

# Terms of reference (ToRs) for the procurement of services below the EU threshold

<b>Impact Assessment of Renewable Energy-Electric Vehicle Integration, Power Quality Monitoring, and Load Redistribution Planning/Strategies for BYPL Network</b>	<b>Project number/ cost centre:  18.2053.9-001.00</b>
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## **0. List of Abbreviation**

BMZ	Federal Ministry of Economic Cooperation and Development
BYPL	BSES Yamuna Power Limited
CEA	Central Electricity Authority
DISCOM	Distribution Company
DT	Distribution Transformer
EV	Electric Vehicle
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
MoP	Ministry of Power
O&M	Operation & Maintenance
PV	Photovoltaic
RDSS	Revamped Distribution Sector Scheme
RE	Renewable Energy
RTPV	Rooftop Photovoltaic
ToRs	Terms of Reference

## **1. Context**

"Energy transition with Indian distribution companies (DISCOMs)" is a project under the umbrella of Indo – German Energy Programme being implemented in India by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of the Federal Ministry of Economic Cooperation and Development (BMZ) in Germany. The programme supports Ministry of Power in India in building up a broad-based, technically, and economically efficient, socially, and ecologically sustainable energy supply by supporting the DISCOMs. The project is working with Ministry of Power (MoP), Central Electricity Authority (CEA), Power Finance Corporation (PFC) and select DISCOMs in India on various themes associated with data analytics, asset management, operation & maintenance (O&M) of distribution networks and training & capacity building.

### **1.1. Introduction and Objective**

#### **1.1.1 Introduction**

The surge in electric vehicle (EV) adoption is reshaping transportation and posing challenges to power distribution networks. Rapid advancements in battery technology and increasing environmental consciousness are driving the exponential growth of EV sales worldwide. This growth brings a significant rise in electricity demand for charging, straining local power grids and causing congestion in certain areas. The rooftop solar PV revolution added intermittent supply to the grid. In a similar way, the expected rise in EVs will add yet another layer of complexity, thus balancing power supply and demand will become even more challenging for decades to come.

A. Some of the challenges in setting up and operating a charging infrastructure in India include:

- I. It is expected that demand from EV charging infrastructure could double the existing demand of distribution infrastructure.
- II. Distribution utilities are still grappling with impact of variable renewable energy (VRE) sources and addition of a load in similar magnitude can severely impact the network if certain safeguard measures are not taken.
- III. Land in a densely populated urban area is one of the major cost drivers and access to land is a major barrier. In fact, availability and price of land have been observed as make or break factor for business viability of charging infrastructure operations.

B. Few opportunities that charging infrastructure can provide are as follows:

- I. Both power generation from PV rooftop and EV charging could help to address technical losses and stability concerns of distribution utilities.
- II. Applications such as vehicle-to-home or vehicle-to-grid that utilizes batteries of EVs as dynamic storage media could result in multiple points of injection of power in the distribution network. This has the potential to enhance resilience of the grid if it is designed and managed well.
- III. Collaborations in city-level could address the challenges of land-use and right of way that could greatly enhance business viability of charging infrastructure.

However, power flow studies and load flow analysis need to be conducted to understand if the nodes of network where these assets could be deployed for viable business operations are resilient enough to absorb the impact of sudden power injection and drawls. There is a need

to study in holistic manner the impact of variable renewable energy, storage and EV charging on distribution networks. Hence, the associated regulations and technical guidelines also need to be evaluated.

With the increase of power electronics devices in distribution grid (e.g - solar inverters, EV chargers & smart appliances along with increasing industrial loads) the grid faces a pressing need for enhanced power quality monitoring and analysis, particularly in assessing harmonics at DT level. These power electronics devices introduce non-linear loads, significantly altering the power flow dynamics and increasing harmonic distortions. Harmonics, if left unaddressed, can detrimentally impact power quality, leading to voltage instability, overheating, and premature failure of DTs. Enabling harmonics monitoring approach not only safeguards against potential grid disruptions but also ensures the longevity and reliability of distribution infrastructure in the face of evolving energy demands and technological advancements.

Similarly, DT load redistribution planning is essential in areas having poor reliability. The planning helps utilities mitigate overloads, unbalanced systems, and ensure efficient power delivery, enhancing overall power reliability and the lifespan of DT.

### **1.1.2 Objective**

To conduct power flow studies and load flow analysis to assess the resilience of network nodes for deploying assets effectively for viable business operations, considering the impact of sudden power injections and withdrawals. This objective aims to study the impact of variable renewable energy, storage systems, and electric vehicle (EV) charging on distribution networks, and the associated regulations and technical guidelines also need to be evaluated. Additionally, the objective includes monitoring harmonics, transients, flickers, dips&swells, etc on selected distribution transformers and analysing their effect with the objective of DTs' power quality and lifespan, etc. Further, this tender includes planning for the distribution transformer load redistribution to mitigate overloads and unbalanced systems, thereby enhancing overall power reliability and infrastructure lifespan.

### **1.2 Target group and other stakeholders**

BSES Yamuna Power Limited (BYPL) is the implementation partner for this activity.

## **2. Task to be performed by the consultant**

### **2.1 General Terms of Reference**

The detailed scope of work shall be implemented to BSES Yamuna Power Limited (BYPL); however, the results shall be disseminated to all target groups responsible for developing policy, and regulatory norms around EVs and its charging facility. In order to conduct the analysis, the critical and heavily loaded minimum 5 feeders of distribution licensee shall be carefully selected for detailed simulation and impact (power flow and load flow) analysis. The entire scope of work described below in category-wise to conduct the study in response to find the solution of aforesaid objective 1.1.2.

Work Package 1: Conceptual introduction to EV charging, impact on distribution grids and relevant regulations

Work Package 2: Development of methodology for simulation exercise and conducting a detailed load flow simulation

Work Package 3: Monitoring power quality parameters on selected distribution transformers and analysing their effect

Work Package 4: Development of DTs load redistribution planning/strategy to mitigate overloads and unbalanced systems

The main activities outlined in the TOR document provide a guideline for the activities envisaged but the consultant is expected to adjust flexibly to changing demands for support.

## **2.2 Detailed description of the tasks**

### **Scope of Work**

This assignment consists of two (4) tasks. Details of the tasks are provided in the following section:

#### **Work Package 1: Conceptual introduction to EV charging, impact on distribution grids and relevant regulations**

Under work package 1 an overview of Electric Vehicle (EV) charging infrastructure and commercially available options for mitigating the power quality related impacts on the electrical grid will be developed. Furthermore, the relevant regulations are to be outlined.

This includes:

- The description of various categories of commercially available charging systems and processes with respect to electric vehicles (buses, light trucks, cars and 2 wheelers etc) as deployed national and international wise. Typical system components details (e.g. grid topology, line and cable type, special transformers, power converters, chargers, switches, protection schemes etc)
- The reported impacts on power quality (including but not limited to voltage and reactive power issues, harmonics, flicker, phase imbalance, surges etc) and also the reported impacts on the asset health like transformer aging, faults, short circuits, thermal loading etc.
- The common mitigation practices regarding the possible potential adverse impacts from EV charging into the power quality and the asset health of the respective analysed feeder.
- Assessment of draft regulations on interconnection and safety standards prepared by Central Electricity Authority (CEA) and recommend additional safeguards that needs to be taken for grid resilience.
- A short study of regulations and grid connectivity standards for charging infrastructure in mature markets with high volumes of EV charging infrastructure installations nationally and internationally (e.g. Europe, China, Norway, California, Finland, etc).
- Assessment of draft regulations on interconnection and safety standards prepared by Central Electricity Authority (CEA) and recommend additional safeguards that needs to be taken for grid resilience.

### **Deliverables:**

**D 1:** A detailed report containing documentation on the items mentioned in WP-1

## **Work Package 2: Development of methodology for simulation exercise and conducting a detailed load flow simulation**

Task:1 detailed concept and action plan for the simulation exercise

Under this task a detailed concept and action plan for the simulation exercise is to be proposed. The aim of the simulation is to investigate the impact of electric vehicle deployment on selected feeders in the distribution area of BYPL. The study areas and feeders (minimum 5 feeders) are to be selected in consultation with BYPL. All criteria, assumptions and scenarios of the simulation must be described and justified. The required data for simulation is to be listed. The availability of the data has to be checked with BYPL. In case of not available data, assumptions are outlined.

Task 2: simulation of the impact of RE&EV charging infrastructure on the selected feeders

Under work task the simulation of the impact of RE&EV charging infrastructure on the selected feeders is carried out. Different scenarios of charging stations with combinations of slow, fast, rapid and high- power chargers are to be modelled. Each scenario further shall build network models to include solar rooftop, storage and injection of power from EVs:

- Conduct load flow analysis to check for power system stability and identify protection schemes for improving resilience of grid and prepare guidelines for interconnection.
- Identification of parameters for monitoring and controlling grid performance for various penetration scenarios of EV charging infrastructure.
- Design tolerance ranges for controlling the parameters of power system.
- Identify network augmentation requirements to improve grid resilience.
- A projection of the number of electric vehicles (different segments) for selected network areas (feeders) in the future until 2035.
- Determine investments required for catering to demand of charging infrastructure till the year 2035.

Detailed steady state load flow type calculations for the scenarios are to be carried out. The focus will be to investigate the electrical characteristics of the selected networks and finding out potential events and items which require specific attention. The following aspects (but not limited to) must be included:

- a) Hosting capacity of the network
- b) Power quality aspects
- c) Congestions in the network
- d) Minimum and maximum penetration levels and safety margins
- e) Protection scheme
- f) Loading losses
- g) Load profiles of the selected feeders

Appropriate information and specific data collection to be conducted. That includes (but not limited to) the collection of operational data such as voltage, current, active and reactive power at different points in the grid, load profile, capacity and loading on distribution transformer, solar rooftop potential. Future situations in 2, 5, 10 years can be assumed with specific input from elsewhere published data and in consultation with BYPL and other relevant organizations.

In order to conduct the simulation, the following major conditions must be (but not limited to) included:

- a) Feeders in normal today's operation without PV penetration
- b) Above but additionally Electric vehicles deployed.
- c) Above with PV rooftop in the distribution system
- d) Above with battery storage for PV rooftop
- e) Above with Large storage at distribution transformer
- A rough estimation on the electrical behaviour (e.g. demand, congestion, and power quality) of the selected feeders over time of the day
- Aggregated approximate impact on the entire DISCOM areas.
- comparing the findings from work package 3 with the impact assessment conducted in 2018 regarding the large-scale integration of electric vehicle charging on BYPL feeders.
- A workshop will be conducted for BYPL to enable them to disseminate the study's findings.

#### **Deliverables:**

- A report containing the proposal for actions, data collection, survey, assumptions, etc. which will be used for the methodology of the simulation tasks. There should be several categorized scenarios proposed here including different levels of EV deployment, load consumption, feeder congestion, assumptions on locations for charging station points, etc. The scenarios should be even further detailed in the framework either with PV as well as without PV and storage deployment in the same area.
- The proposal for action must be discussed with GIZ and BYPL. The consultant must receive approval to go ahead from BYPL. BYPL must agree on sharing the specific data sets for the calculations of this project.
- A detailed report on the description of the calculations, including diagrams, assumptions and details of the simulation conducted. Respective results from the calculations must be documented in structured manner. This should cover the tasks as mentioned above.
- A detailed report on the key observations, discussions, inferences and action points out of the work package 3. Peak demand, load profile, power quality aspects, requirements for network upgradation, cost for network upgradation etc. should be included. Overall implications for BYPL would be described. Recommendations for upgradation requirements of specific feeders modelled have to be submitted to BYPL.

Controllability of the EV charging processes within BYPL selected areas should be discussed.

- The Grid Dynamic Report (GDR) assessing the anticipated load on the distribution network from EV charging and estimate the requirement for network upgradation to accommodate incremental charging load within the analysed BYPL network.
- Propose RE and EV charging infrastructure locations which after the study results would be optimal from an electrical network point of view within the analysed feeder areas.
- A detailed report comparing the findings from work package 3 with the impact assessment conducted in 2018 regarding the large-scale integration of electric vehicle charging on BYPL feeders.
- Conduction of at least one workshop for BYPL to disseminate the study's findings.

### **Work Package 3: Monitoring power quality parameters on selected distribution transformers and analysing the effect**

Under this work package, the consultants are required to conduct below tasks:

- The contractor is responsible for finalizing installation locations, technical specifications, and relevant vendors for procurement of data logger enabled power quality analysers in consultation with BYPL and GIZ. The contractor is expected to provide key strategic inputs to nodal officers and the project steering committee during pilot finalization in kick-off/project update meetings.
- During the piloting phase, the contractor will perform the procurement and installation of additional sensors (if required), integrate the AMR meter and PQ meter system with the central monitoring application (DT-HMS), troubleshoot any issues that may arise, and conduct rigorous testing to validate the robustness and reliability of the entire transformer health monitoring system. The installation may involve careful positioning and wiring of sensors on transformers (if required), while the system integration will ensure seamless data transmission and synchronization with the central monitoring application.
- Report on power quality assessment which includes harmonics, transients, flickers, dips&swells, etc effect on distribution grid and transformer, and also recommendation suggestions for mitigating these problems and reducing unavoidable high technical losses in the network.
- The contractor is required to train the maintenance staff during the pilot implementation on hands-on system navigation, system troubleshooting, and best practices for predictive maintenance. After successful commissioning, the contractor is required to deliver a workshop on result dissemination and knowledge sharing.

### **Deliverables:**

- Implementation plan, Installation of power quality devices, commissioning and demonstration of pilot as mentioned in WP-3



- Submission of detailed report on power quality assessment as mentioned in WP-3
- Deliver a workshop on result dissemination and knowledge sharing for BYPL

#### **Work Package 4: Development of DTs load redistribution planning/strategy to mitigate overloads and unbalanced systems**

Under this work package, the consultants are required to conduct below tasks:

The contractor is required to perform a detailed survey of an identified area. The following activities are expected by contractors during survey, but are not limited to:

- Review historical load data of distribution transformers.
- Identify transformers with high or imbalanced loads.
- Assess the capacity and condition of each transformer.
- Collect load data for each transformer over a specific period (e.g., daily, weekly, seasonal).
- Analyse load profiles to identify peak demand periods and load patterns.
- Determine the diversity factor and load factors for different areas served by each transformer.
- Identification of major cause of failure in identified electrical section
- Analysis of existing DT metering infrastructure and data availability
- Survey of single line diagram (SLD) for DTs and its connected load in designated section
- Survey of DT's life, analysis of existing maintenance scheduling practise and OEM suggestions

The consultant will develop a report on LV load re-distribution planning, which includes transformer sizing and redesign, load balancing strategies, infrastructure upgrades and investments, safety & regulatory compliance, implementation plan for shifting LV loads with proximity DTs, Communication and Stakeholder Engagement, and Monitoring and Optimization, etc.

#### **Deliverables:**

- Report on DT load re-distribution planning for improving the lifespan of DTs and reliable power supply.

#### **Additional information related to the scope of work:**

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 quality of deliverables submitted.

The consultants are expected to submit "Minutes of the meeting" for the meetings with GIZ and project partners.

All activities including travels, meetings and tasks need to be aligned with the GIZ project coordinator (to be nominated by GIZ at the beginning of this assignment).

**Note: The work packages are independent of each other, allowing the consultant to work concurrently on all of them. And for this tender, consortiums and sub-contracting are not permitted.**

### Period of assignment

The selected consultant must complete the entire assignment and deliver the outputs within 6 months. Please note that the contract will be awarded for a validity of 9 months to complete all billing/payment and contract closing purpose.

Certain milestones, as laid out in the table below, are to be achieved by certain dates during the contract term:

Milestone	Deadline
Work Package 1 Deliverables	1 Months after beginning of the assignment
Work Package 2 Deliverables	4 Months after beginning of the assignment
Work Package 3 Deliverables	6 Months after beginning of the assignment
Work Package 4 Deliverables	3 months after beginning of the assignment

## 3. Concept

In the bid, the consultant should refer here to the overall project objective as described in section 1 and apply these in the sections for which he/she is responsible. The consultant is required to interpret the objectives for which he/she is responsible and to carefully review the terms of reference. Repetition of information in existing documents should be avoided. The limits on text length must be observed (see section 8).

### 3.1 Technical methodological concept

#### 1.1 Strategy

Objectives to the consultant (1.1.1): Please interpret the objectives of the assignment in your words. Additionally, from the consultant's point of view: What may be considered as critical? (up to 3 pages) **Weightage: 3%**

Strategy for delivering the services (1.1.2): Please briefly mention the strategy to associate with BYPL and deliver the services mentioned in this assignment along with the assumptions and risks. (up to 2 pages) | **Weightage: 5%**

#### 1.2 Cooperation

(1.2.1) Presentation and interaction between the relevant actors in the consultant's area of responsibility (up to 2 pages) | **Weightage: 2%**

(1.2.2) Strategy for establishing cooperation and then cooperating with the relevant actors (up to 2 pages) | **Weightage: 2%**

#### 1.3 Steering Structure

Steering with project partners (1.3.1): Please indicate how the consultant proposes to steer the project with GIZ and Indian partners. What would be the conflict resolution mechanism, if required during the implementation of the assignment. (up to 1 page) | **Weightage: 4%**

## 1.4 Processes

The consultant is required to describe the key processes for the services for which it is responsible and create a schedule that describes how the services according to section 2 are to be provided. In particular, the consultant is required to describe the necessary work steps and, if applicable, take account of the milestones and contributions of other actors in accordance with section 2.

Implementation plan (1.4.1): Please describe (preferably a chart) the work steps, a milestone of deliverables and scheduled timelines. (up to 2 pages) | **Weightage: 7%**

## 1.5 Learning and Innovation

People, organisations, and society must undergo a learning process if the cooperation system is to be capable of reacting to change. Learning and innovation are rooted in knowledge. A knowledge management system in a project or organisation identifies and stores relevant and experiential know-how and prepares this for subsequent exchanges, both with other projects and within the partner organisation. The consultant is required to describe its contribution to knowledge management for the partner and GIZ and promote scaling-up effects.

At a societal level, scaling up refers to a consciously selected, targeted impetus for anchoring and disseminating experience and knowledge. Vertical scaling-up involves institutionalising strategies/approaches that have already been successfully piloted. In horizontal scaling up, the piloted strategies/approaches are transferred directly between comparable organisations. Functional scaling-up involves transferring strategies, approaches, methods, and lessons learned etc. to a new context.

(1.5.1) Please describe your contribution to knowledge management for the project partners and GIZ. (up to 1 page) | **Weightage: 4%**

## 3.2 Project management

(1.6.1) The consultant is required to provide an **approach and procedure for coordination** under the purview of the GIZ project. The consultant is required to explain the coordination approach considering various relevant factors, e.g., reporting frequency, format, etc that would make the project successful. Coordination is also necessary at different levels in the project (up to 3 pages)

- Indian Stakeholders: BYPL, etc.
- Consultant.
- GIZ.

**Weightage: 2%**

(1.6.2) The consultant is required to draw up a **personnel assignment plan** that lists all the experts (preferably a table) proposed in the bid; the plan includes information on assignment dates (duration and expert days) and locations of the individual members of the team complete with the allocation of work steps as set out in the schedule. (up to 2 pages) | **Weightage: 2%**

(1.6.3) **Consultants backstopping strategy** (incl. CVs of the technical and administrative back-stopper(s): Please explain how you intend to mobilise your expertise beyond the specified staff to the assignment as per section 4 (e.g., quality assessment of other staff, consultants' internal knowledge management, access to professional communities or other sources of knowledge or expertise) (up to 2 pages plus CVs of back-stoppers) | **Weightage: 2%**

The consultant is required to describe its backstopping concept. The following services are part of the standard backstopping package, which (like ancillary personnel costs) must be factored into the fee schedules of the staff listed in the bid in accordance with section 5.4 of the GIZ AVB:

- Service-delivery control
- Managing adaptations to changing conditions
- Ensuring the flow of information between GIZ and field staff
- Consultant's responsibility for seconded personnel
- Process-oriented technical-conceptual steering of the consultancy inputs
- Securing the administrative conclusion of the project
- Ensuring compliance with reporting requirements
- Providing specialist support for the on-site team by staff at company headquarters
- Sharing the lessons learned by the consultant & leveraging the value of lessons learned on-site

In accordance with [AVB \(2020\)](#), the consultant submits the following reports and deliverables:

- Deliverables as mentioned in the table in section 2
- Contributions to reports to GIZ's commissioning party
- Monthly overview on expert days used
- Brief monthly reports on the implementation status of the activities the consultant is involved in (2-3 pages)

All reports and papers shall be submitted in the English language.

### 3.3 Criteria for Eligibility of Firms

**Consulting organisation must submit documentary evidence against the following:**

- Minimum average annual turnover of 110,000 EUR for the last three financial years {last- but- four financial can be included in case of invitation to tender held within six months of end of last financial year.

(All conversion rates must be taken from Infor-euro site: [https://www.ecb.europa.eu/stats/policy\\_and\\_exchange\\_rates/euro\\_reference\\_exchange\\_rates/html/eurofxref-graph-inr.en.html](https://www.ecb.europa.eu/stats/policy_and_exchange_rates/euro_reference_exchange_rates/html/eurofxref-graph-inr.en.html))

- The agency must declare "Average Number of employees & Managers for the past three calendar years".
- The agency must submit a declaration on GWB clauses – refer Annexure "Legal Inferences"
- At least 2 reference projects with Indian power utilities on their business functionalities.
- At least 2 reference projects in Experience on Renewable Energy/EV technologies and integration to distribution grid in the last 3 years.

- The commission value of reference projects should be minimum 18,000 EUR
- Experience in the implementation an IT-OT-based asset condition monitoring system for a utility.
- Experience in RE-EV impact studies on the power distribution grid.
- Experience in O&M of power distribution sector
- Regional Experience

The parameters/criteria for evaluation are also listed in the evaluation sheet named *Assessing eligibility of consulting firms*.

#### 4 Personnel Concept

The consultant is required to provide personnel who are suited to filling the positions described, based on their CVs, the range of tasks involved and the required qualifications. The consultant is kindly requested to tailor their CVs shared as per specific experience requirements, as mentioned below.

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

##### Team leader

The team leader for this project must hold the position of a senior consultant within the consultant's organization. Their primary responsibility will be to ensure the successful completion of all project tasks and serve as the main point of contact for project-related communication.

##### Qualifications of the team leader

- (2.1.1) Education/Training: The team leader should possess an advanced university degree (master's or equivalent) in a relevant field, such as engineering, science, or business administration. | **Weightage: 3%**
- (2.1.2) Language: Good business language skills in English (C1 and above) is **mandatory. Weightage: 2%**
- (2.1.3) General professional experience: The team leader must have at least 10 years of full-time professional experience in the power sector. Part-time professional experience will not be considered. | **Weightage: 4%**
- (2.1.4) Specific professional experience: S/he should have professional experience of 7 years demonstrating: | **Weightage: 8%**
  - Knowledge of RE and EV technologies. (3%)
  - Business and functional operations understanding in Indian DISCOMs.
- (2.1.5) Leadership/management experience: 5 years of management/leadership experience as a project team leader or manager in an organization. | **Weightage: 4%**
- (2.1.6) Regional Experience: NA | **Weightage: 3%**
- (2.1.7) Development cooperation experience: NA | **Weightage: 1%**

##### Expert 1

The expert will be a consultant responsible for the implementation of tasks covered under WP-1 and 2.

##### Qualifications of the Expert 1

- (2.2.1) Education/training: University degree in relevant field (engineering /IT/Science). | **Weightage: 2%**
- (2.2.2) Language: Good language skills in English is **mandatory**.
- (2.2.3) General professional experience: 8 years of professional full-time experience in power distribution sector. Part-time professional experience cannot be counted. | **Weightage: 3%**
- (2.2.4) Specific professional experience: S/he should have professional experience of 6 years demonstrating: | **Weightage: 6%**
  - Knowledge of Renewable energy & Electric vehicles and its Impact on distribution network (2)
  - Experience in distribution grid planning with integration of e-mobility and Solar PV (2)
  - Understanding of the power system simulation and modelling (2)
- (2.2.5) Leadership/management experience: NA
- (2.2.6) Regional Experience: S/he should have 3 years of experience working with power utilities in India. | **Weightage: 2%**
- (2.2.7) Development Cooperation (DC) experience (2.1.7): NA

## **Expert 2**

The expert will be a consultant responsible for the implementation of tasks covered under WP-3 and 4.

### Qualifications of the Expert 2

- (2.2.1) Education/training: University degree in relevant field (engineering /IT/Science). | **Weightage: 2%**
- (2.2.2) Language: Good language skills in English is **mandatory**.
- (2.2.3) General professional experience: 8 years of professional full-time experience in power distribution sector. Part-time professional experience cannot be counted. | **Weightage: 3%**
- (2.2.4) Specific professional experience: S/he should have professional experience of 6 years demonstrating: | **Weightage: 7%**
  - Experience in IT-OT-based asset condition monitoring system for a utility (2)
  - Knowledge of power quality assessment on distribution grid/DTs (3)
  - Knowledge of load redistribution strategy/planning on distribution transformers (2)
- (2.2.5) Leadership/management experience: NA
- (2.2.6) Regional Experience: S/he should have 3 years of experience working with power utilities in India. | **Weightage: 2%**
- (2.2.7) Development Cooperation (DC) experience (2.1.7): NA

## **Short-term expert pool-1 with 4 members**

### Tasks of the short-term expert pool:

The short-term expert pool is required to collectively meet all the eligibility criteria specified for this assignment. Their tasks will support in all four work packages as mentioned.

### Qualifications of the short-term expert lead

- (2.6.1) Education/training: Any university degree. | **Weightage: 1%**
- (2.6.2) Language: Good language skills in English | **Weightage: 0%**

- (2.6.3) General professional experience: consultants 5 years of professional experience in power distribution sector. Part-time professional experience cannot be counted. | **Weightage: 2%**
- (2.6.4) Specific professional experience: All 4 experts should have combined experience in: | **Weightage: 8%**
  - Experience in power system simulation & modelling and data analysis (2)
  - Understanding of renewable energy and EV integration and grid stability challenges (2)
  - Experience in pilot implementation on distribution transformers (sensors installation, monitoring, testing & validation, and troubleshooting, etc) (2)
  - Experience in operation and Maintenance of assists (DTs and PTs, etc) in the distribution network (2)

(2.6.5) Regional Experience: NA | **Weightage: 2%**

## 5 Costing Requirements

### 5.1 Assignment of Personnel

In total, the contract has a volume of 195 working person-days (excluding ad-hoc) to be covered by the short-term experts of the bidding organisation(s). A brief break-up of task wise person day requirement is mentioned in the table below.

Sr. No.	Work Packages	Person-days
1	Conceptual introduction to EV charging, impact on distribution grids and relevant regulations	15
2	Development of methodology for simulation exercise and conducting a detailed load flow simulation	55
3	Monitoring power quality parameters on selected distribution transformers and analysing their effect	90
4	Development of DTs load redistribution planning/strategy to mitigate overloads and unbalanced systems	35
	<b>TOTAL</b>	<b>195</b>

Following is the personnel-wise allocation of the person-days:

- Team leader (senior consultant): 15 person-days
- Expert 1 (consultant): 50 person-days
- Expert 2 (Consultant): 50 person-days
- Short-term expert pool-1 (4 members): 80 person-days

### 5.2 Travel

The consultant is required to propose a travel budget for this project. The travel budget shall comprise of number of flights, overnight accommodation, per diem and local travel envisaged with estimated prices.

GIZ envisages domestic flights (within India). The domestic sector of travel is the duty station (consultant's base) to Delhi. The consultant is supposed to propose a travel/flight plan in the financial offer. For domestic flights up to 4 hours, only economy class are reimbursable. For

long-haul flights (journeys of at least six hours excluding interruptions or stopovers), seats can be booked in premium economy class or business class. First-class tickets are not permitted. Consultant is requested to comply with GIZ travel guidelines and minimize the carbon footprint by choosing more sustainable options for travel and other resources.

The consultant is supposed to propose travel/flight plan in the financial offer. All necessary flights and other travel costs (such as transfer costs to the airport and back, taxi costs will be reimbursed accordingly (against evidence). Only these amounts shall be inserted into the price sheet for the financial offer.

Please note that all travel, per-diem allowances, and accommodation costs shall only be reimbursed as against evidence (actual payment will depend on the actual travel costs against proper original receipts, hotel bills, taxi bills, flight, or train tickets and boarding pass.). Before traveling, each travel request will have to be approved by the GIZ officer in charge for implementation of the project.

It must be noted that interns cannot be deployed in the assignment and travel expenses of only those experts will be reimbursed whose CVs are proposed in the offer. Travel budget will only be used and paid when actual travel happens.

If restrictions arise due to the measures to combat the Coronavirus/Covid-19 (restrictions in air transport and other travel, restrictions on admission, quarantine measures, etc.) GIZ and the consultant are obliged to adjust their contractual services to the changed conditions in good faith, e.g., in terms of

### 5.3 Other Costs - Hardware Procurement

To meet the objectives of this assignment, procurement of additional hardware components such as PQ harmonic analyser meters might be required during the implementation phase. Under this contract, a budget of **INR 15,20,820** (excluding taxes) has been allocated specifically for hardware procurement and shall not be exceeded. The contractor is responsible to purchase the equipment, adhering to GIZ procurement guidelines. The guidelines for procurement are as follows:

- Specifications should be neutral in nature and specifications should be shared with GIZ/BYPL for prior approval for reference purpose.
- If the cost of equipment is less than 89,460.00 INR without splitting the quantities of the same equipment during execution stage, the contractor has the option for direct purchase with vendor without any competitive tendering.
- If the procurement value exceeds the 89,460.00 INR onwards, all the procurement should be done on competitive basis and awarded to L1 bidder only.
- The procurement payment will be reimbursed to consultant will be done based on submission of original 3<sup>rd</sup> party invoices along with supporting documentations and approvals from GIZ/BYPL.
- All the hardware purchased in this assignment will be handovers to political Partner (MoP) or GIZ.

Technical specifications:

Below are sample technical specifications for hardware procurement. Upon contract signing, the consultant responsible to get a finalized hardware procurement list from BYPL."

- PQ meter should be portable type having flex clamps up to 4000 A and clamp on CTs (suitable for 5 A and 1 A measurement) for connection with Current transformers at HV side.



- Meter should have rechargeable battery backup of at-least 8 hours.
- PQ meters should confirm to IEC 61000-4-30 Edition 3 Class 'A'.
- PQ meter should have capability to measure super harmonics in both voltage and current channels.
- The meter should provide data in the format of PQDIFF as per the latest IEEE Std 1159.3 standards with compatibility with PQ view software of Electrotek Concepts. Please refer <https://www.electrotek.com/pqdiffactor/>. PQ. PQDIFF file format should be provided by the meter itself without any use of any software in between.
- PQ report should be as per IS 17036 and IEEE 519. Measurement should confirm to IEEE 519 and IS 17036 requirements.

## 6. Inputs of GIZ or other actors

BYPL expected to make following available:

- Workshop Logistics

## 7 Requirement on the format of the bid

The structure of the bid must correspond to the structure of the ToRs. In particular, the detailed structure of the concept (section 3) is to be organised 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.

The complete bid shall not exceed **20** pages (excluding CVs & other supporting company documents)

The CVs of the personnel proposed in accordance with section 4 of the TOR shall be submitted using the EU (<https://europass.cedefop.europa.eu/documents/curriculumvitae>) format and shall not exceed 4 pages. The CVs must clearly show the position and job the proposed person held in the reference project and for how long. The CVs must be submitted in English only.

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

Please calculate your price bid based exactly on the aforementioned costing requirements. In the contract, the consultant has no claim to fully exhaust the days/travel/workshops/ budgets. The number of days/travel/workshops and the budget amount shall be agreed in the contract as 'up to' amounts. The specifications for pricing are defined in the price schedule.

The financial offer must contain the daily rate of fees for each expert and the travel budget.

The technical offer **may not contain any price information**. Technical and financial offers must be submitted as separate PDF documents and signed.

**The assignment falls under GIZ negotiation award procedure, hence a bidder with maximum technical score shall be contacted for financial negotiations, if required.**