Terms of Reference (TOR)

ENERGY FOR HEALTH – KORPUT DISTRICT, ODISHA

Agency for Quality & Safety Check of Solar Installation at the Public Health Facilities at Koraput District, Odisha

Title	Request for proposals (RFP) from the Solar agencies/consultants for the quality & safety check of installed Solar DRE systems in public health facilities in Koraput District, Odisha
Timeline	3 Months (Sep 2025 – Nov 2025)
Expected area of expertise	• The agency/consultant should have at least 3 - 5 years of proven experience in solar installation, Monitoring, design. • Demonstrated experience of Quality Check in various sized solar plants and knowledge on Solar Installations. • Experience in preferably working with public health facilities. • This assignment would require travel to project sites in Koraput District, Odisha.
Last Date to Apply	13 September 2025
Link to Apply	https://forms.gle/XRLFkC3idHUAMU5dA

About SELCO Foundation:

SELCO Foundation's mission is to create a platform of solutions that uses sustainable energy as a catalyst to bridge environmental sustainability and poverty alleviation. With holistic development as the primary focus, the organization strives to create equitable societies, where services are accessed by all communities. The interventions of SELCO lead to a sustainable delivery model of essential services like livelihoods, education, and health till the last mile. (Read more about SELCO here: http://www.selcofoundation.org/)

1. **Summary of the project:**

As a part of its "Energy for Health" program, SELCO Foundation aims to strengthen health services delivery through the deployment of decentralized sustainable energy solutions for health centers in Koraput District, Odisha.

The SELCO Foundation plans to have a quality and safety check of installed Solar DRE systems in public health facilities in Koraput District, Odisha. The process should be, by visiting the health facilities physically and filling prerequisite check list and recording all other issues/suggestions/feedback taken from the health facility staff along with observations made.

Proposals (Technical & Financial) from eligible Solar agencies/ consultants are invited to conduct Quality

check at the public health facilities as mentioned in the TOR.

2. Goals and Objectives

S.No.	Objective	Methodology
1.	Quality of installations	• Visual/physical inspection for compliance of the installation with reference to the approved SLD/Design/BOM/Other specified instructions as laid down in the agreement/Work order and associated Documents which are signed of between SELCO Foundation and the Vendor. Complete the inspections following the check list provided in Annexure 1. • Recording of the plant electrical performance should be a part of the monitoring process. • Verifying the load connectivity with the solar system in comparison with the load details with the sheet. • Verifying the working of connected loads and sockets
2.	Capacity and Awareness of Healthcare staff	Evaluation of the health staff on below given points: - • Knowledge of basic system functioning, it's limitations and purpose • Knowledge of best practices (cleaning, battery maintenance, safety) • Knowledge of disconnect switches. • Information and process of reporting complaints • Challenges (if any) • Any unmet energy needs. • Training programs (if any)
3.	Servicing and Maintenance	• System and equipment warranties
4.	Safety Assurance	Verify that all electrical connections and components meet safety standards to prevent hazards such as electrical shocks, fires, and system failures.
5.	Detection of Unauthorized Modifications	Quality checks should reveal any unauthorized changes or tampering made to the system, in reference to the original design and installation practice.

3. Scope of Work

The scope of work for the quality check of an installed solar system involves a comprehensive evaluation to ensure that the system meets all design specifications, safety standards, and performance expectations. The quality check should cover various aspects including visual inspections, electrical measurements, performance tests, and documentation review.

- The team is required to visit the 214 Health facilities in Koraput District, Odisha as outlined in Annexure No. 2.
- Ensure necessary arrangements like Ladder, Quality Check Instruments and measuring devices are considered.
- The inspection report needs to be thoroughly completed, to ensure all checkpoints are filled.

- Completing the checklist involves accurately recording the available information acquired through physical visits to the health facility and in close coordination with the staff.
- To ensure thorough inspection, it is imperative to meticulously review and assess each component of the solar system by referring to the documents outlined in Annexure 1 chart. Also, Annexure 1 Chart A & B documents should be duly filled, in references made with Annexure 1 chart documents: 1C, 1D, 1E,

Sl. No	Annexure 1 Chart	
1	Annexure-1 A	Solar Installation Monitoring Checklist
2	Annexure-1 B	Monitoring Observation Report
3	Annexure-1 C	SLD/Concept sheet of solar system
4	Annexure-1 D	Bill Of Materials of solar system
5	Annexure-1 E	Load details sheet

- Record detailed recommendations, feedback, suggestions, and issues in the provided format for comprehensive follow-up and develop a corrective action plan for identified issues.
- The team or person visited should be easily accessible to provide explanations for any clarifications needed regarding the checklist or provided information.
- The visiting team is advised to maintain respectful and attentive interactions with health staff.
- The monitoring should be done without disturbing the medical services and without disturbing the patients.
- The monitoring should be done without damaging the physical infrastructure of the health facility, and if so, the agency is liable for repair of the same
- The individual must inform the SELCO Foundation immediately if any urgent or major rectification is required.
- The final payment will be initiated only after the complete closure of the project (I.e., all the inputs required by Selco foundation are fully furnished and validated. Incorrect and incomplete inputs will be considered invalid)
- The team should be available for online meeting discussions as and when called for.
- If staff are unaware of the basic system functioning, it would be the responsibility of the agency to provide basic orientation to staff on the points mentioned above and document to same.
- Prior coordination/appointment with staff of respective health facility should be compulsorily made, in order to avoid revisits to the same site (Revisits to health centers and the expenses incurred for the same will be the taken care by the vendor/monitoring team and it will not be in the scope of SELCO Foundation to entertain such requests)

4. Requirement:

- The team is expected to provide the checklist, preferably in MS Excel format, along with Photos and its respective comments made. Raw data sheets along with the final digitized formats would be required.
- After every visit, district-wise subfolders containing all the relevant information should be uploaded into the specified folder created by SELCO Foundation.
- To ensure the task is completed within the given timeframe, adequate team members must be available and must look after their own transport, food, and lodging arrangements.
- The Team members should be over 18+ years of age.
- The team members should possess qualifications such as ITI, Diploma, BE, etc., and preferably should have experience in solar installation and maintenance activities. The biodatas of the assigned personnel are to be shared with SELCO Foundation prior to work initiation.

- The details of the tour plan and the information about the team members are to be shared with SELCO Foundation as per the agreed-upon timeline. Day wise updates (Travel plan, Task completion) should be compulsorily shared with SELCO Foundation on a regular basis.

5. Timelines:

10th Oct 2025 to 31st Nov 2025

6. Selection Criteria:

- The agency/consultant should have at least 3 - 5 years of proven experience in solar installation, Monitoring, design.
- Demonstrated experience of Quality Check in various sized solar plants and knowledge on Solar Installations.
- Experience in preferably working with public health facilities.
- This assignment would require travel to project sites in Koraput District, Odisha.

7. Payment Terms:

40%	After signing the contract
30%	After completion of 50% of the Quality check and on submission of all reports and deliverables duly approved by authorized SELCO Personnel.
30%	After completion of 100% of the Quality check and on submission of all reports and deliverables duly approved by authorized SELCO Personnel.

8. To apply

Interested consultants / organizations, with relevant experience (please include samples and/or references of the previous similar work as proof of experience) and based out of India are requested to reach out with a detailed proposal giving a brief on the methodology and the process they will uptake for this project, including budgets (with break-ups and explanation), timelines and milestones and submit the same to google form https://forms.gle/XRLFkC3idHUAMU5dA on before 13th September 2025.

Any further queries please write to procurement@selcofoundation.org with a subject line: **"Agency for Quality & Safety Check of Solar Installation at the Public Health Facilities at Koraput District, Odisha."**

Refer Terms and Condition:

1. **Sub-contracting:** In the event that the Consultant requires the services of subcontractors to perform any obligations under the Contract, the Consultant shall obtain the prior written approval of the Foundation. Any rejection or non-performance of the subcontractor shall not, in and of itself, entitle the Consultant to claim any delays in the performance, or to assert any excuses for the non-performance, of any of its obligations under the Contract, and the Consultant shall be solely responsible for all services, obligations and deliverables performed by its subcontractors.

2. **Quality Assurance**

The data submitted to SELCO Foundation should be accurate, complete, reliable, and relevant. Consulting agencies shall establish additional layers for data cleaning and submission.

3. **Financials & Reporting**
TDS will be deducted on the fixed amount as per Income Tax Act and Rate of Percentage. In accordance with the Central Board of Direct Taxes circular No. 7 of 2022 dated 30th March, 2022 in relation to the clarifications with respect to Section 114AAA of the Income-tax Rules, 1962, failure to link Aadhar number to the PAN card and/or failure by any person, who falls within the income tax bracket or otherwise, to file tax returns in relation to payment of TDS for any service (in accordance with Section 206AB and 206AA) and/or an inoperative PAN card will result in a 20% tax deduction.

4. **Indemnification**
Both parties shall indemnify and hold its Trustees, Directors and representative officers, employees, agents harmless from and against any and all claims, demands, actions, losses, liabilities, charges, damages, costs and expenses (including but not limited to reasonable attorney's fees) arising out of or resulting from (1) any claims arising in connection with activities undertaken by both parties in connection with the project or (2) Consultant's gross negligence or willful misconduct or breach of any undertaking, covenant, representation or warranty contained in this agreement and/ or the actual infringement of any patent, trademark, copyrights, trade secret or any other intellectual property right of the third party.

5. **Patent, Copyright and other Proprietary Rights**
   (i) Except as is otherwise expressly provided in writing in the Contract, the Foundation shall be entitled to all intellectual property and other proprietary rights including, but not limited to, patents, copyrights, and trademarks, with regard to products, processes, inventions, ideas, know-how, or documents and other materials which the Consultant has developed for the Foundation under the Contract and which bear a direct relation to or are produced or prepared or collected in consequence of, or during the course of, the performance of the Contract. The Contractor acknowledges and agrees that such products, documents and other materials constitute works made for hire for the Foundation.
   (ii) Subject to the foregoing provisions, all documents, reports, recommendations, documents, and all other data compiled by or received by the Consultant under the Contract shall be the property of the Foundation, shall be made available for use or inspection by the Foundation at reasonable times and in reasonable places, shall be treated as confidential, and shall be delivered only to the Foundation's authorized officials on completion of work under the Contract
   (iii) The Consultant will treat all information given to him/her as information of proprietary value and will not disclose the same to competitors or any outsiders. The Consultant will not at any time, except under legal process, divulge any trade or business secret relating to the Foundation or any customer or agent of the Foundation, which may become known to him by virtue of his position as consultant, save in so far as such disclosure shall be necessary in the interest and for the benefit of the said Foundation and will be true and faithful to the Foundation in all dealings and transactions whatsoever relating to the said Foundation.
   (iv) Reports or other data that are developed specifically for the performance of this Contract shall be the property of the Foundation and the Consultant shall deliver reports and data to the Foundation as per the milestones. Dissemination of the reports and any information from the said contracts shall be done with written approval from the Foundation.

6. **Publicity, use of name & Logo of the Foundation:** The Consultant shall not advertise or otherwise make public for purposes of commercial advantage or goodwill that it has a contractual relationship with the Foundation, nor shall the Consultant, in any manner whatsoever use the name, emblem, logo or official seal of the Foundation or that of SELCO in connection with its business or otherwise without the written permission of the Foundation.

7. Observance of Law:

The Enterprise shall not advertise or otherwise make public for purposes of commercial advantage or goodwill that it has a contractual relationship with the Foundation, nor shall the Enterprise, in any manner whatsoever use the name, emblem, logo or official seal of the Foundation or that of SELCO in connection with its business or otherwise without the written permission of the Foundation.

Observance of Law: The ***Enterprise*** will comply with all applicable laws, rules, regulations and statutory requirements and amendments thereof, in the manufacture and distribution of products and supplies and in providing services to the SELCO and during the term of **Agreement.**

Child Labor- The Enterprise will, its parent entities, partners or subcontractors nor any of its subsidiary or affiliated entities (if any) is engaged in any practice inconsistent with the rights set forth in the Child Labour (Prohibition and Regulation) Act of 1986, which, inter alia, requires that a child shall be protected from performing any work that is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development.

Forced Labor- The Enterprise will not engage in any activity that will result in forced or compulsory labor under applicable laws including the Bonded Labour System (Abolition) Act, 1976,

Abuse of Labor- Enterprise will act in accordance with applicable laws and regulations and will not violate the rights of labourers as stated in The Factories Act, 1948 and similar legislations.

Working Hours, Overtime, Wages and Other Benefits-Working hours, wages and benefits shall be provided by the Enterprise to its staff and employees in accordance with applicable laws including the Minimum Wages Act, 1948.

- **Declaration of blacklisting-** Enterprise represents and warrants to SELCO that, as on the date of signing of this Purchase Order, it is neither blacklisted/ debarred nor it is under a declaration of ineligibility by Central / State or Semi-Government Organization/Department or Institutions and Public Sector Undertakings in India and abroad Enterprise further undertakes to duly inform SELCO in the event it is blacklisted subsequent to execution of this Purchase Order.

- **Compliance with Anti-bribery Laws:** Enterprise and each of its directors, officers, employees, agents or other (collectively referred to as " Enterprise ") represent and warrant that it shall not either directly or on behalf of SELCO Foundation give, offer, promise to offer, or authorize the offer, directly or indirectly (proxy bribing), anything of value (such as money, shares, goods or service, gifts or entertainment) to government officials, government customers, potential government customers or foreign government officials including officials of any public international organizations or officials of any political party either in India or abroad ("Officials") with an Intent to influence any act or decision in his or her official capacity Induce the Official to do or omit to do any act in violation of his or her lawful duty to obtain any improper advantage, or Induce to use such Official 's influence improperly to affect or influence an act or decision.

The Enterprise shall not provide any offering, promising, giving or receive, solicit or accept a financial or other advantage, or any other thing of value, with the intention of influencing or rewarding the behaviour of a person in a position of trust to perform a public, commercial or legal function to obtain or retain a commercial advantage.

Enterprise understands and acknowledges that any non- adherence to the warranty as stated herein above will be violation of the provisions of the Indian Prevention of Corruption Act,1988 and other applicable laws and legislations ("Anti-bribery Laws").

In addition, Enterprise agrees to promptly report to SELCO Foundation of any incident of breach or potential breach of this section.

Compliance with Sexual Harassment of Women (Prevention, Prohibition & Redressal) Act, 2013 (PoSH): The Enterprise shall agree to adhere to the mandates prescribed under the Sexual Harassment of Women (Prevention, Prohibition & Redressal) Act, 2013, which requires all workplaces to have a Policy and Internal Committee to address complaints of sexual harassment that women may face at the workplace.

8. Termination:

Either party may terminate this contract by giving a notice in writing to the other party stating their intention to terminate the same on the expiration of Seven (7) days from the date of such notice. In addition, the Foundation may also terminate this contract forthwith in the event of any fraud, misconduct or neglect of duties on the part of the Consultant. Any notice to be given hereunder shall be sufficiently given to the Consultant if forwarded by registered post or by Courier Service to the last known postal address of the Consultant and shall be sufficiently given to the Foundation if similarly forwarded to the registered office. Upon the termination of this contract and payment of the said fees due up to such termination, and payment of all disbursements and out-of-pocket expenses incurred up to the date thereof (provided the same have been incurred after obtaining prior approval), the Consultant shall deliver all deeds, documents and paper in his possession relating to the business of the Foundation or as the Foundation shall direct, and shall continue to afford him all reasonable assistance for concluding pending matters at the date of such termination without making any charge thereof.

9. Force Majeure:

(i) *Force majeure* as used herein means any unforeseeable and irresistible act of nature, any act of war (whether declared or not), invasion, revolution, insurrection, terrorism, or any other acts of a similar nature or force, *provided that* such acts arise from causes beyond the control and without the fault or negligence of the Consultant

(ii) In the event of and as soon as possible after the occurrence of any cause constituting *force majeure*, the affected Party shall give notice and full particulars in writing to the other Party, of such occurrence or cause if the affected Party is thereby rendered unable, wholly or in part, to perform its obligations and meet its responsibilities under the Contract. The affected Party shall also notify the other Party of any other changes in condition or the occurrence of any event which interferes or threatens to interfere with its performance of the Contract. Not more than fifteen (15) days following the provision of such notice of *force majeure* or other changes in condition or occurrence, the affected Party shall also submit a statement to the other Party of estimated expenditures that will likely be incurred for the duration of the change in condition or the event of *force majeure*.

(iii) On receipt of the notice or notices required hereunder, the Party not affected by the occurrence of a cause constituting *force majeure* shall take such action as it reasonably considers to be appropriate or necessary in the circumstances, including the granting to the affected Party of a reasonable extension of time in which to perform any obligations under the Contract.

(iv) If the Consultant is rendered unable, wholly or in part, by reason of *force majeure* to perform its obligations and meet its responsibilities under the Contract, the Foundation shall have the right to suspend or terminate the Contract on the same terms and conditions as are provided for in this Contract.

10. Both the Foundation and the Consultant fully and freely intend to create an independent Contractor relationship under this Contract. Nothing herein shall be deemed to establish a partnership, joint venture, association or employment relationship between the parties. Both parties agree that the consultant has the right to sole and exclusive control over the manner and means employed in performing their activities under this Contract.

11. Settlement of disputes:

(i) The Parties shall use their best efforts to amicably settle any dispute, controversy, or claim arising out of the Contract or the breach, termination, or invalidity thereof.

Any dispute, controversy, or claim between the Parties arising out of the Contract or the breach, termination, or invalidity thereof, unless settled amicably, within sixty (60) days after receipt by one Party of the other Party's written request for such amicable settlement, the matter shall be referred by either Party to arbitration in accordance with the Arbitration and Conciliation Act, 1996. The venue of the arbitration shall be Bangalore. Likewise, the jurisdiction will vest with courts in Bangalore.

Annexure-1A

Solar installation monitoring checklist				
Sl.No.	**Observation point**	**If "Yes", then mark with (✓)**	**If "No", then mark with (✗)**	**Remarks if any:**
	Solar Panels Setup			
1	Number of panels used in the installation matches with the number of panels mentioned in the B.O.M. sheet			
2	Panels installed have the same technical specifications as mentioned in the B.O.M. sheet			
3	Serial numbers, bar codes and manufacturing dates are present inside the panels			
4	Discoloration of the solar panels are not seen			
5	Damages are not seen on the solar panels (Both front & back sides)			
6	The solar panels are free from shadows			
7	Cables are tied to panel frame and are protected with conduit pipes			
8	Panels are mounted well within the roof area			
9	Panels are clammped and firm & stable			
10	R.C.C. roof, low elevation set-up: The wind shields are firmly fastened at the back of panels, along with concrete works/ballast blocks			
11	R.C.C. roof, regular set-up: Front side clearance from the roof surface and the panel is 2-feet			

12	R.C.C. roof, regular set-up: The length of concrete work is 1 ft. x 1 ft. x 1 ft. (LxBxH)			
13	R.C.C. roof, high elevation set-up: The length of concrete work is 1.5 ft. x 1.5 ft. x 1.5 ft. (LxBxH)			
14	The orientation of the panel is south facing (For sites in India)			
15	Tilt angle of the panel is as per the latitude of the location			
16	Tin roof: 4-Inch uniform elevation from the sheet roof and the panel is seen			
17	Tin roof wind deflectors: Wind deflectors are firmly fastened at the back of panels			
18	Tin roof: E.P.D.M./Silicone gel/Butyl sealant used			
19	M.M.S. & Panel are given earthing protection			
20	4 Sq. mm cable from panel-panel-M.M.S. are used, and 10 Sq. mm cable from M.M.S. to A.J.B. is used			
A.J.B. (Array Junction Box) Setup				
1	A.J.B.s have the same technical specifications as mentioned in the B.O.M. sheet			
2	Positive & negative lines are separated with separate termination blocks			
3	Positive lines have the in-line fuses provided			
4	PV1-F cables are used			
5	Cables used are of the specifications as mentioned in the B.O.M. sheet			
6	Cable colour codes are followed			
7	All cables are provided with solid conduit pipe protection			
8	A.J.B. is mounted firmly over the wall surface			
9	M.C.B.s, SPDs used in the A.J.B. are of the specifications as mentioned in B.O.M. copy			
10	Earthing down conductor is connected to S.P.D. and D.C. earth pit			
11	There are no physical damages seen at the A.J.B.'s body			
12	A.J.B. glands are tightened			

G.I.P.B. (Grid Input Protection Box) Setup				
1	G.I.P.B.s have the same technical specifications as mentioned in the B.O.M. sheet			
2	Cables used are of the specifications as mentioned in the B.O.M. sheet			
3	Cable colour codes are followed			
4	Cables are provided with solid conduit pipe protection			
5	G.I.P.B. is mounted firmly over the wall surface			
6	Earthing down conductor is connected to S.P.D. and A.C. earth pit			
7	M.C.B.s, S.P.D.s are of the specifications as mentioned in B.O.M. copy			
8	There are no physical damages seen at the G.I.P.B.'s body			
9	G.I.P.B. glands are tightened			
Battery Bank Setup				
1	No. of batteries used in the installation matches with the no. of batteries mentioned in the B.O.M. sheet			
2	Batteries have the same technical specifications as mentioned in the B.O.M. sheet			
3	Batteries have the serial number, barcode over them			
4	No physical damages are seen at the battery body			
5	Battery bank is placed in a clean, dust-free and dry place			
6	Battery room is well ventilated			
7	2-Inch ventilation space is provided between batteries			
8	There is no direct sunlight falling over the batteries			
9	Acid absorbent mat is provided at both the racks			
10	Petroleum based jelly/Vaseline is applied at all terminals of batteries			
11	Cable lugs are insulated			
12	Battery caps are firmly fixed at each terminal			

13	Battery cable size used should be as specified in the B.O.M. sheet			
14	Conduit pipe protection is provided to cables			
15	Float indicators are not damaged			
16	Distilled water level is up to the green mark of the indicator			
17	There are no fire and flammable materials placed/stored around the battery bank			
18	Minimum cable distance is maintained between battery bank and the inverter (No looping of cables)			
19	Cables don't have sharp bending			
20	Insulation mats are provided			
21	Battery rack setup is as per the specifications mentioned in the B.O.M. sheet			
D.C. Combiner Box Setup				
1	D.C.C.B has the same technical specifications as mentioned in the B.O.M. sheet			
2	D.C.C.B. is mounted firm on to the wall surface			
3	The number of H.R.C. fuses provided are as per the B.O.M. specifications			
4	H.R.C. fuse ratings are as per the B.O.M. specifications			
Charge Controller Setup (if Applicable)				
1	Charge Controllers have the same technical specifications as mentioned in the B.O.M sheet			
2	Charge Controllers have the serial number & barcode mentioned over them			
3	There are no damages seen on the Charge Controller body			
4	Charge Controller display is clearly readable			
5	Good ventilation space is provided around the Charge Controller			
6	There is no direct sunlight over the Charge Controller			
7	The Chargecontroller is placed in a clean, dust-free and dry place			

8	There are no flammable materials placed around the Chargecontroller			
9	Charge controller is easy to reach and easy to read the display parameters			
10	Cables entering and exiting the charge controller are intact, and there is no loose connection			
11	Cables connected with chargecontroller are given conduit pipe protection			
12	There are no warning /error messages seen on the display			
13	Cable sizes used are as per the B.O.M. specifications			
14	Cables don't coil or have sharp bendings			
15	Charge Controller is mounted firmly on the wall			
Inverter/P.C.U. Setup				
1	Inverters have the same technical specifications as mentioned in the B.O.M sheet			
2	Inverters have the serial number & barcode mentioned over them			
3	There are no damages seen on the inverter body			
4	Inverter display is clearly readable			
5	Inverter makes minimal noise during operations			
6	The room is well ventilated			
7	Good ventilation space is provided around the inverter			
8	3-inch ground clearance is provided for ventilation (< 2 kVA systems)			
9	There is no direct sunlight over the inverter			
10	The inverter is placed in a clean, dust-free and dry place			
11	There are no flammable materials placed around the inverter			
12	Inverter is easy to reach and easy to read the display parameters			
13	Cables entering the inverter are intact, and there is no loose connection			

14	Cables connected with inverter are given conduit pipe protection			
15	Priority settings are made as Solar-> Battery-> Grid			
16	Cable sizes used are as per the B.O.M. specifications			
17	Cables don't coil or lie on the floor			
18	Battery-Inverter distance is 50 cm. to 75 cm.			
19	Ground mounted: PCU is firm & stable on the resting platform			
20	Wall mounted: PCU is fixed firmly on the wall			
Changeover Switch Setup				
1	Changeover switches have the same technical specifications as mentioned in the B.O.M. sheet			
2	Labelling is made for both the changeover switches			
3	(In case of changeover switch-1) Connectivity for both solar and grid is checked			
4	(In case of changeover switch-1) The orientation of the switch is towards solar power			
5	(In case of changeover switch-2) Connectivity for both grid and generator are checked			
6	(In case of changeover switch-2) The orientation of the switch is towards grid power			
7	Changeover switches are firmly mounted on the walls			
8	Earthing protection is provided for the change-over switches including the doors			
Lightning Arrestor Setup				
1	Lightning arresters have specifications as mentioned in the B.O.M. sheet			
2	There are no physical damages seen to the L.A.s			
3	There is no corrosion seen in the L.A.s			
4	Insulation is provided between L.A.s & elevation pole (ceramic or porcelain insulators)			
5	Sheet roof: The entire L.A. set-up is firmly fixed over the roof surface using T-base			

6	R.C.C. roof: The entire L.A. set-up is firmly fixed over the roof surface using anchors and concrete blocks			
7	The L.A. set-up is given additional support by using support-wires			
8	R.C.C. roof: G.I. strips are supported with saddle insulators			
9	Sheet roof: G.I. strips are supported with capping-casing			
10	G.I. conductor strip does not make any contact with other D.C. cables or with any cables passing around			
11	The L.A. set-up stands vertical to the ground surface			
12	The L.A. maintains a distance of 0.75 metres from the panels			
13	The tip-height of the L.A. is 3-metre or more from the panel-top edge			
Earthing Pits Setup				
1	The no. of electrodes used, matches with the no. of electrodes mentioned in the B.O.M. sheet			
2	Electrodes have the same technical specifications as mentioned in the B.O.M. sheet			
3	There is no physical damages seen at the electrodes			
4	There is no corrosion seen over the electrodes			
5	The no. of earth pits made matches with the no. of earth pits as specified in the B.O.M. sheet			
6	Separate earth pit is provided for A.J.B., G.I.P.B., Inverter and lightning arrestor			
7	Chemical earthing is made, and the pit are filled with chemical powder, up to the tip/green mark of electrode			
8	Chambers are built around the earth pits			
9	Earth conductors are protected with conduit pipe, till the pits			
10	Earth conductors and electrodes are making full contact			
11	Distance between pit-to-pit is 3 meters			
12	Distance between pit to building foundation/water sump is 1.5 meters			
13	Earth electrodes are fully buried in the earth			

14	Earth pit diameter is 1-feet & 8-feet by depth			
15	Earthing pits are made at backyard of the centre			
16	Earthing cable are of the size as mentioned in the B.O.M.			
17	Earth pits are given identification/labelling (A.J.B., G.I.P.B., Inverter, L.A.)			
Cable Routing & Termination				
1	The sizes of the cables used, matches with the specifications as mentioned in the B.O.M. sheet			
2	Cable lugs are used for termination of cables			
3	Cable lugs are properly crimped			
4	Cable lugs are insulated			
5	There are no loose connections seen at the end termination points			
6	Cables are given solid conduit pipe protection along their entire run			
7	u.P.V.C. conduit pipes are used for cable protection			
8	M.C.-4 connectors are properly interlocked			
9	Cables don't make unnecessary loops/circles			
10	(In case of overhead transmission from block-to-block), cables are given G.I. wire support along with conduit pipe protection, and are given pole-support from sagging			
11	Labelling of cables/conduit pipes are done for the panels, batteries, inverter and load side			
12	Dressing/laying of conduit pipes are neatly done			
13	Conduit pipes are firmly held to building surfaces with metal clamps			
Fire Extinguisher Setup				
1	The specifications of the fire extinguisher is as per the specification in B.O.M. sheet			
2	The pointer of the indicator lies in the green zone			

3	Fire extinguisher is placed at the entrance of battery-inverter room			
4	Fire extinguisher is placed in cool place			
5	Fire extinguisher can be easily reached and picked up			
Luminaries Setup				
1	The no. of L.E.D. bulbs & tube lights installed matches with the numbers as specified in the B.O.M. sheet			
2	The specifications of the luminaries are as per the specifications in the B.O.M. sheet			
3	The luminaries installed are functional			
4	There are no physical damages seen on the luminaries			
5	The luminaries are fixed firm over the wall/ceiling			
Fan Setup				
1	The no. of fans & regulators installed, matches with the numbers as specified in the B.O.M. sheet			
2	The specifications of the fans & regulators, are as per the specifications in the B.O.M. sheet			
3	The installed fans and regulators are functional			
4	Fans and regulators are intact and there is no physical damages seen			
5	Fan regulators control the speed at different levels			
6	The fans are fixed firmly under the ceiling/on the wall			
Medical Equipment Setup				
1	The no. of medical equipment installed, matches with the numbers as specified in the B.O.M. sheet			
2	Medical equipment is assembled and are functional			
M.C.B.s, A.C., D.C. Isolators & Load Side Protection Setup				
1	A.J.B.'s M.C.B. ratings are as per the B.O.M. specifications			
2	A.J.B.'s S.P.D. ratings are as per the B.O.M. specifications			

3	G.I.P.B.'s M.C.B. ratings are as per the B.O.M. specifications			
4	G.I.P.B.'s S.P.D. ratings are as per the B.O.M. specifications			
5	Load M.C.B. rating is as per the B.O.M. specifications			
6	When PV isolator is used: Switch disconnector installed is as per the B.O.M. specifications			
7	When battery isolator is used: Switch disconnector installed is as per the B.O.M. specifications			
8	When grid isolator is used: Switch disconnector installed is as per the B.O.M. specifications			
9	Isolator box is firmly mounted on the wall & is easy to reach			
Metal Plaque Setup				
1	Metal plaques are installed at the reception/main-entrance of the health centre			
2	Metal plaque is clearly visible to the visitors at the health centre			
3	Metal plaques are not damaged			
DOs and DON'Ts Plaque Setup				
1	DOs and DON'Ts practices foam plaques are pasted in the Battery/Inverter room			
2	Size of the foam plaques are as per the B.O.M. specifications			
3	Plaques have the emergency contact details and the customer-care details mentioned in them			
4	The plaques are firmly attached to the wall using round-clips			
5	Plaques are easy to reach and read.			
Luminaries, Fans & Medical equipment Plaque Setup				
1	The B.O.M. sheet containing number of fans, luminaries & medical equipment provided to the health centre is pasted in the battery-inverter room			
Load Details Plaque Setup				
1	The load details sheet containing the list of solar loads which are to be connected to inverter is pasted in the battery-inverter room			

Solar System - Single Line Diagram Setup				
1	The S.L.D. of the solar system installed, is pasted in the battery-inverter room, and it is firmly pasted			
Other Sign Boards Setup				
1	High voltage/caution sign board is pasted at the entrance of the battery-inverter room			
2	No-fire poster is pasted at the entrance of the battery-inverter room			
3	PASS poster (Fire extinguishing instructions) is pasted at the entrance of the battery-inverter room			
Complete System Functional Status				
1	Solar system functionality is normal without any fault/warning messages			
Solar System - Documentation				
1	In-efficient equipment handover document is cleared			
2	Solar system Asset handover document is cleared			
3	Installation completion report with electrical readings are made			
4	Warranty Cards (Solar Panel, Battery and Inverter) are submitted to health centre			
Load Wiring Installation Setup for Solar Loads (100% New Wiring)				
1	All critical solar loads (As specified in the load details) are connected to the solar system			
2	The new solar lines installed, are functional			
3	Non-solar loads (Heavy, inefficient loads) are connected to the grid lines			
4	RCCBs used are as per the B.O.M. specifications			
5	Isolators used are as per the B.O.M. specifications			
6	M.C.B.s used are as per the B.O.M. specifications			
7	A separate circuit connects only fans, bulbs and tube lights			
8	A separate circuit connects only sockets			

9	The sockets are functional			
10	The number of sockets installed matches with the numbers as specified in the B.O.M. sheet			
11	The specifications of the installed sockets are as per the B.O.M. specifications			
12	The switches are functional and have specifications as mentioned in B.O.M sheet			
13	The number of switches installed matches with the numbers as specified in the B.O.M. sheet			
14	Labelling of the circuits are made			
15	Cable sizes used are as per the B.O.M. specifications			
16	Separate earthing is provided for medical loads			
17	Cables are protected using u.P.V.C. conduit pipes			
Load Wiring Installation Setup for Heavy Loads (100% New Wiring)				
1	All heavy loads are connected to the Grid line			
2	The new Grid lines installed, are functional			
3	RCCBs used are as per the B.O.M. specifications			
4	Isolators used are as per the B.O.M. specifications			
5	M.C.B.s used are as per the B.O.M. specifications			
6	A separate circuit connects only sockets			
7	The sockets are functional			
8	The number of sockets installed matches with the numbers as specified in the B.O.M. sheet			
9	The specifications of the installed sockets are as per the B.O.M. specifications			
10	The switches are functional and have specifications as mentioned in B.O.M sheet			
11	The number of switches installed matches with the numbers as specified in the B.O.M. sheet			
12	Labelling of the circuits are made			
13	Cable sizes used are as per the B.O.M. specifications			

14	Separate earthing is provided for medical loads			
15	Cables are protected using u.P.V.C. conduit pipes			
Existing Cable Segregation for Solar Loads				
1	All critical solar loads (As specified in the load details) are connected to the solar system			
2	The Segregated solar lines are functional			
3	Non-solar loads (Heavy, inefficient loads) are excluded from the segregated solar lines			
4	RCCBs used are functional			
5	Isolators used are functional			
6	M.C.B.s used are functional			
7	A separate Segregated circuit connects only fans, bulbs and tube lights			
8	A separate Segregated circuit connects only sockets			
9	The sockets are functional			
10	The number of sockets connected matches with the numbers of loads			
11	The switches are functional			
12	The number of switches connected matches with the numbers of loads			
13	Labelling of the circuits are made			
14	Separate earthing is provided for medical loads			
Load Wiring - Single Line Diagram				
1	The S.L.D. of the load wiring installation (circuits) and the loads they are connected with, is pasted at the entrance of the battery-inverter room			
Load Wiring - Documentation				
1	Installation completion report is made			

Sl. No.	Image details	Minimum no of Pictures
1	Clear image of solar panels with Module mounting structure from a range in which gives better visibility (Please capture image with standard marking)	2
2	Clear image of batteries from a range in which gives better visibility including the water level (Please capture image with standard marking)	2
3	Clear image of inverter from a range in which gives better visibility (Front and back) (Please capture image with standard marking)	2
4	Clear image of the charge controller	2
5	Clear image of the inverter switch disconnectors & Load MCB	2
6	Clear image of cable routing from the complete system (Please capture image with standard marking)	2
7	Clear image of AJB	2
8	Clear image of GIPB	2
9	Clear image of Lightning Arrestor	2
10	Clear image of Earthing pits	2
11	Clear image of Changeover Switch	2
12	Clear Image of ACDB	2
13	Pictures of Load wiring cable routing	3
14	Pictures of Switches and Sockets	3
15	Pictures of Lights, Fans and Medical equipments connected to solar sockets	4
16	Clear image of DO’s and Don’ts Poster	1
17	Clear image of Foam Palques (SLD, High Voltage, PASS, No Fire, Danger, Risk of Electric Shock)	1

18	Clear image of Metal Plaque	1
19	Clear image of Outdoor Light	1
20	Clear image of the Health Centre (Long Shot)	1
21	Clear image of Health staff with Solar system	1
22	Full Display Vedio of Inverter/Charge Controller	1

Note: Pictures taken should cover all the details mentioned in the master checklist for each component

Annexure-1B

MONITORING OBSERVATION REPORT						
1	Name of Visitor					
2	Date					
3	Visit Number					
4	Date:					
5	Name & Address of Installation site: (Please mention the complete address of the site including Health facility name, address, state, district, block, P.O, Pin code etc.)					
Solar Installation Bill Of Material (AC System)						
Sl. No.	**Product**	**Serial Number**	**Make & Capacity**	**Quantity**	**As per BOM Yes/No**	

1	Solar Module				Yes	
2	Solar Battery					
3	Module Mounting Structure					
4	Solar Inverter/PCU					
5	Changeover Switch / Bypass Switch - 1					
6	Changeover Switch / Bypass Switch - 2					
7	Copper cable (Module – Module) -PV1-F (Solar cables)					
8	Cables (or) Strips (Battery - Inverter) - (DC Cables)					
9	Copper Cable (Battery - Inverter) - (DC Cables)					
10	Copper Cable (Red + Black) (AJB - Inverter)- (DC Cables)					
11	DC Earthing (Panels + MMS + AJB)					
12	Earthing Cable (AJB, GIPB, Inverter & Battery Rack)					
13	Cable/down conuctor for lightning arrestor					
14	Earthing Kit					
15	Lightning Protection System					
16	Grid Input Protection Box with AC SPD and AC MCB					
17	Battery trolley box with Wheels - Har Plastic					

18	Battery rack with Following: 1. Acid absorbent mat 2. Electrical Insulation mat					
19	Inverter Elevation Leg					
20	DC Combiner Box					
21	Solar Array Junction Box with AC MCB and AC SPD and String Fuse					
22	Load Side AC MCB with Conduit box					
23	Marking for AC earthing with Elevated Plaques (GIPB + Inverter + Loads)					
24	Marking for DC earthing with Elevated Plaques (AJB + MMS + Panels + Battery rack)					
25	Marking of Lightning Arrester Earthing with Elevated Plaques					
26	Single Line Diagram (SLD) for the system					
27	Do's and Don'ts Practices Poster (Solar Panels, Battery and Inverter)					
28	Signboards - Danger (Electric Shock & High Voltage), No Fire and PASS					
29	I/P and O/P wiring of Grid Connection- AC cable					
30	Fire Extinguisher					

31	Metallic enclosures with Isolator's having minimum gap of 1 inch (PV, Battery & Grid Input to Inverter)					
32	Consumables					
Bill of material (For luminaries & fans)						
Sl. No.	**Products**	**Make**	**Capacity**	**Installed Quantity**	**Balance Quantity**	Additional Information
1	LED Bulb					
2	LED Bulb					
3	LED Tube light					
4	LED Tube light					
5	Ceiling Fan with regulators - Two Modular					
6	Wall Mounted Fan					
7	Outdoor light with automatic control switch (For Dusk to dawn operations)					
8	Outdoor light arm - Rust Free (GI Material)					
	Date of recording:		**Time of recording:**			
				(Tick on the appropriate box)		
	Weather Condition at the time of recording	Clear Sky	Partially Cloudy	Over cast	Rainy	
	At the AJB					

	Test Condition	Voltage	Measured Value	Current in DC	Measured Value	
	Measurement with Grid OFF + AJB MCB OFF	Voc (in Volts)	String 1: String 2: String 3: String 4:	NA	NA	
			Array:	NA	NA	
	Measurement with Grid OFF + AJB MCB ON	Vmp (in Volts)	String 1: String 2: String 3: String 4:	Imp (in Amperes)	String 1: String 2: String 3: String 4:	
			Array:		Array:	
	Battery Bank parameters (With Grid OFF) and Load ON					
	Particulars	**Measured Value**	**Unit**			
	Battery Bank Volatge		V			
	Battery Bank Current		A			
	1- Phase System - PCU/Inverter parameters					
	Measurement with Grid OFF			**Measurement with Grid ON**		
	Particulars	**Measured Value**	**Unit**	**Particulars**	**Measured Value**	**Unit**
	Load voltage/Inverter output voltage		V	Grid input voltage (Phase – Neutral)		V
	Inverter Output Frequency		Hz	Inverter Output Frequency		Hz

	Inverter output current at full load (All solar loads turned on continuously for 10 minutes)		A	Grid input voltage (Neutral-Earth)		V
	3 - Phase System - PCU/Inverter parameters					
	Measurement with Grid OFF			**Measurement with Grid ON**		
	Particulars	**Measured Value**	**Unit**	**Particulars**	**Measured Value**	**Unit**
	Load voltage/Inverter output voltage **(Red & Neutral)**		V	Grid Input Voltage (Red & Neutral)		V
	Inverter output frequency (Red & Neutral)		Hz	Grid Input Frequency (Red & Neutral)		Hz
	Inverter output current at full load (Red & Neutral) (All solar loads turned on continuously for 10 minutes)		A	Grid Input Voltage (Yellow & Neutral)		V
	Load voltage/Inverter output voltage (Yellow & Neutral)		V	Grid Input Frequency (Yellow & Neutral)		Hz
	Inverter output frequency (Yellow & Neutral)		Hz	Grid Input Voltage (Blue & Neutral)		V
	Inverter output current at full load (Yellow & Neutral) (All solar loads turned on continuously for 10 minutes)		A	Grid Input Frequency (Blue & Neutral)		Hz

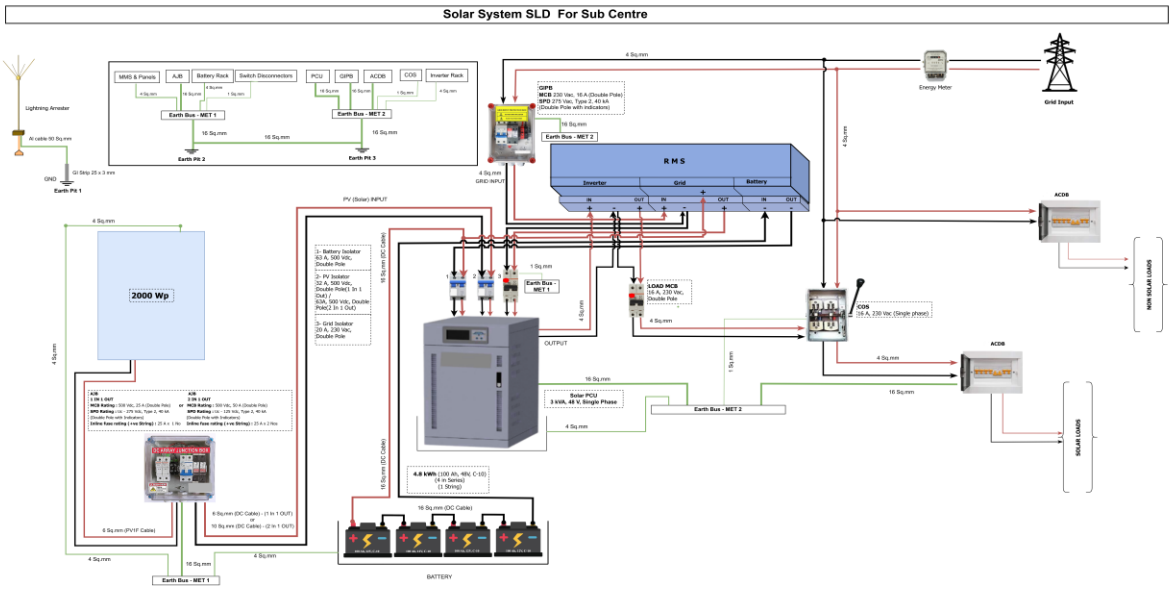
	Load voltage/Inverter output voltage (Blue & Neutral)		V	Grid Input Voltage (Red & Yellow)		V
	Inverter output frequency (Blue & Neutral)		Hz	Grid Input Frequency (Red & Yellowl)		Hz
	Inverter output current at full load (Blue & Neutral) (All solar loads turned on continuously for 10 minutes)		A	Grid Input Voltage (Blue & Yellow)		V
	Inverter output voltage between Red & Yellow		V	Grid Input Frequency (Blue & Yellowl)		Hz
	Inverter output voltage between Red & Blue		V	Grid Input Voltage (Red & Blue)		V
	Inverter output voltage between Yellow & Blue		V	Grid Input Frequency (Red & Bluel)		Hz
	PCU/Inverter display & setting					
	For both 1-Phase & 3-Phase connectivity					
	Inverter Priority Settings	Solar Priority	Grid Priority	(Tick on the appropriate box)		
	Battery Settings	Ah: 150 / 170 / 180 / 190 / 200	Tubular/ VRLA/Li FePO4			
	The load is running on:	Inverter	Grid	(Tick on the appropriate box)		
	Changeover Switch settings					
	Changeover switch orientation is:	Solar	Grid	(Tick on the appropriate box)		

	Is change over switch functional for both solar & grid?	Yes	No	(Tick on the appropriate box)		
	Measurements at Sockets (For both 1-Phase & 3-Phase connectivity)					
	Particulars	Measured Value	Unit			
	Voltage between Phase & Neutral		V			
	Voltage between Phase& Earth		V			
	Voltage between Earth & Neutral		V			
	New ACDB for Solar Loads / heavy Loads (100% new load wiring)					
	Demo testing of Lines using Temporary Connection					
	Test Condition	**Rating**	**Working Yes/No**	**Remarks**		
	RCCB 1					
	RCCB 2					
	RCCB 3					
	MCB 1					
	MCB 2					
	MCB 3					
	MCB 4					
	MCB 5					
	Socket 16A					
	Socket 6A					

	Switch 16 A					
	Switch 6 A					
	Fan points and Regulator					
	Outdoor Light					
	Old ACDB for Solar Loads (Cables Segregation)					
	Test Condition		**Working Yes/No**	**Remarks**		
	RCCB 1					
	RCCB 2					
	RCCB 3					
	MCB 1					
	MCB 2					
	MCB 3					
	MCB 4					
	MCB 5					
	Socket 16A					
	Socket 6A					
	Switch 16 A					
	Switch 6 A					
	Fan points and Regulator					
	Outdoor Light					
Data to Be Captured for Solar Installation Side						
Sl. No	**Description**	**Cable Size (Sq.mm)**	**Distance in Feet**	**Remarks**		

1	ACDB to Loads					
2	ACDB to Loads					
3	ACDB to Loads					
4	ACDB to Loads					
5	ACDB to Loads					
6	ACDB to Loads					
Details pertaining to local network provider in the area						
1	Mention the names of the network providers in the area (Select all that is applicable):	Airtel	BSNL	Idea/Vodafone	Jio	Others (Specify):
2		Airtel	BSNL	Idea/Vodafone	Jio	Others (Specify):

Annexure-1C



ANNEXURE 1D: TECHNICAL SPECIFICATIONS OF SOLUTIONS

Sub Centre:

Bill of Materials for Solar System:

Sl. No	Products	Capacity	Qty
1	Solar Module	Solar Photovoltaic modules of Minimum Capacity 2000 Wp (TOPCON) Panel Make and Model should be approved under MNRE ALMM List	1 Set
2	Solar Battery	Valve regulated lead-acid (VRLA) battery – 100 Ah @ 12 V, C – 10 (Battery terminal caps used, must be big enough to cover the entire terminal area and the nut bolt assembly. Also, spring washers to be used at each battery terminal).	4 Nos
3	Module Mounting Structure (MMS)	Solar PV Module support structure. **RCC Roof:**	1 Set.

		Very Low elevation/Landscape Orientation (Triangular MMS with concrete block with wind deflectors). **Wind deflectors** on the East, West and North Side of each panel should be incorporated. Additional Ballast and anchoring should be incorporated for additional stability. **Inclined Tin Sheet Roof:** Mini rail of the following specifications are to be incorporated Anodized aluminium(70 Microns) L x H x W x T – 300mm x 100mm x 40mm x 3mm EPDM tapes with adhesion to be used for each mini rail. Self drilling screws of 2 inches to be used for metal purlins and 3 inches to be used for wooden purlins. Or Triangular MMS(Landscape mode) with EPDM tapes for south orientation. **It should withstand the wind speed of 200 – 250 km/hr. It should be suitable for above mentioned solar module** - As per Sl.No. 1	
4	Solar Inverter/PCU - 230 Vac, 50 Hz	Total Minimum Capacity **3 kVA, 48 V – MPPT** based Single Phase Supply, With Data Port (RS 485) Output.	1 No
5	Change over switch / Bypass Switch(PCU - Grid - Solar Loads)	**16 A, 230 Vac** (Single Phase)	1 No.
6	Copper Cable Red+Black (Module – Module - AJB) - PV1-F (Tin Coated Solar Cables)	**6 sq.mm** UV Protected Cable (Tin-coated copper lugs with insulation to be used at each termination points).	32 m

7	Copper Cable Red + Black (AJB - Inverter) - (Tin Coated DC Cables)	**6 sq.mm (1 IN 1 OUT)** **(or)** **10 Sq.mm (2 IN 1 OUT)**	15 m
8	Cables (or) Strips (Battery - Battery) - (Tin Coated DC Copper Cables)	**16 Sq.mm** (Tin-coated copper lugs with insulation to be used at each battery terminal) (or) Lead coated heavy-duty copper strips not less than 25 micron of lead plating.	2 m
	Copper Cable (Red + Black) (Battery - Inverter) - (Tin Coated DC Cables)	**16 Sq.mm** (Tin-coated copper lugs with insulation to be used at each battery terminal).	10 m
9	Earthing Cable (Panels + MMS + Battery Rack + Inverter Rack)	**4 Sq.mm** **Panel to Panel, Panel to MMS, MMS leg to Main Earthing Terminal (Copper Busbar)** Grounding lugs should be used. (Tin-coated copper lugs with insulation to be used at each termination points).	20 m
10	Earthing Cable for COS and Switch Disconnector	**1 Sq.mm** Grounding Lugs should be used. (Tin-coated copper lugs with insulation to be used at each termination points).	10 m
11	Voltage Sensing Cable (Red) for Remote Monitoring System	**1 Sq.mm** (Tin-coated copper lugs with insulation to be used at each termination points).	3 m
12	Earthing Cable (AJB, GIPB & Inverter)	**16 Sq.mm** (Tin-coated copper lugs with insulation to be used at the cable-earth electrode interface).	32 m + 3 m
13	Cable/Down conductor for Lightning Arrestor	**From Lightning arrestor to ground level:** Aluminium cable of 50 sq.mm should be used. (Aluminium lugs with insulation to be used at each termination points)	10 m

		From Ground to Earth pit: Insulated (Outdoor) GI Strip (120 microns) of size 25 x 3 mm should be used. GI strips are to be routed by using DMC saddle insulator. Interconnection of aluminium cable with GI strip will be done by using SS nut and bolt assembly (M6, 304 Grade)	4 m
14	Earthing Kit ● LA ● GIPB + Inverter + Load ACDB + Changeover Switch + Inverter Rack ● Panels + MMS + AJB + Switch Disconnector + Battery Rack	Chemical earthing powder (50 kg per pit). Solid electrode (Steel) Bonded copper – 16 mm diameter, 2000 mm long with 250 microns Bonding thickness, tin-coated copper lugs with insulation, SS clamps with SS nut-bolts assembly. protective FRP Chamber with lid should be made. Earthing pit size should be minimum of 6-inch diameter and 2.5-meters long and should be filled with back fill compound. SS flats to be used between GI strips and electrodes. Inter connection of AC and DC earthing pits are to be made using 16 Sq.mm. 2 x Copper Busbar of 6-inch long, 5-hole, 3 mm thick Typology – Equipotential (Refer Annexure 2)	3 Set
15	Lightning Protection System	Lightning arrestor Solid Aluminium Alloy of 15 mm diameter and 2000 mm long with base plate should be used. **Bore clamp to be used to interconnect lightning arrestor and down conductor.** **RCC Roof:** GI Elevation pole 40 mm diameter, 3000 mm height. Supporting wires of 4 Sq.mm (120 microns) to be incorporated for stability to withstand wind speed of 200 – 250 km/hr. Bull dog grip to be used to tighten the support wires. Ceramic insulation to be provided between lightning arrestor base plate and GI elevation pole. 1.75 metre distance to be maintained between panel edges and LA	1 Set

		Baseplate of elevation pole should be provided with anchor fasteners and to be provided with civil work of size 1.25 x 1.25 x 1.25 feet by L x B x H **Inclined Sheet roof:** T-based clamp of following specifications to be used Structural material : GI - 120 microns. L – Angle geometry Profile L – Angle thickness – 3mm L- Angle LxB – 37x37mm Hexagonal Nut – M8x20mm Hexagonal bolt – M8x6mm Vertical pole - 750 mm Support Wire 4 Sq.mm	
16	Grid Input Protection Box with SPD and MCB	MCB Rating: **230 Vac, 16 A (Double Pole)** SPD Rating: **275 Vac, Type 2, 40 kA (Double pole with indicators)** Inter connection of the components inside the GIPB should be 4 Sq.mm (Tin-coated copper lugs with insulation to be used at each termination points).	1 No.
17	One row Battery rack with the following: Electrical Insulation mat (Minimum 0.4 kV)	**As per Solar Battery Sl. No. - 2** (Each leg should be given a base flat plate) The elevation height of battery rack should be 4-inches above the floor and should be made of GI structure • 120 microns. • L – Angle geometry Profile • L – Angle thickness – 3 mm • L- Angle LxB – 37 x 37 mm • Hexagonal Nut – M8x20mm • Hexagonal bolt – M8x6mm (Wood supports are not to be used) In the battery rack, each joint should be assembled with GI nut and bolt assembly	1 Set.

		.(Welding of any sort should be avoided)	
18	Inverter rack with the following: Electrical Insulation mat (Minimum 0.4 kV)	(Each leg should be given a base flat plate) The elevation height of battery rack should be 4-inches above the floor and should be made of GI structure • 120 microns. • L – Angle geometry Profile • L – Angle thickness – 3 mm • L- Angle LxB – 37 x 37 mm • Hexagonal Nut – M8x20mm • Hexagonal bolt – M8x6mm (Wood supports are not to be used) In the inverter rack, each joint should be assembled with GI nut and bolt assembly. (Welding of any sort should be avoided)	1 Set.
19	Solar Array Junction Box with MCB and SPD and String Fuse.	**1 IN 1 OUT** MCB Rating : **500 Vdc, 25 A (Double Pole)** SPD Rating: **Uc - 275 Vdc, Type 2, 40 KA (Double pole with indicators)** Inline DC Fuse rating*: (+ve Strings): **25 A X 1 No.** Inter connection of the components inside the AJB should be DC cable of 6 Sq.mm **(or)** **2 IN 1 OUT** MCB Rating : **500 Vdc, 50 A (Double Pole)** SPD Rating: **Uc - 125 Vdc, Type 2, 40 KA (Double pole with indicators)** Inline DC Fuse rating*: (+ve Strings): **25 A X 2 Nos.** Inter connection of the components inside the AJB	1 No.

		should be DC cable of 10 Sq.mm	
20	Load Side MCB with Conduit box	MCB Rating: **16 A, 230 Vac (Double Pole)**	1 No.
21	Marking for AC earthing with Elevated Plaques (GIPB + Inverter + Loads ACDB + Changeover Switch + Inverter rack)	Elevation pole length - 3 Feet. Metal plaque dimension - A5	1 No.
22	Marking for DC earthing with Elevated Plaques (Panels + MMS + AJB + Switch Disconnector + Battery rack)	Elevation pole length - 3 Feet. Metal plaque dimension - A5	1 No.
23	Marking of Lightning Arrester Earthing with Elevated Plaques	Elevation pole length - 3 Feet. Metal plaque dimension - A5	1 No.
24	Single Line Diagram (SLD) for the system	Sun board with 3 mm Thickness - 4 ft x 2 ft	1 No.
25	Do's and Don'ts Practices Poster (Solar Panels, Battery and Inverter)	Foam Plaque - A4 Size for each	1 No.
26	Signboard for Danger, No Fire and PASS	Danger - Electric shock – A4 Danger - High Voltage – A4 No Fire – A5 PASS - A4	1 No each
27	I/P and O/P wiring of Grid Connection (Red + Black) - AC cable	**4 Sq. mm.** (Tin-coated copper lugs with insulation to be used at each termination points).	30 m
28	Fire Extinguisher	Multi-Purpose - ABC Dry powder extinguishing agents (or) CO2 type with 3 kg net weight of the charge inside the cylinder.	1 No
29	Metallic Enclosure	1st Switch for Battery Input - 63 A, 500	1

	with Isolator's having minimum gap of 1 inch. (PV, Battery & Grid Input to Inverter)	Vdc, Double Pole 2nd Switch for PV Input – 32 A, 500 Vdc, Double Pole (1 IN 1 OUT) (or) 63 A, 500 Vdc Double Pole (2 IN 1 OUT) 3rd Switch for Grid Input – 20 A, 230 Vac, Double Pole	Set
30	Consumables	Includes: UPVC pipes and fittings, Flexible pipes, Screws, Nuts and Bolts, Cable lugs etc…	1 Set

Note:

1. *For heavy loads (Loads which are excluded from solar system design) such as Autoclave, Sterilizer, Geyser, Air conditioner, Water cooler, Water Pump and CCTV etc, a **new separate wiring** for grid connectivity has to be done accordingly.*

Annexure 1 E: Load details Subcentre

Odisha - Koraput SC Load Details											
Sl. No	**Name of the Room**	**Name of the Loads**	**Load Rating (Watt)**	**Qty (Nos)**	**Total loads (Watt)**	**Hours Used in Day (Hrs)**	**Hours Used in Night (Hrs)**	**Total Usage Hours (Hrs)**	**Day Time Eenrgy Usage (W-hr/Day)**	**Night Time Energy Usage (W-hr/Day)**	**Total Energy Usage (W-hr/Day)**
1	General OPD	LED Tubelight	20	1	20	3	1	4	60	20	80
		Ceiling fan	75	1	75	3	1	4	225	75	300
		LED Bulb	15	2	30	1	0	1	30	0	30
		Desktop	100	1	100	2	0	2	200	0	200
		Printer	200	1	200	1	0	1	200	0	200
		Eye Testing Drum	20	1	20	1	0	1	20	0	20

		Mobile Charging	25	1	25	1	0	1	25	0	25
2	Lab	Tube light	20	2	40	1	0	1	40	0	40
		LED Tubelight	20	1	20	1	1	2	20	20	40
		Ceiling Fan	75	1	75	3	1	4	225	75	300
		Refrigerator	165	1	165	5	3	8	825	495	1320
		Baby Weigning Machine 1	15	1	15	1	0	1	15	0	15
		Infra red Lamp	150	1	150	0.5	0	0.5	75	0	75
		Nebulizer	50	2	100	1	0	1	100	0	100
		OT spot Light	20	1	20	1	0	1	20	0	20
3	Waiting Hall	Tube light	20	1	20	1	0	1	20	0	20
		LED Tubelight	20	1	20	3	1	4	60	20	80
		Ceiling Fan	75	1	75	3	1	4	225	75	300
4	NCD room	Tube light	20	1	20	1	0	1	20	0	20
		Ceiling Fan	75	1	75	1	0	1	75	0	75
5	Multi purpose room	Tube light	20	1	20	2	0	2	40	0	40
		Ceiling fan	75	1	75	2	0	2	150	0	150
6	Store Room	Tube light	20	1	20	1	0	1	20	0	20
7	Toilet	Tube light	20	1	20	1	0	1	20	0	20
8	Yoga Room	Tube light	30	1	30	1	1	2	30	30	60
		Ceiling Fan	75	1	75	1	1	2	75	75	150
9	Toilet	Tube light	20	2	40	1	0	1	40	0	40
10	Outdoor	Outdoor Light	30	1	30	0	12	12	0	360	360
		Total			**1575**				**2855**	**1245**	**4100**

Sl.no	Products	Capacity	Unit	Qty

1	Tube light	20 W, 230 Vac	Nos	9
2	Tubelight	30 W, 230 Vac	Nos	1
3	LED Bulb	15 W, 230 Vac	Nos	2
4	LED Tubelight	20 W, 230 Vac	Nos	3
5	Ceiling Fan	75 W, 230 Vac	Nos	6
6	Outdoor Light with automatic control switch (For dusk-to-dawn operation)	30 W, 230 Vac	Nos	1
7	Medical Equipments - 6A	Desktop, Printer, Eye Testing Drum, Mobile Charging, Baby Weighing Machine, Infrared Lamp, Neubilizer, OT Spot Light	Nos	9
8	Medical Equipments - 16 A	Refrigerator	Nos	1
				32

ANNEXURE 2

slno	HFs Name	Block	District	Type of HF
1	Almanda	Bandhugaon	Koraput	Sub- Center
2	Baunsaput(Sarapalli)	Bandhugaon	Koraput	Sub- Center
3	Garidi	Bandhugaon	Koraput	Sub- Center
4	Kapalada	Bandhugaon	Koraput	Sub- Center
5	Keberibadi	Bandhugaon	Koraput	Sub- Center
6	Kumbhariput	Bandhugaon	Koraput	Sub- Center
7	Mahaguda1	Bandhugaon	Koraput	Sub- Center
8	Neelabadi	Bandhugaon	Koraput	Sub- Center
9	Pedawallada	Bandhugaon	Koraput	Sub- Center
10	Sadabadi	Bandhugaon	Koraput	Sub- Center
11	Sansarpalli	Bandhugaon	Koraput	Sub- Center
12	B.Kenduguda	Boipariguda	Koraput	Sub- Center
13	Baligaon	Boipariguda	Koraput	Sub- Center
14	Bhaluguda	Boipariguda	Koraput	Sub- Center
15	Bichalkota	Boipariguda	Koraput	Sub- Center
16	Bodaput	Boipariguda	Koraput	Sub- Center

17	Boipariguda	Boipariguda	Koraput	Sub- Center
18	Cherika	Boipariguda	Koraput	Sub- Center
19	Dondabadi	Boipariguda	Koraput	Sub- Center
20	Doraguda-A	Boipariguda	Koraput	Sub- Center
21	Doraguda-B	Boipariguda	Koraput	Sub- Center
22	Haladikund	Boipariguda	Koraput	Sub- Center
23	Kakalapada	Boipariguda	Koraput	Sub- Center
24	Kollar	Boipariguda	Koraput	Sub- Center
25	Kenduguda	Boipariguda	Koraput	Sub- Center
26	Mathapada	Boipariguda	Koraput	Sub- Center
27	Pujariput	Boipariguda	Koraput	Sub- Center
28	Ramagiri1	Boipariguda	Koraput	Sub- Center
29	Santeiput	Boipariguda	Koraput	Sub- Center
30	Siribeda	Boipariguda	Koraput	Sub- Center
31	Talur	Boipariguda	Koraput	Sub- Center
32	Tentuliguma	Boipariguda	Koraput	Sub- Center
33	Anchala	Borigumma	Koraput	Sub- Center
34	B.Singpur	Borigumma	Koraput	Sub- Center
35	Bamuniaguda	Borigumma	Koraput	Sub- Center
36	Baragaon3	Borigumma	Koraput	Sub- Center
37	Benasur	Borigumma	Koraput	Sub- Center
38	Bijapur	Borigumma	Koraput	Sub- Center
39	Bodigam	Borigumma	Koraput	Sub- Center
40	Chatrala	Borigumma	Koraput	Sub- Center
41	Dengapadar2	Borigumma	Koraput	Sub- Center
42	Gumuda	Borigumma	Koraput	Sub- Center
43	Hardoli	Borigumma	Koraput	Sub- Center
44	Jujhari	Borigumma	Koraput	Sub- Center
45	Kamara	Borigumma	Koraput	Sub- Center
46	Kamta	Borigumma	Koraput	Sub- Center
47	Katharaguda	Borigumma	Koraput	Sub- Center
48	Kumuli	Borigumma	Koraput	Sub- Center
49	Malada2	Borigumma	Koraput	Sub- Center
50	Nandarla	Borigumma	Koraput	Sub- Center
51	Narigam1	Borigumma	Koraput	Sub- Center
52	Nuagam	Borigumma	Koraput	Sub- Center
53	Pandasuguda	Borigumma	Koraput	Sub- Center
54	Puruna_Borigumma	Borigumma	Koraput	Sub- Center

55	Sanomajhiguda	Borigumma	Koraput	Sub- Center
56	Sanopindapadar	Borigumma	Koraput	Sub- Center
57	Santospur	Borigumma	Koraput	Sub- Center
58	Semalaguda	Borigumma	Koraput	Sub- Center
59	Sosahandi	Borigumma	Koraput	Sub- Center
60	Takiguda	Borigumma	Koraput	Sub- Center
61	A.Malkangiri	Dashmantapur	Koraput	Sub- Center
62	Baghachemma	Dashmantapur	Koraput	Sub- Center
63	Chanabada	Dashmantapur	Koraput	Sub- Center
64	Dasmantapur_Mc	Dashmantapur	Koraput	Sub- Center
65	Girligumma	Dashmantapur	Koraput	Sub- Center
66	Kapsiguda	Dashmantapur	Koraput	Sub- Center
67	Lulla	Dashmantapur	Koraput	Sub- Center
68	Machhaput	Dashmantapur	Koraput	Sub- Center
69	Malingajodi	Dashmantapur	Koraput	Sub- Center
70	Mujanga	Dashmantapur	Koraput	Sub- Center
71	Murkar	Dashmantapur	Koraput	Sub- Center
72	Nandigaon	Dashmantapur	Koraput	Sub- Center
73	P.Phulaabeda	Dashmantapur	Koraput	Sub- Center
74	Paikapuki	Dashmantapur	Koraput	Sub- Center
75	Parajapedapadar	Dashmantapur	Koraput	Sub- Center
76	Parajapuki	Dashmantapur	Koraput	Sub- Center
77	Pindapadar	Dashmantapur	Koraput	Sub- Center
78	Podagada	Dashmantapur	Koraput	Sub- Center
79	Sukraput	Dashmantapur	Koraput	Sub- Center
80	Upergadala	Dashmantapur	Koraput	Sub- Center
81	Anta	Jeypore	Koraput	Sub- Center
82	Bairagi_Matha	Jeypore	Koraput	Sub- Center
83	Balia5	Jeypore	Koraput	Sub- Center
84	Bariniput	Jeypore	Koraput	Sub- Center
85	Dangarchinchi	Jeypore	Koraput	Sub- Center
86	Ekamba	Jeypore	Koraput	Sub- Center
87	Hadia	Jeypore	Koraput	Sub- Center
88	Jayantagiri	Jeypore	Koraput	Sub- Center
89	Khadapa	Jeypore	Koraput	Sub- Center
90	Kumbariput	Jeypore	Koraput	Sub- Center
91	Kumuliput	Jeypore	Koraput	Sub- Center
92	O.C.C.Colony	Jeypore	Koraput	Sub- Center

93	Pujariput1	Jeypore	Koraput	Sub- Center
94	Randapalli	Jeypore	Koraput	Sub- Center
95	Tankua	Jeypore	Koraput	Sub- Center
96	Umuri	Jeypore	Koraput	Sub- Center
97	B.Bhejaput	Koraput	Koraput	Sub- Center
98	Badanayakguda	Koraput	Koraput	Sub- Center
99	Bagra	Koraput	Koraput	Sub- Center
100	Deoghat	Koraput	Koraput	Sub- Center
101	Dumuripadar	Koraput	Koraput	Sub- Center
102	Dumuriput	Koraput	Koraput	Sub- Center
103	Jhadiguda	Koraput	Koraput	Sub- Center
104	Kudumul	Koraput	Koraput	Sub- Center
105	Lendrimaliguda	Koraput	Koraput	Sub- Center
106	Litiguda	Koraput	Koraput	Sub- Center
107	Malipondi	Koraput	Koraput	Sub- Center
108	Mathalput_Mc	Koraput	Koraput	Sub- Center
109	Narajiput	Koraput	Koraput	Sub- Center
110	Rudiambo	Koraput	Koraput	Sub- Center
111	Umuri1	Koraput	Koraput	Sub- Center
112	Uppar_Mangra	Koraput	Koraput	Sub- Center
113	Ankula1	Kotpad	Koraput	Sub- Center
114	Asana	Kotpad	Koraput	Sub- Center
115	Batamba	Kotpad	Koraput	Sub- Center
116	Batasona	Kotpad	Koraput	Sub- Center
117	Bhansuli	Kotpad	Koraput	Sub- Center
118	Bobia	Kotpad	Koraput	Sub- Center
119	Dhamanahandi	Kotpad	Koraput	Sub- Center
120	Ghumar1	Kotpad	Koraput	Sub- Center
121	Girla	Kotpad	Koraput	Sub- Center
122	Kenduguda1	Kotpad	Koraput	Sub- Center
123	Kotpad_Mc	Kotpad	Koraput	Sub- Center
124	Latiguda	Kotpad	Koraput	Sub- Center
125	Mokagaom	Kotpad	Koraput	Sub- Center
126	Nandigam1	Kotpad	Koraput	Sub- Center
127	Phuphugam	Kotpad	Koraput	Sub- Center
128	S.B.Nuagam	Kotpad	Koraput	Sub- Center
129	Sadaranga	Kotpad	Koraput	Sub- Center
130	Sorgiguda	Kotpad	Koraput	Sub- Center

131	Bagderi	Kundra	Koraput	Sub- Center
132	Banuaguda	Kundra	Koraput	Sub- Center
133	Bhusanguda	Kundra	Koraput	Sub- Center
134	Gundala	Kundra	Koraput	Sub- Center
135	Jabapadar	Kundra	Koraput	Sub- Center
136	Jabapatraput	Kundra	Koraput	Sub- Center
137	Kalapada1	Kundra	Koraput	Sub- Center
138	Karemati	Kundra	Koraput	Sub- Center
139	Kodalimunda	Kundra	Koraput	Sub- Center
140	Lima	Kundra	Koraput	Sub- Center
141	Mosigaon	Kundra	Koraput	Sub- Center
142	Pakhanguda	Kundra	Koraput	Sub- Center
143	Raniguda1	Kundra	Koraput	Sub- Center
144	Badigada	Lamtaput	Koraput	Sub- Center
145	Ballel	Lamtaput	Koraput	Sub- Center
146	Dhadi	Lamtaput	Koraput	Sub- Center
147	Godihanjar	Lamtaput	Koraput	Sub- Center
148	Guneipada	Lamtaput	Koraput	Sub- Center
149	Kadamguda2	Lamtaput	Koraput	Sub- Center
150	Lamptaput_Mc	Lamtaput	Koraput	Sub- Center
151	Petta	Lamtaput	Koraput	Sub- Center
152	Tusuba	Lamtaput	Koraput	Sub- Center
153	Umbel	Lamtaput	Koraput	Sub- Center
154	Bandikar	Laxmipur	Koraput	Sub- Center
155	Bhitarguda	Laxmipur	Koraput	Sub- Center
156	Biriguda	Laxmipur	Koraput	Sub- Center
157	Champi	Laxmipur	Koraput	Sub- Center
158	Dumuripadar1	Laxmipur	Koraput	Sub- Center
159	Goudoguda	Laxmipur	Koraput	Sub- Center
160	Kakiriguma	Laxmipur	Koraput	Sub- Center
161	Kellar1	Laxmipur	Koraput	Sub- Center
162	Kendar1	Laxmipur	Koraput	Sub- Center
163	Keskapadi	Laxmipur	Koraput	Sub- Center
164	Kutinga	Laxmipur	Koraput	Sub- Center
165	Laxmipur_Mc	Laxmipur	Koraput	Sub- Center
166	Marbaiguda	Laxmipur	Koraput	Sub- Center
167	Odiapentha	Laxmipur	Koraput	Sub- Center
168	Panchada	Laxmipur	Koraput	Sub- Center

169	Pipalpadar	Laxmipur	Koraput	Sub- Center
170	Bheja	Nandpur	Koraput	Sub- Center
171	Bijapur1	Nandpur	Koraput	Sub- Center
172	Hatibari1	Nandpur	Koraput	Sub- Center
173	Jollaput	Nandpur	Koraput	Sub- Center
174	Khemunduguda	Nandpur	Koraput	Sub- Center
175	Pujariput2	Nandpur	Koraput	Sub- Center
176	Balipeta	Narayanapatna	Koraput	Sub- Center
177	Bari2	Narayanapatna	Koraput	Sub- Center
178	Borigi	Narayanapatna	Koraput	Sub- Center
179	Ichhapur3	Narayanapatna	Koraput	Sub- Center
180	Jogipalur	Narayanapatna	Koraput	Sub- Center
181	Kumbhari1	Narayanapatna	Koraput	Sub- Center
182	Narayanpatna_Mc	Narayanapatna	Koraput	Sub- Center
183	Podapadar3	Narayanapatna	Koraput	Sub- Center
184	Sekram	Narayanapatna	Koraput	Sub- Center
185	Tentulipadar	Narayanapatna	Koraput	Sub- Center
186	Tolagumundi	Narayanapatna	Koraput	Sub- Center
187	Upara_Dkapadu	Narayanapatna	Koraput	Sub- Center
188	Ampabali	Pottangi	Koraput	Sub- Center
189	Chandaka1	Pottangi	Koraput	Sub- Center
190	Galigavadar	Pottangi	Koraput	Sub- Center
191	Gangrajpur	Pottangi	Koraput	Sub- Center
192	Kotia	Pottangi	Koraput	Sub- Center
193	Kuruli	Pottangi	Koraput	Sub- Center
194	Maliput	Pottangi	Koraput	Sub- Center
195	Petru	Pottangi	Koraput	Sub- Center
196	Podapadar4	Pottangi	Koraput	Sub- Center
197	Pottangi_Mc	Pottangi	Koraput	Sub- Center
198	Pukali	Pottangi	Koraput	Sub- Center
199	Ralegada	Pottangi	Koraput	Sub- Center
200	Sambai	Pottangi	Koraput	Sub- Center
201	Sunki	Pottangi	Koraput	Sub- Center
202	Thuria	Pottangi	Koraput	Sub- Center
203	Tolabeluru	Pottangi	Koraput	Sub- Center
204	Aligam	Simliguda	Koraput	Sub- Center
205	Balda	Simliguda	Koraput	Sub- Center
206	Charangul	Simliguda	Koraput	Sub- Center

207	Gunthaput	Simliguda	Koraput	Sub- Center
208	Kunduli_Mc	Simliguda	Koraput	Sub- Center
209	Mania	Simliguda	Koraput	Sub- Center
210	Pakjhola	Simliguda	Koraput	Sub- Center
211	Pitaguda	Simliguda	Koraput	Sub- Center
212	Renga	Simliguda	Koraput	Sub- Center
213	Sorisapadar	Simliguda	Koraput	Sub- Center
214	Sundiput	Simliguda	Koraput	Sub- Center