TERMS OF REFERENCE (TORS)

Hiring of Consultancy Services to Develop Battery Waste Management Rules and Identify Strategies for Ecosystem Development for Punjab Clean Air Program (PCAP)

1. Background

The Government of Punjab has launched a World Bank funded Program "Punjab Clean Air Program (PCAP)". The overall Program Development Objective (PDO) is to strengthen air quality management and reduce population weighted $PM_{2.5}$ annual average exposure in Lahore Division.

With the rising use of batteries in various sectors, there is an increasing need to manage battery waste effectively to prevent environmental damage. The development of comprehensive rules and strategies for battery waste management will contribute to sustainable waste management practices and ecosystem protection. Battery waste management in Punjab, Pakistan, is governed under national hazardous and e-waste regulations and provincial environmental rules enforced by the Punjab Environmental Protection Agency (EPA).

Most of the Producers, importers, and recyclers are not collecting used batteries and not performing proper recycling, as there is no formal, regulated Extended Producer Responsibility (EPR), that's why, implementation remains weak. Most used batteries, especially lead-acid and UPS types, end up in informal recycling or general waste streams due to limited infrastructure, lack of proper regulations, poor enforcement, and low public awareness.

Punjab has initiated broader waste reforms under programs like *Suthra Punjab*, promoting segregation and digital monitoring, but dedicated battery-collection and recycling facilities are scarce, and there is little public data on collection or recycling rates of these batteries. Environmental and health risks from improper disposal of hazardous battery materials (lead, acid, lithium) remain high. With the rising use of batteries in various sectors, there is an increasing need to manage battery waste effectively to prevent environmental damage. The development of comprehensive rules and strategies for battery waste management will contribute to sustainable waste management practices and ecosystem protection.

2. Objectives of the Assignment

i. Develop battery waste management rules aligned with international best practices and national regulatory frameworks including but not limited to incorporation of EPR, the concept of circular economy and transition of informal sector under regulatory regime.

ii. Identify strategies to promote a sustainable battery waste management ecosystem, including quantification of the required financing, clearly defined roles and responsibilities of relevant departments and agencies, analysis of the existing market structure, and specification of regulatory and oversight mechanism. Provide actionable recommendations for stakeholder engagement and capacity building

iii. Assist Client in achievement of DLR 6-4 of PCAP

iv. Assist Client in getting approval of Battery Waste Management Rules from the competent Forum

3. Scope of Work

The scope, duties and responsibilities of the consultant will include but not limited to the following tasks to undertake the stated objectives.

i. Review existing national and international policies, regulations, and best practices on battery waste management, with specific reference to the EU Battery Regulation, Basel Convention, guidelines issued by the World Bank time to time and India's Battery Waste Management Rules, 2022. The review shall include battery-type–specific regulatory approaches and associated risk considerations.

ii. Identify all relevant public and private stakeholders through a stakeholder mapping matrix, which shall at a minimum include producers and importers, retailers, scrap dealers, informal recyclers, EPA, LGD, relevant industry associations, representatives of the telecom and solar sectors, and academia. Develop a framework for conducting stakeholder consultation sessions, with clear documentation of stakeholder inputs and how their recommendations are incorporated into the final outputs, in compliance with ESS10 principles of transparency, inclusiveness, and documentation.

iii. Conduct a policy and regulatory gap analysis comparing Punjab's existing framework with international benchmarks. The gap analysis shall identify differentiated regulatory gaps for each battery type related to collection, transport, storage, recycling, and disposal.

iv. Review global best practices for the inclusion, integration, and transition of the informal sector into the formal regulatory framework, and recommend specific actions and steps for integrating existing informal sector actors, including registration mechanisms, incentives, and occupational health and safety safeguards.

v. Develop a framework for registration of producers, retailers, recyclers, and collectors, incorporating the concept of Extended Producer Responsibility (EPR), with clear roles and responsibilities of all relevant stakeholders. This shall include a mandatory producer registration system, quantified collection and recycling targets, digital tracking and monitoring mechanisms, and standardized data reporting templates for regulators and producers.

vi. Develop Draft Punjab Battery Waste Management Rules with full operationalization of the EPR framework, in line with PAD requirements and global best practices. The Rules shall clearly define legal definitions, institutional roles and responsibilities, producer obligations, prohibitions, licensing and permitting requirements, reporting obligations, enforcement mechanisms, penalties, and transitional provisions. The following battery types shall be specifically analyzed while preparing the Rules, Strategy, and Action Plan:
    - Lead-Acid
    - Lithium-Ion
    - Ni-Cd
    - Ni-MH
    - Alkaline / Zinc-Carbon
    - Button / Coin
    - EV & Energy Storage Batteries

vii. Develop special regulatory provisions for EV and energy storage batteries, including fire and explosion risks, transport safety, thermal runaway controls, emergency response protocols, and end-of-life dismantling and storage requirements.

viii. Explicitly incorporate environmental, social, public health, and occupational health and safety (OHS) risk considerations, with particular focus on lead-acid batteries and informal recycling operations.

ix. Cross-reference all regulatory and safety provisions with relevant international technical standards and frameworks, including ICAT, IEA, and IEC safety standards, where applicable.

x. Propose ecosystem development strategies incorporating Producer Responsibility Organizations (PROs), deposit–refund schemes, buy-back systems, formalization of the informal sector, permitting systems for recyclers, structured collection systems, and public–private partnerships, taking into account different battery types.

xi. Design and recommend financial and economic instruments such as fees, incentives, subsidies, compliance costs, and penalties for effective implementation of the newly developed rules.

xii. Identify capacity-building needs through a structured Training Needs Assessment (TNA). The TNA shall explicitly assess regulatory, enforcement, technical, monitoring, laboratory testing, and recycling safety capacity gaps. Based on the TNA, design and deliver targeted training programs including modules on hazardous battery handling, fire safety, EV & lithium-ion risks, transport safety, and compliance monitoring.

xiii. The consultant shall design and implement public awareness programs on battery waste management and shall arrange an international demonstration visit to a developed country with advanced battery waste management and recycling facilities for 3–5 officers nominated by the Program Director (PCAP). The selection of the host country and facility shall be based on clearly defined criteria, including: (a) the presence of an advanced regulatory framework for battery waste management; (b) availability of large-scale operational recycling facilities; (c) proven safety systems for lithium-ion and EV batteries; and (d) applicability and replicability of technologies and systems in the Punjab context. The expected outputs of the demonstration visit shall mandatorily include: (i) a formal Back-to-Office Report; (ii) a structured Lessons Learned Report covering regulatory, technical, institutional, and safety practices; and (iii) documented replicable best practices in collection, transport, recycling, and enforcement. A clear integration mechanism shall be defined to ensure that lessons learned from the demonstration visit are systematically incorporated into the Draft Battery Waste Management Rules, the Ecosystem Development Strategy, and the Phased Implementation Action Plan.

xiv. Develop a phased implementation roadmap (short, medium and long term) and monitoring framework with clear KPIs aligned with the rules and DLR 6-4

4. Detailed Tasks

The Consultancy Firm will undertake the following specific tasks:

TASKS	DESCRIPTION
Task – 1	The firm will submit an inception report including methodology to achieve the assigned tasks, along with their reporting mechanism and time schedule for submitting all deliverables.
Task – 2	The firm will submit a comprehensive literature review, specifically review of existing national and international studies, articles, policies and regulations on battery waste & best practices on battery waste management including specific review of the EU Battery Regulation, Basel Convention, guidelines from World Bank regarding battery waste, and India's Battery Waste Management Rules, 2022, with battery-type–specific regulatory and risk considerations.
Task – 3	The Consultant shall conduct structured Stakeholder Consultation Sessions in accordance with ESS10, supported by a stakeholder mapping matrix covering producers/importers, retailers, scrap dealers, informal recyclers, EPA, LGD, industry associations, telecom & solar sector, and academia, containing invitations, attendance sheets, written comments via email or letters & feedback given by stakeholders, pictures of session and presentation given to the participants by the speakers, full documentation of invitations, attendance, feedback, disclosures, grievances, and incorporation of stakeholder inputs into the final outputs.
Task – 4	The Consultancy firm shall prepare Draft Punjab Battery Waste Management Rules with full operationalization of the EPR framework, including legal definitions, roles & responsibilities, prohibitions, licensing & permitting, reporting, enforcement, penalties, transitional provisions, and battery-type–specific regulatory requirements (including special safety provisions for EV & energy storage batteries).
Task – 5	The consultancy firm shall submit Ecosystem Development & Capacity Building Strategy, including PRO models, recycling and collection systems, public–private partnerships, formalization of the informal sector, and financial/economic instruments (fees, incentives, compliance costs). This task shall also include Training Needs Assessment (TNA)-based capacity building plan and public awareness framework, along with clearly defined arrangements for an international demonstration visit (selection criteria, expected outputs, and feedback into Rules/Strategy).

Task – 6	The consultancy firm shall submit a complete Phased Implementation Roadmap (short-, medium-, and long-term), a Monitoring & Evaluation Framework with KPIs aligned with DLR 6-4, and a time-bound Action Plan, including producer registration system, collection & recycling targets, digital tracking & reporting templates, and institutional roles & responsibilities of departments i.e. EPA, LGD, industry, PROs etc.
Task – 7	The consultancy firm shall prepare documentation, policy briefs, and formal presentations for placing the Battery Waste Management Rules, Ecosystem Strategy, and Action Plan before the competent approving forum for final approval.

5. Deliverables/Outputs with Timelines

Sr.	Description	Deliverables	Timeline
1.	The firm shall submit an Inception Report including detailed methodology, value-chain mapping, EPR concept, implementation approach, reporting mechanism, stakeholder engagement framework, and time schedule for all deliverables. The Inception Report shall be fully aligned with World Bank ESF compliance (ESS3, ESS4, ESS10).	Inception Report	02 weeks after signing of Agreement.
2.	The firm shall submit a comprehensive literature and policy review of existing national and international policies, regulations, and best practices on battery waste management, including specific review of EU Battery Regulation, Basel Convention, and India's Battery Waste Management Rules, 2022, with battery-type–specific regulatory and risk considerations.	Policy Review Report	2 weeks after approval of Inception Report.
3.	The Consultant shall conduct a series of Stakeholder Consultation Sessions (minimum 03) in compliance with World Bank ESF ESS10, supported by a stakeholder mapping matrix (including producers/importers, retailers, scrap dealers, informal recyclers, EPA, LGD, industry associations, telecom & solar sector, and academia). Full documentation of invitations, attendance, disclosures, feedback, grievances, photographs, and	Stakeholder's Consultation Session Report	15 days after approval of Policy Review Report

	presentations shall be provided, with clear evidence of how stakeholder inputs were incorporated.		
4.	The Consultancy firm shall prepare and present Draft Punjab Battery Waste Management Rules with full operationalization of the EPR framework, including: legal definitions, institutional roles & responsibilities, prohibitions, licensing & permitting, reporting obligations, enforcement mechanisms, penalties, transitional provisions, and battery-type–specific regulatory requirements, including special safety provisions for EV & energy storage batteries.	Punjab Battery Waste Management Rules *(Draft)*	15 days after approval of Policy Review & Stakeholder Sessions Report.
5.	The consultancy firm shall submit a Punjab Battery Waste Management Strategy (Draft), including: PRO models, financial instruments, informal sector integration, recycling & collection systems, and public–private partnerships. This shall also include a Training Needs Assessment (TNA)–based capacity-building plan, public awareness framework, and clearly defined arrangements for an international demonstration visit (selection criteria, expected outputs, and feedback into Rules & Strategy). The cost of the demonstration visit shall be included in the bid price.	Punjab Battery Waste Management Strategy *(Draft).* Demonstration of international best practice.	15 days after approval of Punjab Battery Waste Management Rules.
6.	The consultancy firm shall submit a comprehensive report presenting a phased implementation plan (short-, medium-, and long-term), an implementation roadmap, a monitoring and evaluation framework with DLR-linked KPIs, and a time-bound Action Plan for the Battery Waste Management Rules. The monitoring framework shall explicitly include KPIs aligned with DLR 6-4, such as producer registrations, battery collection rates, and volumes of batteries recycled. The Action Plan shall clearly define institutional roles and responsibilities of EPA, EPD, LGD, industry, and PROs for enforcement, compliance, monitoring, and financing.	Draft Action Plan for Implementation of Punjab Battery Waste Management Rules	15 days after approval of Punjab Battery Waste Management Strategy
7.	The consultancy firm will prepare documentation and presentations for placing the Battery Waste Management Rules, Strategy & Action Plan before competent forum (Punjab Environmental Protection Council or any other forum) for approval.	Presentation and Relevant Documents of Rules, Strategy and Action Plan	As per date indicated by relevant approving fora

6. Tentative Timeline for Completion of Deliverables

Task / Activity	M 1	M 2	M 3
Inception Report: 02 week for submission and 02 weeks for review, revision and approval			
Policy Review Report			
Review, approval and submission of revised report (if required)			
Stakeholder Session Report			
Review, approval and submission of revised report (if required)			
Battery Waste Management Rules			
Review, approval and submission of revised report (if required)			
Arrangement for Demonstration of Internationally best practice.			
Battery Waste Management Strategy			
Review, approval and submission of revised report (if required)			
Implementation Roadmap and Action Plan			
Review, approval and submission of revised report (if required)			
Placing before competent forum for approval.			

7. Duration of Assignment

The consulting firm will be required to complete the whole activity/ assignment and furnish the final documents/ reports within a period of 3 months (12 weeks) from the award of contract, extendable upon satisfactory performance.

The assignment must be in line with the verification protocol of DLR 6-4, as mentioned in the Program Appraisal Document (PAD), which will be approved by the World Bank after due diligence by the IVA/CMU-PCAP.

8. Institutional Arrangements

The consultancy Firm will be contracted by the Planning and Development Board (PCAP-CMU). The firm will coordinate with the Environmental Protection and Climate Change Department, Environmental Protection Agency and any other Department/Agency/Authority relevant to the assignment. The Consultancy Firm will report directly to the CMU and provide copies of reports for onward submission to the World Bank.

9. Key Experts

#	Position	Qualification, Experience and Key Responsibilities	No. of Positions
1	Team Lead/PD	**Qualification:** • MPhil/Master's degree in Environmental Sciences, Environmental Engineering, Public Policy, or a related field. **Experience:** • Minimum 15 years of professional experience in environmental policy development, waste management, or sustainability planning. • Proven experience in leading multi-disciplinary teams for national-level policy or regulatory formulation. • Preferably demonstrated experience in developing or implementing waste management rules or extended producer responsibility (EPR) frameworks. • Strong coordination, project management, and report-writing skills. **Key Responsibilities**: Overall coordination, quality assurance, stakeholder engagement, reporting to CMU	1
2	Environmental Policy & Governance Specialist	**Qualification:** • MPhil degree in Environmental Sciences/ Policy, Environmental Management, Public Administration, or a related discipline. **Experience:** • Minimum 10 **years** of experience in environmental policy analysis, regulatory drafting, or governance reform. • Strong understanding of environmental legislation frameworks, institutional mechanisms, and compliance monitoring systems. • Experience with policy impact assessment, rule formulation, or inter-ministerial coordination. • Familiarity with circular economy and EPR mechanisms in the waste sector. **Key Responsibilities**: This resource will provide guidance on formulation and enforcement of environmental policies in Punjab.	1

		Also provide drafting support for DLR-aligned regulatory provisions and institutional role mapping.	
3	Waste Management Specialist	**Qualification:** • Master's degree in Environmental Engineering/Sciences, Waste Management, Chemical Engineering, or Industrial Ecology **or** Mechanical Engineering **Experience:** • At least 10 years of experience in solid and hazardous waste management, with specific exposure to battery waste, e-waste, or hazardous waste recycling. • Knowledge of waste characterization, collection systems, treatment technologies, and environmentally sound disposal methods. • Experience in developing or evaluating recycling or take-back systems. • Familiarity with battery chemistry, recycling technologies, and materials recovery. • experience with informal recycling sector and environmentally sound management (ESM) of hazardous battery flows **Key Responsibilities**: WM Expert will be engaged during complete tenure to formulate the rules, Strategy and Action plan.	1
4	Electrical Engineer	**Qualification:** • Bachelor's or Master's degree in Electrical or Electronics Engineering. **Experience:** • Minimum 7 years of experience in battery design, storage systems, or electronic waste handling. • Understanding of battery types (lead-acid, Li-ion, NiMH, etc.), lifecycle impacts, and safe handling and dismantling processes. • Experience in technical standards, product safety, and performance testing for batteries or energy storage devices. **Key Responsibilities**: EE will be engaged on research regarding safe disposal of batteries in Punjab.	1
5	Stakeholder Engagement Specialist	**Qualification:** • Master's degree in Communication, Public Policy, Social Sciences, Anthropology or related fields	1

		Experience: • At least 10 years of experience in stakeholder consultation, community engagement, or participatory policy formulation. • Proven experience organizing and facilitating multi-stakeholder dialogues, workshops, and consultations with government, industry, and civil society. • Strong communication, facilitation, and documentation skill **Key Responsibilities:** Stakeholder Engagement Specialist will be engaged during stakeholders consultation sessions.	
6	Legal Expert	**Qualification:** • Bachelor's or Master's degree in Law (LLB/LLM) and specialization in Environmental Law. **Experience:** • Minimum 10 years of experience in environmental legislation drafting, compliance, or enforcement. • Demonstrated understanding of hazardous waste, e-waste, or environmental protection laws at national and international levels. • Experience in reviewing and drafting regulatory frameworks, policy notes, or notifications. • Familiarity with international conventions relevant to hazardous materials and waste trade. Key responsibilities: Legal Expert will provide guidance on rules formulation, approving mechanism and implications after approval of these rules.	1
7	Sociologist	**Qualification:** • Master's degree in Sociology, Social Work and related fields of Social sciences. **Experience:** • Minimum 10 years of experience in social impact assessment, behavioral studies, or community-level environmental research. • Understanding of the social dimensions of e-waste management, including the role of informal sectors, gender, and livelihoods.	1

		• Experience conducting field studies, focus group discussions, and perception analysis related to environmental or waste issues. **Key responsibilities**: Sociologist will identify the socio-economic issues due to implementation of rules and strategies. He will also propose corrective measures for affected parties.	

10. Reporting and Communication

The consultancy firm will produce all reports in English and aligned with World Bank formats. Reports must include evidence such as photographs, GPS-tagged site visit data, and survey results (if required). Fortnightly/Weekly review meetings will be held with CMU and the World Bank. After preparation of Battery Waste Management Rules, the consultancy firm will submit the final report of assignment, both in hard and soft form to the Program Director, CMU-PCAP. The Program Director, CMU-PCAP will submit the report to the World Bank before placing the case for the approval of Punjab Environmental Protection Council. The consultancy firm will remain active and facilitate the client, till the approval of Rules, to be granted by the competent forum.

11. Ethical Standards and Confidentiality

The Consultancy firm must adhere to the World Bank's Environmental and Social Framework (ESF) while preparation of Battery Waste Management Rules, strategy & Action Plan , as well as relevant laws and regulations of the Government of Punjab. Confidentiality of beneficiary and program data must be maintained. The firm must also disclose any conflict of interest and ensure impartiality throughout the assignment.

12. Payment Schedule

The Consultancy firm will be compensated based on deliverables, with payments made against satisfactory acceptance of Tasks/deliverables by the CMU and the World Bank. Suggested payment milestones are:

Deliverables	Payment %
• Upon satisfactory submission of Inception Report	10%
• Upon submission of Policy Review Report	15%
• Upon submission of Stakeholder's Consultation Report	15%

• Upon submission of **Punjab Battery Waste Management Rules (Draft)**	10%
• Upon submission of **Punjab Battery Waste Management Strategy (Draft).**	20%
• Upon submission of **Action Plan for Implementation of Punjab Battery Waste Management Rules (Draft)**	10%
• Upon approval of Punjab Battery Waste Management Rules from the competent forum & Achievement of DLR 6-4	20%

13. Responsibilities of the Consultant

The consultancy Firm will report to the Program Director, CMU-PCAP and work closely with designated focal points. The client shall facilitate the consultant in obtaining information/data. Consultancy firm shall work in the field for situation Analysis/data collection and allied matters.

14. Responsibilities of the Client

The consultancy will report to Program Director, CMU-PCAP and work closely with designated focal points. The client shall facilitate the consultant in obtaining information/data. Consultancy firm shall work in the field for data collection and allied matters.

15. Type of Contract

The contract will be on a Lump-Sum basis.