

1.1. Appendix to SOW – CRC guidelines

1.1.1. Disclaimer

- 1.1.1.1. These guidelines meant for use of OREDA only.
- 1.1.1.2. These guidelines are prescribed for installation, Commissioning, Acceptance and Comprehensive Maintenance of renewable energy systems installed by/under OREDA only.
- 1.1.1.3. OREDA does neither recommend nor insist other organizations to follow these guidelines for the renewable energy systems developed by either by themselves or through any other organization other than OREDA.
- 1.1.1.4. OREDA reserves all the right to modify, amend or supplement these guidelines whenever such necessity arises.
- 1.1.1.5. Though adequate care has been taken for preparation of these guidelines the installation and maintenance details prescribed in this document are not the only and absolute prescriptions. Depending upon the on-site conditions, the installation/maintenance technician shall take his/her own well-judged decision while installing or maintaining a given RE system.
- 1.1.1.6. Though safety features have not been covered under these guidelines, Indian standard safety guidelines for construction work and electrical works must be followed by all involved in with installation and maintenance of RE systems under these guidelines.

1.1.2. Declaration

- 1.1.2.1. These guidelines will hereinafter be known as “General Guidelines for Installation and Maintenance of RE Systems under OREDA”
- 1.1.2.2. These guidelines shall be applicable to all distributed RE systems installed under the aegis of OREDA.
- 1.1.2.3. These guidelines shall be strictly followed by all vendors of OREDA.
- 1.1.2.4. These guidelines will also be strictly adhered to by all technicians and supervisory level officers of OREDA.
- 1.1.2.5. These guidelines will also constitute an integral part of all tenders of OREDA
- 1.1.2.6. The scoring system prescribed in these guidelines shall be applicable to all vendors of OREDA executing projects on behalf of OREDA

1.1.3. Intent behind framing these guidelines

- 1.1.3.1. These guidelines have been framed solely with the intention of improving the installation standards of RE systems and to extend the quality and timely maintenance services so as to minimize system downtime and guarantee customers' satisfaction.

1.1.4. Context

- 1.1.4.1. The last few years have witnessed a tremendous rise in the number of RE installation particularly in remote, un-served and underserved parts of the state. In view of the absolute need of these installations to meet the basic requirements such as lighting, the supply of drinking water, irrigating farmlands, etc. it is imperative on the part of OREDA to ensure proper performance of the systems which largely depends on the quality of materials, standards of installation and the certainty and frequency of maintenance.
- 1.1.4.2. Ministry of New and Renewable Energy, GOI normally determines the quality and standards of the materials which are elaborately reiterated in the respective tender documents.

- 1.1.4.3. Project-specific installation procedures are often elaborated in the respective tender documents which the vendors are expected to follow meticulously. However, it has been observed that the vendors often do not adhere to these procedures which results in poor performance of the systems. To enable the vendors to follow the procedures meticulously a specific installation App has been developed by OREDA which will be shared with the vendors on their registered mobiles meant to be used by their designated Technicians. The App has been made in such a way that as a technician proceeds for installation of a certain system/device it opens up the step by step installation procedure for the given system/device which the technicians simply has to follow and upload pictures wherever camera buttons have been provided. As a technician completes installation the entire installation report along with pictures will be ready on his mobile for submission to OREDA.
- 1.1.4.4. Renewable Energy systems are known for their low maintenance needs. Often this is misconceived as “no-maintenance” which results in non-performance of such high value and efficient systems. Thus, all RE systems must be maintained well.
- 1.1.4.5. Though the primary responsibility of maintenance of the systems has been vested in the concerned vendor the rising number of unresolved service requests at the CRC calls for some serious organizational oversight. Moreover, it is presumed that many customers are also not able to register their requests due to poor or no mobile connectivity, ignorance about CRC and its toll-free number, etc.
- 1.1.4.6. Keeping the above in view, OREDA during September 2018 introduced a Scheduled Maintenance Regime through its Customer Relationship Centre so as to introduce periodicity and certainty in the maintenance services being extended by the vendors. Like installation, the scheduled maintenance has also been made a mobile application based where the technician responsible for maintenance of the system can step by step follow the prescribed procedure for scheduled maintenance and upload pictures wherever camera buttons have been provided. At the end of the maintenance procedure, a maintenance report can also be generated by the technicians.
- 1.1.4.7. This initiative is not only expected to increase the performance level of the installations but also greatly reduce service requests by customers.

1.1.5. Objectives:

The primary objectives of this new initiative are

1. Increase the economic life span of installations.
2. Ensuring better performance of RE systems.
3. Higher returns on investments.
4. Higher customer satisfaction
5. Better acceptance of decentralized RE based power systems
6. Increased response to climate change mitigation.

1.1.6. Stakeholders:

Ensuring proper performance of RE installations calls for the combined effort of all stakeholders such as Customers, Sponsors, PRIs, Vendors, Independent Service Organizations, OEMs, and OREDA.

1.1.6.1. Customers:

Customers are the ultimate users and custodians of RE systems/devices. They are required to own the systems irrespective of the systems being privately owned by them or a public property installed inside their premises. They should be responsible for the safety and security of the systems as well as day-to-day maintenance of the systems as prescribed in the users' manual.

1.1.6.2. Sponsors

Sponsors are the Government Departments/Organizations sponsoring the schemes/program under which the RE systems/devices are installed. Sponsors are responsible for availing and extending maintenance contracts and organizing funds for the same. Sponsors are to be kept informed about the maintenance activities as well as emergent situations that call for material and financial resources.

1.1.6.3. Panchayati Raj Institutions (PRIs)

PRIs are supposed to be the ultimate owners of community assets such as drinking water supply systems, streetlights, etc. They are expected to properly register the community assets in their asset registers as well as apportion funds from their grants/income for repair and maintenance of the assets beyond the scheduled maintenance period.

1.1.6.4. Vendors

Vendors are primarily responsible for supply, installation and commissioning of the RE systems/devices. They are also responsible for the effective maintenance of the systems for the first five years or as may be mentioned in the concerned tender. Vendors are required to extend scheduled maintenance services as well as on-call maintenance services to all systems installed by them. For extending such services smoothly they may establish their own service network or avail services of Independent Service Organizations. Vendors are also required to have back-to-back agreements with their OEMs for extending guarantee, warranty, the supply of spares, etc. Vendors shall work in close coordination with the customers, custodians, field units, respective technical divisions, and CRC of OREDA in order to deliver effective maintenance services.

1.1.6.5. Original Equipment Manufacturers (OEMs)

The Manufacturers of the original equipment used in RE systems/devices are important stakeholders as far as delivery of effective maintenance services is concerned. Without a proper inventory of spares at their end for the entire period of maintenance and quick response to the need for spares at the project site, it is almost impossible to deliver effective maintenance services on the part of the vendors. Hence OEMs must enter into tripartite agreements with vendors as well as OREDA with regards to the adequacy and timely supply of spares. OREDA may also consider empaneling OEMs of important items such as pumps, invertors, CPUs, etc.

1.1.6.6. OREDA

OREDA represented by its Technical Divisions, Field Units, CRC is the most important stakeholders in respects of

- a) Managing processes and providing oversight
- b) Establishing principles and parameters for extending maintenance services
- c) Setting up performance parameters
- d) Monitoring, measuring and analyzing stakeholders' performance.
- e) Working for performance improvement
- f) Identifying time-bound and appropriate actions as well as working on the same
- g) Developing internal preparedness to repair, re-installing systems beyond the scope of the vendors.
- h) Developing contingency resources and plans to force majeure situations.
- i) Recognizing and encouraging good performance

1.1.7. Process

The overall process is hinged on three distinct sub-processes. They are

1. Onboarding the project
2. Installation & Commissioning of the systems
3. Creation of system IDs and linking to CRM
4. Managing the R&M.

The efficiency of maintenance is largely dependent on the quality and regularity of step 1,2&3. The processes are as follows:

1.1.7.1. ONBOARDING:

Onboarding refers to the creation of the project-specific database comprising of the following details. Onboarding of each project is to be done by the concerned Division Head of OREDA.

- a) Name of the scheme (Generic-Specific)
- b) Name of the sponsors.
- c) Details of sanction order indicating the quantity, cost, locations, etc.
- d) Date of floating of tender
- e) Date of finalization of tenders.
- f) Vendor details (name, the quantity of work awarded, the total cost of the work, locations assigned)
- g) Date of Issue of LOI
- h) Details of survey report submitted by the vendor in response to LOI
- i) Details of project execution schedule submitted by the vendor in response to LOI
- j) Date of issue of firm work order vendor wise
- k) Final date of completion of the project.

This would get populated onto the database in phases as the scheme progresses from conception to inception. Once a scheme is on-boarded the details are to be intimated to CRC for the creation of a new account.

1.1.7.2. PROJECT EXECUTION: The vendor to whom a particular work has been assigned is responsible for the execution of the project. As soon as a project is on-boarded with the above details the same will appear on the dashboard of the concerned vendor(s). The vendor then has to assign the project to a specific technician(s) having registered mobile phones on which the installation apps have been loaded.

The technician will then be able to see his/her assigned projects on the app provided having details such as the name of the project, name of the customer, location details including GPS coordinates, the capacity of the project, etc. As the technician starts executing the project, he/she has to upload the following details as and when it happens

- a) Date of commencement
- b) Details of all hardwares
- c) Exact location of installation
- d) Complete step by step installation details including the picture as per the installation app.

- e) Date of commissioning the project

This would get populated onto the database in phases as the scheme progresses from conception to inception.

1.1.7.3. SUPERVISION:

a) District Level: As soon as the on-boarding is complete the Officer-in-charge of the District RE Cell can see the details on his dashboard. Similarly, he can see the subsequent processes carried out at the vendor and technician levels. At any point in time as may be required the Officer-in-charge of the District RE Cell can undertake field visits and supervise the progress of the work, quality of work execution, etc.

Once a project is commissioned the Officer-in-charge of District RE Cell can make necessary checks and upload the Joint Commissioning Certificate on the App provided to him within a stipulated timeline.

- b) HQR. Level: After getting the commissioning reports and necessary checks thereon the concerned division of OREDA will create the project/system ID after which the project/system will automatically get linked to the CRC which will mark the beginning of the processes at CRC such as Scheduled Maintenance and Corrective Maintenance.



1.1.8. R&M Management:

The R&M regime involves two types of efforts. The first is the Scheduled Maintenance Activities, which is done as a preventive action. It is expected that these periodic maintenances will drastically reduce the incidents of breakdowns. This should be done at some periodicity and in each case, a list of activities must be done. The second is the Unscheduled Maintenance Activities which are of corrective nature. This means when any breakdown/ malfunction is detected, the appropriate corrective action needed can be initiated.

1.1.8.1. Scheduled (Preventive) Maintenance:

- a) A master maintenance schedule is to be drawn up for the organization covering each installation.
- b) This will be done by stratifying the districts into District Clusters based on logistical convenience.
- c) Each Cluster will be broken down into three geographical patches (comprising of Blocks/ GPs) called as Maintenance Cluster to evenly distribute the ticket load across each month within that Maintenance Cluster.

- d) The CRMS, well before the schedule, will fire a flurry of emails and SMS to the Vendors notifying about the list of installations they must cover in each of the Clusters within that Month. A ticket for each installation in the list will be automatically generated. It may be noted that though the list is sent in one list, separate emails will be sent for each ticket on which communication/ transactions have to be made by the Vendor
- e) It's the responsibility of the Vendors to track each case through their authorized technicians and report compliance throughout the month as soon as they cover the installations.
- f) The technicians/ SPOC of the vendor must share the documents/evidence required for the acceptance of resolution over e-mail in the same thread the ticket was raised. No resolution mail other than that thread will be accepted. The protocol of communication may get subsequently changed to improve operational efficiency.
- g) The CRC as soon as it receives the resolution mail, will cross verify the claim of resolution by the technicians and may close the ticket or return for rework.
- h) The CRMS at the end of the month will compute the performance of the ticket/ Vendor/ Scheme and release a scorecard.



1.1.8.2. Unscheduled (Corrective) Maintenance:

- a) Breakdown occurs at one of the installations.
- b) The customer calls the CRC to submit a service request.
- c) The agent at the CRC using the CRMS identifies the customer and registers a request called a ticket.
- d) Automatically a set of e-mails is fired to the Vendor, its Technician, Administering Dept. of the Scheme and OREDA.
- e) The CRMS tracks each ticket and follows up each case over e-mail and voice calls.
- f) After the lapse of certain days, the CRMS auto escalates it to the Nodal Officer/ Scheme Officer for action.
- g) The vendor/ Technician resolves the ticket at the field and intimates the CRC about it through the designated communication channel as per the protocol.
- h) CRC cross-verifies it with the community/ customer and closes the ticket.
- i) CRMS measures performance.



1.1.9. Repair and Maintenance Regime:

1.1.9.1. Scheduled Maintenance:

The schedule maintenance regime will focus on the vendor's **certainty and regularity** of visit to the installations under him as his performance parameter. He is expected to comply with a minimum of 90% visit against the Scheduled Tickets within that Service Month.

a) Activities under each category of Tickets:

The vendor is warranted to visit the installations and undertake a list of activities linked to that category of ticket. The ticket category can be of Quarterly, Half Yearly and Annual. To know the installation of a Class-specific and ticket Category-specific list of activities, kindly refer to Appendix Clause **Error! Reference source not found.**

b) Time Limit:

It's expected that the vendor must complete the activities over the list of installations designated for that maintenance month within that calendar month itself.

It may be noted that they can work on any day without any bias to the day being notified as a holiday or otherwise.

c) Route/ Sequence:

Each installation must be visited once in every quarter, half-yearly and yearly for different categories of activities.

To maintain a uniform gap between the visits every time, the vendor is expected to stick to an optimal sequence in a route.

The number of routes that the vendor identifies depends on how big the list and how many technicians are to be deployed.

Care must be taken so that all installations not only are resolved within a month but also are closed.

d) Score:

On successful completion of one ticket as per the service standard, the vendor will earn certain points, and for each default, it will earn a negative score which is designed to be a deterrent.

The scores are:

Visits	Activity Types	Earnings	Penalties
Visit - 1	Q1	3	-9
Visit - 2	Q2	3	-9
	H1	1	-3
Visit - 3	Q3	3	-9
Visit - 4	Q4	3	-9
	H2	1	-3
	A1	1	-3

1.1.9.2. Corrective Maintenance:

a) Service Standards:

While the Schedule Maintenance regime focuses on the vendor's certainty and regularity of visit to the installation as his performance parameter, Corrective Maintenance Regime focuses on the Timeliness of the vendor to respond to a breakdown situation.

The vendor upon being notified of a breakdown situation shall have to complete his assessment within 2 days and complete the repair work within the next 5 days. All (100%) tickets must be resolved within the time limit given above. If the scope of repair/ replacement is found to be beyond the scope of Maintenance Contract (MC), then the vendor immediately after the field reconnaissance must report the same to the CRC.

- i. It is expected that at any point in time, none of the vendors would be having cases older than 7 days pending in their list.
- ii. And, no vendor's installations under a scheme should show 'Non-Working' status of more than 2% of the installations.

b) Methodology:

Corrective maintenance requires a different approach as against the scheduled maintenance methodology. While the scheduled maintenance is predictable, corrective maintenance requires a case-specific approach. The following are recommendations for the most efficient methodology. But the vendors are free to adopt their own if they are complying with the time limit.

c) Reconnaissance:

Within 2 days of the ticket date.

- iii. When a request of service is registered, the vendor as the first response must organize the collection of field level information about the nature of the problem.
- iv. Based on that feedback from the field, the vendor must decide the following;
 - The genuineness of the request,
 - If the requirement of repair is beyond the scope of his MC,
 - If it is within his scope, then, he must arrange labor, spares, materials needed for the repair, and mobilize them to attend the breakdown at the spot.

This will help the vendor to resolve the request in one visit. This is more necessary as at times the villagers without ascertaining the owner of the installation, register a request in the CRC, and, as there is the possibility of multiple installations in one village and the data matches, the ticket is raised against a working installation.

d) Repair:

Within 7 days of the ticket date.

- i. The authorized technicians of the vendor must move to the location with the resources to undertake the repair.
- ii. Upon completion of the repair, the installations must be tested in the presence of the customer/ custodian.
- iii. Requisite evidence and documentation must be completed by the technicians and immediate intimation need to be sent to the CRC.

e) How to handle repair beyond the scope of MC

- i. At the reconnaissance stage, when the vendor realizes that the requirement is beyond the scope of MC, he must request closure giving appropriate reasons.
- ii. He must use the same communication channel as he would have used for resolution,
- iii. The CRC then would take it off the Vendor list and transfer it to the OREDA list.
- iv. OREDA will take this matter up with their principals for resolution.

f) Score:

- i. Each vendor at the start will be given a Credit account of 8760 hrs. (365 Days x 24 hrs.) for each of the installation he is responsible for maintenance. That will be known as the 'Total Achievable Uptime'.
- ii. When a request for service gets registered at the CRC the clock is started from the next day. The day the Vendor responds to a ticket informing successful resolution, the Clock stops on that day.
- iii. At the end of a period, the time taken for each ticket for a resolution, which is converted into hours gets deducted from the 'Total Attainable Uptime' of that Ticket.
- iv. And if the resolution time exceeds the set time of '7 Days', the system will treat those additional days with twice the score.
- v. The system is so designed that the lesser the time is taken to resolve, the higher will be his Net Score. More he takes time to resolve; higher will be his penalty score which may erode his other good works.

1.1.10. Implementation:

1.1.10.1. Training and Orientation:

OREDA will conduct orientation and training sessions for the Vendors and their technicians

1.1.10.2. Helpdesk:

OREDA CRC will provide support to the field personnel of the vendors to acquaint themselves with various communication and process protocol.

1.1.10.3. Performance Evaluation:

The following paragraphs explain the way OREDA will evaluate both the performances and how it will turn it into a composite score of performance. The Scheduled Maintenance activities have been given primacy over the Corrective Maintenance activities. While the Scheduled Maintenance is given 80% weightage in the composite score, Corrective Maintenance is given 20%.

1.1.10.4. Computation of performance

Examples from the shared Excel sheets may be incorporated.

1.1.10.5. Streamlined and timebound service

- i) Each district should have one individual ID and pass for monitoring all the installed asset for the respective district.
- ii) The Assistant Directors should check the generated ticket and SM ticket for each and every asset of their jurisdiction every month and intimate the corresponding vendor if the ticket is not closed within 7-days.
- iii) If a ticket is generated for an asset as well SM, then they should be communicated to the vendor, customer as well as the corresponding A.D., In-charge of the District through SMS as well as App. Issued by CRC.
- iv) Every month the Assistant Directors will submit the report of the generated ticket and resolved ticket vendor wise within 10th to the Chief Executive, OREDA for necessary review of the vendor in presence of CRC.
- v) For continuous delay in resolving generated ticket for the consecutive 2- months, the same will be marked as negative remark and further course of action will be taken against the default vendor.
- vi) Similarly, Scheduled Maintenance notification as scheduled to be sent to vendor, concern Assistant Directors.
- vii) After resolution/ closure of tickets, notification message regarding closure of the ticket should be sent and communicated to vendor, beneficiary and the Assistant Director.
- viii) At least one before and after, photographs to be uploaded in the CRC portal for resolving a generated ticket.

1.1.10.6. Rewards and Recognitions

OREDA will do everything under its might to support the good performance of the vendors as achieving very high uptime of its installation and good customer relationship is its prime organizational focus. It also will weed out non-performing vendors by penalizing them for their bad performance and blacklisting them for good.

OREDA will.

- a) Give preference to the high performing vendors in the upcoming tenders.
- b) Institute Awards and Recognition during important days of OREDA
- c) Recover Liquidated Damages in the shape of penalties
- d) Blacklist vendors whose past performances are not at all good