

Terms of reference (ToRs) for the procurement of services

Battery Ecosystem: A Global Overview, Gap Analysis in Indian context, and Way Forward for Ecosystem Development	Project number/ cost centre: 18.9040.9-006.00
--	--

List of Abbreviations	2
1. Project background	3
1.1 Objective and scope of the assignment.....	3
2. Detailed scope of work	4
2.1 Work Package 1: Examine the status quo of traction batteries used in E-mobility application	4
2.2 Work Package 2: Feasible models for battery ecosystem	9
2.3 Work Package 3: Implementation support for battery swapping and battery recycling to State Utilities (for the state of Delhi and another city)	10
2.4 Work Package 4: Framework for ad hoc support.....	11
2.5 Duration and location of the assignment	12
2.6 Milestones of the assignment.....	12
Workshops, training	12
3. General management of the project assignment.....	13
4. Payment schedule	13
5. Specifications of Inputs.....	14
5.1 Eligibility criteria of the Consulting firms	14
5.2 Eligibility criteria of the proposed personnel	14
6. Requirements on the format of the bid	16
7. Further requirements.....	17
8. Submission of proposal	18
9. Specific Conditions pertain to Covid- 19 Measures	18

Terms of reference (ToRs) for the procurement of services

List of Abbreviations

BMU	Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety
BMW	Battery Waste Management
BMS	Battery Management System
CEA	Central Electricity Authority
EV	Electric Vehicle
FAME	Faster Adoption and Manufacture of (Hybrid and) Electric Vehicles
GIZ	German Development Cooperation
GHG	Green House Gas
GoI	Government of India
HCV	Heavy Commercial Vehicles
ICE	Internal Combustion Engine
IKI	International Climate Initiative
LCRT	Low-Carbon Road Transport
LCV	Light Commercial Vehicles
NDC	Nationally Determined Contribution
NGO	Non-government Organisation
OEM	Original Equipment Manufacturers
STU	State Transport Undertakings
TIA	Transport Initiative for Asia
UNFCC	United Nations Framework for Climate Change
WP	Work Package
2W	2-Wheeler
3W	3-Wheeler
4W	4-Wheeler

1. Project background

Climate Change is a growing challenge world over and there is an increasing momentum for transition towards a low carbon economy. The concern for increase in greenhouse gases and need for a low carbon economy led to the signing of Paris Agreement in December 2015. In its nationally-determined contributions (NDCs) under the Paris Agreement, India has promised to reduce its emissions intensity — greenhouse gas emissions per unit of GDP — by 33 to 35 per cent below 2005 levels by the year 2030.

As part of the International Climate Initiative (IKI), the Federal Minister for the Environment, Nature Conservation, and Nuclear Safety (BMU) in Germany has supported a project called the NDC Transport Initiative for Asia (NDC-TIA), which is a joint consortium of seven organizations and engages in three partner countries from emerging economies i.e. China, India and, Vietnam. The central aim of the project is to promote a comprehensive approach to decarbonizing transport, i.e. a coherent strategy of effective policies that are coordinated among various sector ministries, civil society and, the private sector. In each of the partner countries, the consortium supports countries in facilitating and informing the stakeholder processes and in developing selected climate actions. This enables partners to make a sectoral contribution towards achieving their NDCs and increase ambition in transport sections of long-term strategies and 2025 NDCs. As a regional initiative, the project also disseminates knowledge in Asia. The consortium connects with regional stakeholders and other Asian countries in order to encourage taking a comprehensive approach to decarbonizing transport. At a global level, the project would disseminate knowledge and share experiences in the UNFCCC process.

GIZ is leading the project and its office in India is the overall coordinator for the India component of the project. One of the major focuses of the India component is electric vehicles (EV) charging infrastructure. With the growing concerns over carbon emissions and the need to curb oil imports to enhance India's energy security, Electric Vehicles (EVs) are becoming more and more popular due to varied reasons such as lower maintenance costs, cheaper fuel cost, eco-friendliness, and a few more. People are willing to make the sensible switch to EVs, provided there is a required EV charging/ battery swapping infrastructure in place. In view of this, many states are racing ahead through policy frameworks in this domain. Also, concerned ministries have already taken many steps to promote E-Mobility such as the introduction of the second phase of the Faster Adoption and Manufacturing of (Hybrid and) Electric Vehicles scheme (FAME India), Amendments in the Model Building Bye-Laws for Electric Vehicle Charging Infrastructure, the introduction of Guidelines and Standards for Electric Vehicles charging infrastructure.

One of the plausible solutions to decarbonize transport system is Electric mobility (or e-mobility), which is evolving rapidly since recent years. The Government of India (GoI) has taken several steps for enabling the transition to electric vehicles (EVs) from conventional Internal Combustion Engines (ICE). EVs offer huge potential to fight issues of air pollution in urban areas. While there has been so much happening in the domain, there are several challenges and gaps existing in the EV ecosystem that must be addressed.

The detailed scope of work has been explained in the subsequent sections.

1.1 Objective and scope of the assignment

The primary objective of this assignment is to investigate the complete value chain of Motive/traction batteries used in the electric vehicle applications. The following aspects are to be investigated to ensure the sustainability of battery supply chain through a multi-stakeholder approach.

- What does the supply chain for traction batteries comprise? What is the current scenario of sourcing, manufacturing, assembling, reuse, and recycling in India and globally?
- The issues associated with the mineral extraction process necessary for the EV supply chain (specially traction batteries).

- What parameters add to the battery quality? What are the gaps that need to be filled? How can these gaps be filled?
- Policies, Regulatory, technical and logistical barriers constrain to the battery life extension, refurbishment, and recycling.
- Inadequate coordination amongst the relevant stakeholders and data sharing across supply chain standards limit adherence.

The outcome of this research study will be one of the guiding documents for the policymakers, stakeholders, and industry professional to adopt the necessary change and or amendments for the sustainable development of e-mobility.

2. Detailed scope of work

The detailed scope of work is divided into three work packages (WP) to achieve the assignment objective.

With respect to analysis of the Indian states, if required, the Consultant is required to cover each relevant Indian state.

With respect to analysis for the International review, the Consultant is required to cover a minimum of 5 countries. Specifically, for work Package 1, section C, China, Australia, Brazil, South Korea, Japan, and USA needs to be covered.

2.1 Work Package 1: Examine the status quo of traction batteries used in E-mobility application

A. Overview of Motive/Traction Batteries: Technology and Chemistry

Battery plays a vital role in overall development of electric vehicle development. The Lithium-ion batteries (Lithium Iron Phosphate-LFP, Nickel Cobalt Manganese-NMC, Lithium Cobalt Oxide-LCO etc.) have emerged as widely accepted combination for electric vehicles. Under this section, the Consultant will document and review the various technological options available for the different Traction EV Batteries. This will include:

- I. Map and briefly explain the role and responsibility of the relevant stakeholders engaged in the Battery ecosystem.
- II. Describe the various battery technologies (such as Lead acid batteries, Advanced lead acid, Lithium batteries, Flow batteries, High temperature batteries etc.). Subsequently, describe the various battery chemistries (such as Lead acid batteries, Advanced lead acid (Lead carbon, Bipolar lead acid), Lithium batteries (LCO, LMO, LFP, NMC, LTO, NCA), Flow batteries (ZnBr, Vn, Redox), High temperature batteries (Sodium, Sulphur and Zinc batteries) etc.)
- III. Describe the characteristics and compare traction batteries with batteries used for stationary applications.
- IV. Briefly analyze and projection of growth of traction batteries technology (and chemistry)-wise and cost in the short term (till 2022), medium term (till 2025) and long term (till 2030).
- V. The consultant should have communications interactions (online meetings/ email exchanges/ telephonic calls, etc) with relevant organizations in India (such as BIS, DST, ARAI, Panasonic, Exide etc.) to understand the battery technologies and chemistries that are currently prevalent and under process of development.

Deliverable:

D1. Document the recommended practices for the characterization and evaluation of emerging battery technologies and chemistries. Recommend the suitable battery technologies and chemistries suitable for Indian operations and conditions for all vehicle segments in road transportation. Project the demand supply gap (due to central (such as FAME) and state (such as those mentioned under Delhi EV Policy) policies and subsidy schemes) that may emerge for motive/traction batteries, as per battery technologies and chemistries.

D2. Analysis of the current state of the technology as well as Research and Developments for traction Batteries in India and International lead markets of Electro-mobility; selection of Battery technologies relevant to the future development of the Indian Automobile (for all vehicle segments in road transportation i.e 2W, 3W, 4W and LCVs, HCVs, e-buses) market

D3. A summary on technologies (and chemistry) of batteries in operation (historically used and at present) should be documented. Brief details with comparison of benefits and drawbacks/risks of the battery technologies (and chemistry) as traction batteries to be presented.

B. Overview of Motive/traction batteries Standards

A comprehensive overview of all relevant individual categories of standards related to battery technology needs to be provided. Under this section, the Consultant will review and document and review the various standards applicable for the different Traction EV Batteries. These following tasks needs to be undertaken:

- I. Document the various national (such as IS, BIS, ARAI etc.) and International (such as IEC, ISO, CENELEC, UL, SAE, UN, BATSO, Telcordia, US DOE, QC/T, Ellicert, etc.) standards which are applicable for on traction batteries. The standards should be documented technology (and chemistry)-wise, in case applicable.
 - a. The standards should be differentiated for every possible battery technology and chemistry, and be categorized in following ways (though not restricting to):
 - i. General standards
 - ii. Safety and Design standards
 1. Global – such as IEC 60086, ISO 12405-1, SAE J2464, SAE J2929, IEC 62660-2, SAE J2380, UL 2580, QC/T 743, etc.
 2. National – such as AIS 048, IS 16046, etc.
 - iii. Performance Standards
 1. Global - such as IEC 61982, IEC 62660-1, etc.
 2. National – such as IS 16893, etc.
 - iv. Ageing and Material standards (lifecycle standards)
 - b. Identify the various testing standards that are applicable for every possible battery technology and chemistry in India and Globally. Also, identify the various labs that undertake such testing procedures in India.
 - c. Document the various national (such as IS, BIS, ARAI etc.) and International (such as IEC, ISO, CENELEC, UL, SAE, UN, BATSO, Telcordia, US DOE, QC/T, Ellicert, etc.) standards & technical guidelines which are applicable for reuse and recycling of batteries
 - d. Review and document the status on adoption of Global Technical Regulations (GTRs), a global standard used for batteries used in Electric Vehicles.
- II. Review and document the National and International abuse testing standards and regulations for Li-ion batteries in electric and hybrid electric vehicles.
- III. Standards for any additional entities in the battery ecosystem should also be explained.
- IV. Any standard applicable for communication between traction batteries (the Battery Management System (BMS)) and the various components of electric vehicles such as EVs and EVSEs (charging or battery swapping station) should also be explained.
 - a. A summary of national and international review on the protocols and standards for implementation of the smart battery (such as smart locked batteries to prevent theft from EVs) framework must be documented.
- V. The consultant should have communications interact (online meetings/ email exchanges/ telephonic calls, etc) with relevant organizations in India (such as BIS, DST, ARAI, Panasonic, Exide etc.) to understand the standards that are in practice and those that are in the process of development.

Deliverables:

D1: A detailed report containing the review and analyses of the items listed under B. Recommended the standards testing parameters, testing, replacement that should be applicable for motive/traction batteries in India.

C. Review of Policy and Regulatory Environment for Traction Batteries

The Consultant will document and review the current policy framework and enabling environment for Batteries in India and globally and identify any gaps. The policy and regulatory review will include the following:

- I. Review of various national schemes/policies/plans as well as identify and present the gaps in current schemes/policies/plans/regulations and the implementation challenges around for the following:
 - a. raw material sourcing for battery manufacturing
 - b. promotion of battery manufacturing, R&D and supply chain development
 - c. promotion of efficient battery manufacturing for EVs
 - d. developing battery swapping infrastructure
 - e. promotion of safe battery disposal (especially battery waste management rules), battery recycling and reuse
- II. The review would also look at framework/ mechanism and process for providing financial incentives and subsidies across various schemes as well as policies related to manufacturing and import of key components/ elements of Batteries (as well as impact of Make in India policy on scaling up).
- III. Benchmarking with schemes/policies/plans and regulatory practices followed globally by countries leading in battery manufacturing, R&D and supply chain development, efficient batteries for EVs, developing battery swapping infrastructure, battery recycling and reuse.
- IV. Identify the various schemes/grants/ subsidies under Make in India policy or any fiscal/non-fiscal rebates prevalent for:
 - a. raw material sourcing for battery manufacturing
 - b. promotion of battery manufacturing, R&D and supply chain development
 - c. promotion of efficient battery manufacturing for EVs
 - d. developing battery swapping infrastructure
 - e. promotion of safe battery disposal, battery recycling and reuse

Deliverables:

D1: Document the key findings from activities undertaken in this works package. Suggest recommendations to improve the national schemes/policies/plans for the following:

- raw material sourcing for battery manufacturing
- promotion of battery manufacturing, R&D and supply chain development
- promotion of efficient battery manufacturing for EVs
- developing battery swapping infrastructure
- promotion of safe battery disposal, battery recycling and reuse

D. Overview on Battery Manufacturing for EVs

The Consultant will carry out the following tasks:

- I. Document the value chain for battery manufacturing, such as raw material sourcing, electrode manufacturing, cell designing, cell assembly and packaging, battery assembly etc.

- II. Identify the key components of batteries
- III. Identify the raw materials required for battery manufacturing and their source of origin (i.e countries where such raw materials are available)
- IV. Identify stakeholders (public and private industry/associations), involved in raw material mining and sourcing for batteries.
- V. Identify the various cell designing and battery manufacturing processes for EVs
- VI. Analyse the levelized costing in battery manufacturing. Compare the levelized cost of battery manufacturing for different battery technologies.
- VII. Review of licensing or registration requirements for manufacturing of traction batteries
- VIII. Identify stakeholders (public and private industry), their business plans and their current manufacturing capacity in:
 - a. India
 - b. Globally

Deliverables:

D1: Review and summarize the key findings from activities undertaken in this works package. Suggest recommendations on the battery technology (or chemistries) that should be considered by India for manufacturing.

E. Overview on Battery Swapping Infrastructure

The Consultant will carry out the following tasks:

- I. Undertake a feasibility study of battery swapping and for each type of applications (e-2wheelers, e-3wheelers, e-4wheelers and e-buses)
- II. Document the technology available for battery swapping operations
- III. Document the battery supply chain for battery swapping operations.
- IV. Identify the key components of batteries swapping infrastructure
- V. Component wise costing in batteries swapping infrastructure
- VI. Review of licensing or registration requirements for operating batteries swapping infrastructure
- VII. Identify the various business models for operating batteries swapping infrastructure, such as decentralized model, hub and spoke model etc. Evaluate benefits and drawbacks of each type of business model.
- VIII. Identify stakeholders (public and private industry), their business plans and their current capacity (number of batteries swapping stations) in:
 - a. India
 - b. Globally
- IX. Undertake discussions with battery swapping station operators in India to understand the nuances of battery swapping operations and business models

Deliverables:

E1: Review and summarize the key findings from activities undertaken in this works package. Suggest recommendations on the business models and battery technology (or chemistries) that should be considered for battery swapping in India.

F. Overview of Disposal of Traction Batteries

The Consultant will carry out the following tasks:

- I. Review and document the various methods/ processes for procurement of batteries for disposal generally used in India and Analysis and Assessment of the strengths and weaknesses of India's current Recycling system for batteries.

- a. Detailed analysis (desk research, online survey, and or expert interactions/interviews) and description of the existing system and technologies for recycling Li-ion batteries while covering the following stages:
 - i. Dismantling
 - ii. Collection
 - iii. Logistics
 - iv. Pre-treatment
 - v. Recycling (Technologies)
 - vi. Disposal
- II. Review and summarize the licensing or registration requirements for disposal of batteries in India.
- III. Identify and document the operations/working of the organized as well as unorganized sector present in the battery collection and disposal value chain.
- IV. Document in brief, 2 case studies (global/national) on battery disposal firms

G. Overview on Battery recycling:

The Consultant will carry out the following tasks:

- I. Analyse the international benchmark and illustration of the most appropriate and recycling technologies for maximum 4 battery types used for EV application.
- II. Evaluate benefits and drawbacks of each type of method/ process.
- III. Review raw material recovery efficiency and for all types of battery technologies (& chemistries).
- IV. Identify component wise costing of battery recycling
- V. Identify the management model (including monitoring and enforcement issues) as well as on the collection, logistics, pre-treatment, and the secondary life potential of traction batteries
- VI. Identify and document the operations/working of the organized as well as unorganized sector present in the battery recycling value chain.
- VII. Review of licensing or registration requirements for recycling of batteries
- VIII. Identify all relevant stakeholders and analyse the current Business Models for (traction Batteries) recycling system in the selected countries; identification of factors of success for effective and efficient EV traction battery recycling systems in China.
- IX. Document in brief, 2 case studies (global/national) on battery recycling firms.

H. Overview on Battery reuse

The Consultant will carry out the following tasks:

Analysis and assessment of the various methods/ processes (such as Reconditioning, Refurbishing, Repurposing, Reusing, etc.) for battery reuse in the international led markets and perform the PEST and or SWOT analysis.

- I. Assessment of strengths and weaknesses of those technologies against a systematic set of criteria concerning the potential use in India.
- II. Analyse the international benchmark and illustration of the most appropriate and reuse techniques for maximum 4 battery types used for EV application.
- III. Identify applications where Reconditioned/Refurbished/ Repurposed/ Reused batteries can be used, post their end of life as traction batteries. Also, identify component wise costing of battery Reconditioning/Refurbishing/ Repurposing/ Reusing
- IV. Identify and document the operations/working of the organized as well as unorganized sector present in the battery reuse value chain.
- V. Review of licensing or registration requirements for Reconditioning, Refurbishing, Repurposing, Reusing, etc. of batteries

- VI. Identify stakeholders (public and private industry), their business plans and their current capacity (for developing Reconditioned/Refurbished/ Repurposed/ Reused batteries) in:
 - a. India
 - b. Globally
- VII. Evaluate the various public and private-led business models for battery Reconditioning/Refurbishing/ Repurposing/ Reusing, nationally and globally. Evaluate benefits and drawbacks of each type of business model.
- VIII. Document in brief, 2 case studies (global/national) on battery Reconditioning/Refurbishing/ Repurposing/ Reusing firms

Final Deliverable on Work Package 1

D1: In-depth report covering section A to H under Work Package 1. It is expected that the consultant should provide Sections F, G and H on priority and subsequently the complete report.

D2: Technology-neutral recommendations for effective and efficient recycling systems for EV traction batteries in India. Understand, document and recommend ways to harmonize and streamline the operations/working of the organized as well as unorganized sector present in the battery collection, disposal, recycling and reuse value chain.

2.2 Work Package 2: Feasible models for battery ecosystem

Task A: Financial & Economic Analysis for battery swapping stations (from Battery Swapping station Operator Point of View for e-2Ws, e-3Ws and e-buses)

The consultant would undertake the following activities assuming battery swapping station operations in India:

- I. Perform the financial and economic analysis that should estimate cost and benefits of various battery technologies (specifically for traction batteries) also help and select the project configuration. The following sub-activities needs to conduct by consultant are as follows:
 - A. Financial Analysis:
 - 1. Development of a comprehensive data collection tool and gathering of the available data and definition of default data where data is not available.
 - 2. Analysis of capital cost (CAPEX) and operating Cost (OPEX)
 - 3. Analysis of the net present value (NPV) and Levelized Cost of storage (LCOS)
 - 4. Conduct a sensitivity analysis for CAPEX, OPEX, NPV, LCOS with the parameters defined under the scope of work
 - 5. Expand the financial model by analysing the external benefits of the project in terms of PM2.5, NOx, SO2, CO2e and noise emissions. Also explain ways how these benefits can be monetized, if possible.
 - B. Economic Analysis
 - 1. Analysis of the economic net present value (NPV)
 - 2. Estimation of all financial and economic indicators
 - Estimated cost per tCO2 eq (total investment cost/expected lifetime emission reductions)
 - Economic and financial rate of return (with and without the Fund's support)

Deliverable:

D1: A detailed report containing the review and analyses of the items of Task A. The report should clearly highlight the implementation gaps & challenges from policy, regulation, and standardization perspective in the Battery Swapping also possible recommendations.

D2: Financial & Economic Model (Excel) including list of all data collected along with manual (description of the assumptions and instruction on the model applications)

Task B: Financial & Economic Analysis for Battery Recycling Plant

- I. Review and summarize the procurement supply chain and How are batteries recycled (Step-by-Step Process of battery recycling)
- II. Review and identify the challenges in the Battery Waste Management Rules (BMW) 2020 and existing schemes/policies for battery recycling.
- III. Perform financial and economic analysis that should estimate the cost and benefits of various battery recycling. The sub-activities to be undertaken by the consultant are:
 - a. Financial Analysis:
 - i. Development of a comprehensive data collection tool and gathering of the available data and definition of default data where data is not available.
 - ii. Analysis of capital cost (CAPEX) and operating Cost (OPEX)
 - iii. Analysis of the net present value (NPV) and Levelized Cost of storage (LCOS)
 - iv. Conduct a sensitivity analysis for CAPEX, OPEX, NPV, LCOS with the parameters defined under the scope of work
 - v. Expand the financial model by analysing the external benefits of the project in terms of PM2.5, NOx, SO2, CO2e and noise emissions. Also explain ways how these benefits can be monetized, if possible.
 - b. Economic Analysis
 - i. Analysis of the economic net present value (NPV)
 - ii. Estimation of all financial and economic indicators
 1. Estimated cost per tCO2 eq (total investment cost/expected lifetime emission reductions)
 2. Economic and financial rate of return (with and without the Fund's support)

Deliverables:

D1: A detailed report containing the review and summary of Task B. Moreover, the report should clearly highlight the gaps and implementation challenges of BWM Rules 2020 and possible recommendation.

D2: Financial & Economic Model (Excel) including list of all data collected along with manual (description of the assumptions and instruction on the model applications).

2.3 Work Package 3: Implementation support for battery swapping and battery recycling to State Utilities (for the state of Delhi and another city¹)

Post understanding of the status quo of the battery ecosystem as well as feasible models for implementation of battery ecosystem, support to state utilities for on-ground implementation is vital for the overall development of electric vehicle industry. The consultant shall undertake the following under this section:

- I. Evaluate the current schemes/policies/plans/regulations for (already covered under Work Package 1):
 - A. Battery swapping infrastructure operators

¹ To be decided post discussion with the Consultant

- B. Battery recycling firms
- II. Evaluate the gaps and implementation challenges in the current schemes/policies/plans/regulations for (already covered under Work Package 1):
 - A. Battery swapping infrastructure operators
 - B. Battery recycling firms
- III. Evaluate the existing business models for (already covered under Work Package 1 and 2):
 - A. Battery swapping infrastructure operators
 - B. Battery recycling firms
- IV. Evaluate the existing stakeholders (public (such as DISCOMs, Transport Corporation of Delhi, DDCCD, etc) and private) in (already covered under Work Package 1):
 - A. Battery swapping infrastructure operators
 - B. Battery recycling firms
- V. Undertake discussions and consultations with relevant stakeholders (public (such as DISCOMs, Transport Corporation of Delhi, DDCCD, etc) and private) to strengthen the model template documents
- VI. Undertaking Steps 1-5 and taking reference from the work already done under Work Packages 1 and 2, Develop Model Template documents for implementation support to State of Delhi and another city for following:
 - A. Setting up battery swapping stations
 - B. Setting up battery recycling plant
- VII. Design a Standard Operating Procedure (SoP) document inclusive of parameters such as battery procurement mechanism, collection of batteries, schemes for promoting consumers to provide batteries for recycling, roles & responsibilities of stakeholders, etc. for developing an efficient battery recycling ecosystem.
- VIII. Through the Operating Procedure, recommend ways to harmonize and streamline the operations/working of the organized as well as unorganized sector present in the value chain.

Final Deliverables under Work Package 3:

Model Template documents for implementation support to State of Delhi for following:

D1. Setting up battery swapping stations

D2. Setting up battery recycling plant

D3. Standard Operating Procedure (SoP) document for developing an efficient battery recycling ecosystem.

2.4 Work Package 4: Framework for ad hoc support

Work package 4 is not divided into pre-defined tasks. Instead, the Consultant will give support on an ad-hoc basis. The contractor would be given short-time assignments. The ad-hoc task would be activated only after written request and subsequent approval by GIZ mentioning the task and the corresponding effort required for the same

Based on specific requests, different activities that could be included here are:

- I. Provide inputs for publications in scientific peer-reviewed journals with the co-authorship of GIZ and Indian partners based on the results achieved in the project.
- II. Provide a report based on acting upon the request of Indian stakeholders.
- III. Provide inputs for preparation of presentations, papers intended to be delivered in conferences.
- IV. Support in organizing conferences workshops not envisaged in any other work package.

Final Deliverable:

Post completion of Work Packages 1, 2 and 3, the Consultant shall conduct one (1) dissemination workshop (preferably physical (depending on COVID-19 situation), else virtual) for the relevant public and private stakeholders of the battery and EV ecosystem on the learning from our study from Work Packages 1 and 2 only.

2.5 Duration and location of the assignment

GIZ shall hire the consultant **for 7 calendar months** and the location of the assignment will be in Delhi NCR. In case there is an extension or change in scope and/or timeline as defined in this ToR, a separate addendum to the Contract will be signed.

2.6 Milestones of the assignment

The consultant is expected to provide the following deliverables at a specified time. All the deliverables must be approved by GIZ before the final submission.

Sr. No.	Deliverable under Work Packages (WP)	Key highlights of the content	Expected time of delivery
1.	Report under WP1	<ul style="list-style-type: none"> Examine the status quo of traction batteries used in E-mobility application Recommendations to developing an efficient battery ecosystem 	Four (04) months from the start of the engagement.
2.	Report and MS Excel model under WP2	<ul style="list-style-type: none"> Financial & Economic Analysis for battery swapping stations (from Battery Swapping station Operator Point of View) Financial & Economic Analysis for Battery Recycling Plant 	Five and half (5.5) months from the start of the engagement.
3.	Model Template Document under WP3	<ul style="list-style-type: none"> Setting up battery swapping stations Setting up battery recycling plant 	Seven (07) months from the start of the engagement.
4.	Work under WP4	<ul style="list-style-type: none"> Ad-hoc support 	Within the Seven (07) months from the start of the engagement.

Workshops, training

Roundtable discussions with key stakeholders, individual interviews and final information and dissemination workshop are expected under this assignment. It is envisaged that the format of the workshop would be preferably physical (depending on COVID-19 situation), else virtual/online. The final format of the workshop would be decided by GIZ in consultation with the consultant at the appropriate time. The consultants will be responsible for technical content preparation, making presentations for the dissemination of study findings in the workshops planned under this study. The costs/expenses for the workshop shall be borne by GIZ and should not be added in the financial budget of the Consultant.

3. General management of the project assignment

1. A project kick-off meeting shall be conducted before official starting of the project. With an intention to scope the entire project, meet the key stakeholders if required. (A project implementation plan shall be submitted in the **inception report** as an output of the meeting)
2. In the evaluation of the proposal maximum weightage shall be given to interpretation of objective and scope, and proposed methodology.
3. Notwithstanding the GT&C (General Terms & Conditions), the confidentiality of data collected by Consultants during the project tenure shall not be shared with any agency outside the cooperating partners/stakeholders.
4. All deliverables shall be provided in electronic format, following the procedures and format defined by GIZ.
5. Diagrams, maps, pictograms etc. should be used wherever possible with the target to ensure proper visualization of study results.
6. All graphics, images and presentations must be delivered in high quality and high resolution.
7. At the end of assignment, the consultant shall transfer/handover all the research publications, project reports, GoI order, policy, regulations & standard documents etc. used during the assignment.

4. Payment schedule

GIZ shall hire the consultant **for 7 calendar months** and the location of the assignment will be in Delhi NCR. Following shall be the payment schedule for the scope under the tender which has to be performed by the consultant:

S. No.	Work Package (WP)	Payment as a percentage %	Weeks/Months
1.	Project Kick-off	30%	Within 1 month from the award of contract
2.	WP1	15%	Within 3 months from the award of contract
3.	WP2	20%	WP1 + 2 month
4.	WP3	25%	WP2 + 2 month
5.	WP4	10%	From 1 month from the award of contract till the end of 7 months (project completion, whichever comes last)

5. Specifications of Inputs

5.1 Eligibility criteria of the Consulting firms

The Lead Bidders/Consulting firms should be registered and incorporated in India as per The Companies act, 1956/2013 with a valid Company Registration Certificate PAN card and GST Certificate of the registered Company.

The Consortium firm can be national/International firm registered with their respective country.

The Lead firm should have an average annual turnover for the last three financial years of at least 70,000 Euros. The lead firm needs to provide the Audited balance sheet including Profit & Loss Account statement of Last three (3) Financial Years FY 17-18, FY 18-19, and FY 19-20.

The lead firm should have at least 10 employees in the firm as of the last year. The lead firm should have undertaken similar/reference projects with a minimum value of 10,000 Euros.

The firm (lead and consortium) should have experience as follows:

- At least 5 years project experience on technical aspects, standards related to Batteries and Battery Waste Management in India.
- At least 5 years project experience on policy/ regulatory/market aspects of Batteries and Battery Waste Management in India.
- At least 3 years project experience on technical aspects, standards related to Electric Vehicles in India.
- At least 3 years project experience on policy/ regulatory/market aspects of Electric Vehicles in India.
- At least 3 years project experience on business and financial models (including their economic analysis) in India.

5.2 Eligibility criteria of the proposed personnel

A total of up to 350 person-days (15 person-days for team leader, 30 person-days for team manager, and 100 person-days each for 3 team members and 5 person-days for review by international battery/storage expert) may be spent in completing the assignment.

The split up of effort classified according to each work package provided below:

Work Package 1: up to 130 person days.

Work Package 2: up to 100 person days.

Work Package 3: up to 100 person days.

Work Package 4: up to 20 person days.

The below specified qualifications represent the requirements to reach the maximum number of points.

Note: An organization, operating from an office in India must be lead bidder for this contract. It should also include the services of the international experts. The international experts must be either working in individual capacities/ part of an organisation and must be located outside India. The bids are allowed to be submitted by consortium of companies.

Following is a recommended team structure with the desired skills and experience:

5.1.1. Team Leader (as per technical evaluation grid 2.1)

- (2.1.1) Qualification: The team leader must be qualified (Post-graduation or equivalent) in Engineering/ Transport/ Management.
- (2.1.2) Language: English language proficiency (written and verbal).
- (2.1.3) General Professional Experience: At least 12 years of demonstrated experience in handling assignments in policy, market, and statistical analysis in the power sector and transport and related domains.
- (2.1.4) Specific Professional Experience: At least 5 years of either national or international experience in E-mobility sector and should have worked in at least 6 E-mobility/Energy Storage based projects or a similar scope of work. Should have a thorough understanding of the governing policies, processes of transport authorities/ institutions in the Indian context.
- (2.1.5) Leadership/Management Experience: One Senior Manager/Manager level expert. A minimum of 5 years of management/leadership experience as a project team leader or manager in a company.
- (2.1.6) Regional Experience: India and International experience
- (2.1.7) Development Cooperation Experience: Should have experience in working with Development Cooperation institutions.
- (2.1.8) Other: Not Applicable

5.1.2. International Expert (as per technical evaluation grid 2.6)

- (2.6.1) Qualification: Must be qualified (Post-graduation or equivalent) in Engineering/ Transport/ Management
- (2.6.2) Language: English language proficiency (written and verbal).
- (2.6.3) General Professional Experience: At least 12 years of demonstrated experience in handling assignments in policy, market, and statistical analysis in Power/Transport sectors i.e in E-mobility / Energy storage/Battery manufacturing/Battery Recycling.
- (2.6.4) Specific Professional Experience: At least 5 years of international experience in Energy storage/Battery manufacturing/Battery Recycling sector and should have worked in at least 6 Energy storage/Battery manufacturing/Battery Recycling based projects or a similar scope of work. Should have a thorough understanding of the governing policies, processes of governing authorities/ institutions in the International context.
- (2.6.5) Leadership/ Management Experience: One Founder/ Director/ Senior Manager/Manager level expert. A minimum of 5 years of management/leadership experience as a project team leader or manager in a company.
- (2.6.6) Regional Experience: International (other than India)
- (2.6.7) Development Cooperation Experience: Should have experience in working with Development Cooperation institutions.
- (2.6.8) Other: Not Applicable

5.1.3. Team Manager (as per technical evaluation grid 2.2)

- (2.2.1) Qualification: Must be qualified (Post-graduation or equivalent) in Engineering/ Transport/ Management.
- (2.2.2) Language: English language proficiency (written and verbal).
- (2.2.3) General Professional Experience: At least 6 years of overall experience with 3 year of experience in E-mobility / low-carbon transport/mobility technology/ Energy Storage in India or abroad. Should have experience in developing energy related financial models.

- (2.2.4) Specific Professional Experience: Must have a thorough understanding of power and transport sector, policy, regulation, business models, services and technologies used in low-carbon transport/E-mobility/ Energy Storage.
- (2.2.5) Leadership/Management Experience: One Manager/Senior Consultant level expert. A minimum of 3 years of management/leadership experience as a project manager in a company.
- (2.2.6) Regional Experience: India
- (2.2.7) Development Cooperation Experience: Should have experience in working with Development Cooperation institutions.
- (2.2.8) Other: Not Applicable

5.1.4. Team Member (3 persons) (similar requirements and marking scheme as per technical evaluation grid 2.3, 2.4 and 2.5)

- (2.3.1) Qualification: Must be qualified (Graduation or equivalent) in Engineering/ Transport
- (2.3.2) Language: English language proficiency (written and verbal).
- (2.3.3) General Professional Experience: At least 3 years of overall experience with 1 year of experience in E-mobility / low-carbon transport/mobility technology/ Energy Storage in India or abroad. Should have experience in developing energy related financial models.
- (2.3.4) Specific Professional Experience: Must have a thorough understanding of power and transport sector, policy, regulation, business models, services and technologies used in low-carbon transport/E-mobility/ Energy Storage.
- (2.3.5) Leadership/Management Experience: At least three consultant level experts.
- (2.3.6) Regional Experience: Not Applicable
- (2.3.7) Development Cooperation Experience: Not Applicable
- (2.3.8) Other: Not Applicable

6. Requirements on the format of the bid

The structure of the bid must correspond to the structure of the ToR. In particular, the detailed structure of the concept is to be organized in accordance with the positively weighted criteria in the assessment grid (not with zero). It must be legible (font size 11 or larger) and clearly formulated. The bid is drawn up in English (language).

The complete bid shall not exceed 25 pages (excluding CVs). Consultant should only provide details of the relevant assignments/ projects done. It should not include all e-mobility/transportation projects/assignments.

The CVs of the personnel proposed in accordance with section 5 of the ToR must be submitted using the format specified in the terms and conditions for application. The CVs shall not exceed 3 pages. The CVs must clearly portray the requirements as mentioned under section 5 of the ToR.

If one of the maximum page lengths is exceeded, the content appearing after the cut-off point will not be included in the assessment.

7. Further requirements

- a) The proposal should clearly line out how the consultants complement each other according to their fields of expertise to give evidence that all relevant work fields are covered appropriately.
- b) In case the bidder is a consortium, a clear proposal (based on deliverables) is to be submitted along with a clear definition of the roles and responsibilities of each member of the consortium.
- c) All communication with media (TV, radio, print, and other media) must be approved by the responsible person of GIZ. And the evaluation of the proposal will follow the attached evaluation matrix.
- d) Timelines shall be strictly adhered and any delay in any of the deliverable shall be reported and aligned with GIZ in advance.
- e) The different phases / activities shall be documented in a professional manner to be shared with relevant stakeholders for information dissemination.
- f) The Consultant should not be dependent on GIZ or the partner distribution licensee for the supply of documents / data; rather it should gather data and information from already existing resources available wherever possible.
- g) All work results, including reports, must be in format, design, and layout as specified by GIZ and must follow GIZ design guidelines
- h) All phases shall be coherent and complementary in nature and they should not be considered as individual isolated phases
- i) Since the assignment's scope of work is based majorly on secondary research, no travel cost or expenses will be budgeted in the Contract. As mentioned in Section 2 of the ToR, the costs/expenses for the workshop shall be borne by GIZ and should not be added in the financial budget of the Consultant.
- j) The consultant should submit the deliverables to GIZ for its approval. GIZ will review the content and quality and provide feedback to the consultants. It is imperative that the consultants should be able to satisfy GIZ regarding the deliverables submitted.
- k) There will be monthly progress meetings between consultants and GIZ. In addition to this, there should be meetings organized at the completion of various important milestones/deliverables within the project.
- l) Backstopping services need to be specified. Back stoppers must be listed and need to be available during the contract duration. However, no extra budget should be kept for the same.
- m) All activities including travels, meetings and tasks in different focus areas need to be aligned with the GIZ project coordinator (to be nominated by GIZ at the beginning of this assignment).
- n) Experts should be proposed within the specified categories. It is strongly desired that the experts proposed within these categories should only work on the tasks where their expertise is required.
- o) The shortlisted consultants might be requested to make a presentation of the technical bids by GIZ as a part of the selection process.
- p) Each expert proposed for the study and whose CV has been used for technical evaluation has to declare bindingly that s/he shall be available for executing their respective tasks within the assignment until the full term and further if the assignment gets extended on mutually agreed terms.
- q) The proposed consultants need to be available from the first day of the official start of the assignment until the end of the assignment.
- r) The proposed consultants should be included in all communication, coordination meetings with the GIZ team and should as well be available for making presentations /participate in meetings with the relevant stakeholders.
- s) The proposal should clearly line out how the consultants complement each other according to their fields of expertise to give evidence that all relevant tasks are covered appropriately.
- t) A clear proposal (based on deliverables) is to be submitted along with a clear definition of the roles and responsibilities of lead bidder and international consultants.
- u) At the beginning of each step, a work-plan must be submitted to GIZ for alignment.
- v) The different steps/ activities shall be documented in a professional manner to be shared with the relevant stakeholders for information dissemination.

- w) The consultant should at all times of the assignment possess the copyrights (licenses in the case of software packages) of the documents, pictures, technical papers, standards used in the study.
- x) At the end, of the assignment, the Consultant should provide all the documents, research documents, software, outcomes etc to GIZ. The outcome/final deliverable and all the documents under the study shall become the sole proprietary of GIZ.
- y) The consultant should propose the software (if they deem it to be necessary) to be used in their technical bids and highlight the benefits and limitations related to the assignment. It is to be noted that there is no budget provision for licensing of software under this assignment.

8. Submission of proposal

The consultant is expected to submit a technical proposal electronically (refer bidding conditions). Regular rounds of feedback/progress reporting should be planned for and must be described in the proposal.

The shortlisted candidates may be invited either for a virtual or physical (depending on COVID-19 situation) presentation in GIZ Delhi Office within 30 days of the submission of the proposal.

9. Specific Conditions pertain to Covid- 19 Measures

The specific conditions pertain to Covid- 19 measures are integral part of contract and shall act as binding under special agreement and interpreted along with GTCC.

In addition to the provisions as detailed in clause 09 of The General Terms of Contract governing the delivery of works and services commissioned by **Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH (local)**, the Consultant confirms that he/she accepts the Consulting engagement with full knowledge and understanding of the travel and other requirements of the engagement including specifically the need, on the part of the Consultant, to take all required precautions (including prevention and risk mitigation measures) against the risks arising from the ongoing Novel Corona Virus (CoVid - 19) Pandemic

The Consultant shall provide to the GIZ an RT-PCR Negative Test Report for Novel Corona Virus (CoVid - 19) prior to starting the Consulting Engagement and shall additionally comply with the following at all times in the course of the Consulting Engagement:

1. Obtain Medical and other Insurance Cover in respect of the Novel Corona Virus (CoVid - 19) Infection/Disease and consequences thereof – (GIZ will reimburse the insurance cover up to 5000 Indian Rupees on lumpsum basis)
2. Strictly follow and comply with the prescribed Mask, Hand Washing/Sanitization and Social Distancing Protocols.
3. Take safe and secure mode of transportation.
4. Observe all local restrictions/precautions as applicable for the specific areas of travel covered by the Consulting Engagement.
5. If eligible, get vaccinated against the Novel Corona Virus (CoVid - 19).
6. Install and maintain as active at all times the Government of India's Arogya Setu App.
7. If exposed to any active case of Novel Corona Virus (CoVid - 19) to take all steps as advised by the Government of India's advisories in such case.

8. If feeling unwell and experiencing any of the symptoms of Novel Corona Virus (CoVid - 19) infection - to take all steps as advised by the Government of India's advisories in such cases including but not limited to getting an RT-PCR Test for Novel Corona Virus (CoVid - 19), self-isolation, notifying the GIZ and also the concerned local Novel Corona Virus (CoVid - 19) isolation/treatment facility.
9. Other compliance as may be notified by the GIZ and the Government of India from time to time in relation to Novel Corona Virus (CoVid - 19) infection/disease.

Furthermore, The Consultant accepts the Consulting Engagement on a best and informed judgement basis with full knowledge of the tasks to be performed, the place of performance and the precautions and safeguards to be reasonably taken try the Consultant to mitigate all types of risks associated with the said Consulting Engagement. The Consultant undertakes the Consulting Engagement at his/her own risk and responsibility and shall not, under any circumstances, and at any time, be entitled to assert any liability or other claims whatsoever against the GIZ, its Management, Officers and Employees for any consequences or risks or harm that may arise to the Consultant in the course of or as a consequence of undertaking the Consulting Engagement or any actions or consequences arising in relation to such Consulting Engagement.

-----End of document-----