environmental/ Social Aspects	Impacts	Mitigation/ Management Measures	Implementation	Supervision/ Monitoring
			• Sourcing of local workforce, wherever feasible.		
15.	Labour Working Condition	Poor working conditions, including risks of discrimination, unequal wages among workers.	• Ensure compliance with all relevant labor laws such as Employee Compensation Act 1923, Payment of Wages Act 1936, among others. • Setup grievance redressal mechanism for workers. Widely disseminate information on GRM and ensure timely redressal of grievances	Vendor	MSEDCL Zone/ Circle Office
16.	Quality checks	Poor quality of material and installation work	• Ensure materials meet required standards. • Ensure installation best practices such as proper mounting, tilt adjustments, secure pump placement, and ensuring electrical safety are adopted. • Ensure installations are geo-tagged, and quarterly maintenance reports are prepared by the Vendors and submitted to the Zone/Circle office.	Vendor MSEDCL Zone/Circle Office	PMU
OPERATION AND MAINTENANCE					
17.	Occupational health and safety	Impacts on health and safety due to exposure to live power lines, and risks of accidents (electrocution, lightning, fires and explosion)	• Ensure proper grounding and deactivation during maintenance work • Provide PPE for workers, safety guidelines and other precautions • Require beneficiaries to observe the minimum approach distances for excavations, tools, vehicles, pruning, and other activities when working around the solar panels. • Provide adequate trainings on OHS and emergency preparedness to the beneficiaries. • Maintain data and reports on incidents and accidents and report them immediately. • Facilitate in availing insurance in case of fire, natural calamities and theft.	Site in charge/ Operator	MSEDCL Zone/ Circle Office
18.	E- Waste Management	Safe disposal of solar panels	• Maintenance of the solar pumps to be covered by the vendors for a period of five years after its installation. • Abide by the E-Waste Management Rules, 2022 for disposal of damaged solar panels, • Collect damaged solar panel within a period of 30 days of reporting and not store the damaged panels for more than 180 days in accordance with the Rules. • Disposed to only authorized E-waste recyclers and upload information on the portal, • Ensure records are properly documented- 6 monthly and annual reporting to Pollution Control Board is carried out. • Generate awareness on waste disposal among the beneficiaries.	Vendor	MSEDCL Zone/ Circle Office

S. No.	Environmental/ Social Aspects	Impacts	Mitigation/ Management Measures	Implementation	Supervision/ Monitoring
19.	Solid Waste Management	Increased hazardous solid waste associated with solar water pumps (including batteries, glass, etc.) that are installed	• Hazardous waste (batteries, broken glasses, wiring, etc.) to be properly labeled and stored onsite. • Ensure disposal through authorized waste recyclers and records are properly documented • Generate awareness on waste disposal among the beneficiaries.	Beneficiaries/ Vendor	MSEDCL Zone/ Circle Office
20.	Community health and safety	Impacts to community health and safety such as electrocution and lightning strikes, explosion and fire, etc.	• Vendors and MSEDCL to provide public information / awareness campaign on risks and hazards related to solar pump installation. • Conduct regular inspections of the solar pumps to ensure it is well maintained, and that missing or corroded part are immediately identified and replaced • Provide lightning arresters along the line • Provide warning signages to the public about safety. • Disseminate and display information on grievance redressal management in a visible and easily accessible place.	Site in charge/ Operator	MSEDCL Zone/ Circle Office
21.	Sustainability of Groundwater Resource	Unsustainable extraction of groundwater may result in lowering of the water table, land subsidence and decreased water quality.	• Create awareness on groundwater resource management among beneficiaries to avoid exploitation • Conduct audits and studies to monitor groundwater depletion and soil moisture in SIP served areas with active groundwater monitoring and recharge plans.	MSEDCL Zone/Circle Office	PMU
22.	Limited capacity	Lack of capacity due to limited or no appropriate training for farmers to operate the system.	• Conduct training sessions on solar pumps to educate farmers and local community members on using and maintaining solar irrigation systems.	Vendors MSEDCL Zone/Circle Office	PMU
23.	Grievance management	Farmers unaware of formal reporting channels, leading to delayed service requests and unresolved issues.	• Generate awareness during demonstrations and campaigns • Provide information on how to file grievances during installation • Display information on grievance mechanism and emergency contact details • Document and maintain records of all grievances received and resolved under the Program	Vendors MSEDCL Zone/Circle Office	PMU