"SITE" means the land and other places upon which the Facilities are to be installed, and such other land or places as specified in the SCC of the Contract as forming part of the Site.

"Solar Inverter" shall mean inverters that convert electricity generated from solar PV panels from DC to AC.

"SUB-CONTRACTOR" including vendors, means any person to whom execution of any part of the Facilities, including preparation of any design or supply of any Plant and Equipment, is subcontracted directly or indirectly by the Contractor, and includes its legal successors or permitted assigns.

"System Integrator" shall mean the agency who had carried out the Design, Engineering, Supply, Installation, Testing & Commissioning and O&M of Grid connected solar PV based Power Plants.

"TIME FOR COMPLETION" means the time within which Completion of the Facilities is to be attained in accordance with the specifications, as a whole (or of a part of the Facilities where a separate Time for Completion of such part has been prescribed) as specified in the SCC of the tender document

"TS" means Technical Specification

Interpretations

1. Words comprising the singular shall include the plural & vice versa

2. An applicable law shall be construed as reference to such applicable law including its amendments or re-enactments from time to time.

3. A time of day shall save as otherwise provided in any agreement or document be construed as a reference to Indian Standard Time.

4. Different parts of this contract are to be taken as mutually explanatory and supplementary to each other and if there is any differentiation between or among the parts of this contract, they shall be interpreted in a harmonious manner so as to give effect to each part.

5. The table of contents and any headings or sub headings in the contract has been inserted for case of reference only & shall not affect the interpretation of this agreement.

PART-C: Scope of Work

PROJECT NAME: Design, engineering, manufacture, supply, assembly, inspection, testing and commissioning of ABT Tariff meters with terminal modem, establish AMR data server and create a IT based solutions (dashboard) for remote monitoring of decentralized solar power plant with comprehensive maintenance of 5 years.

1. PROJECT BACKGROUND

Convergence Energy Services Limited (CESL) has been implementing large number of Solar projects of various capacities in different parts of the country. One of the key requirements of CESL management is to have easy access to real-time or near real-time power generation data of Solar projects to generate MIS and facilitate management in decision making. This requires streamlining of data collection process and to strengthen information database for monitoring performance of various Solar projects. For sharing generation data with CESL, many of the developers/manufacturers have developed their own web portals and have given on-line access to CESL for downloading generation data from their portal. However, CESL is facing following challenges in data collection and reporting:

- Accessing individual web portals, downloading data and consolidation of information in common formats is time consuming and error-prone task
- No centralized repository of information for reporting
- Difficultly in analyzing current and historical data of various projects

In order to address these challenges, CESL intends to automate and streamline data collection process from Solar projects through technological interventions and to implement these interventions, there is a need to have an IT enabled mechanism/processes/systems in place for getting generation data from developers' systems automatically through system interface and without any human intervention. The implementation of IT enabled centralized database would help CESL in getting generation data from solar projects in a common format on a regular basis.

2. Project Scope and Technology Selection

2.1 Scope

The scope under this RfP covers **design, engineering, manufacture, supply, assembly, inspection, testing and commissioning of ABT Tariff meters with terminal modem, establish AMR data server and create a IT based solutions (dashboard) for remote monitoring of decentralized solar power plant with comprehensive maintenance of 5 years** with systems of capacity ranging from 0.3 MW to 10 MW capacity at various locations in the state of Maharashtra and demonstration of site performance evaluation and analysis over the remote monitoring portal and report the performance on periodic interval (monthly and yearly) and suggest measures to improve plant performance from time to time.

i. Supply of ABT Tariff meters with terminal modem.

ii. Installation and commission of meters and modem on site.

iii. Establish the AMR data server at bidder data center.

iv. Daily AMR data collection for approx. 500 sites.

v. Periodic maintenance of AMR infrastructure (SIM/Modem/Cable) for successful data collection for period of 5 years.

vi. Meter data collection for offline sites (once in month).

vii. Processing and management of AMR data in appropriate database and protect the data forcontact period.

viii. Publishing the web portal for data dashboard and reports in agreed format to different CESL users. (User management and data management will be managed by bidder; process for user enrolment will be defined and agreed.)

2.2 Proposed System Components

Proposed solution will consist of following components.

i. ABT meter with GPRS modem and all necessary hardware arrangement for meter mounting at site andif require Meter Boxes will be supplied and Installed by bidder.

ii. SIM cards and GPRS network service from available network operators, GPRS rental paid by bidder till contract period.

iii. Meter reading server: Installed and managed by bidder own data center at own cost.

iv. **Database**: storage of meter reading data with periodic backup for the project period (5 years).

v. **Data processing**: Processing of reading data and make it online available for view at differentsite offices on internet web portal.

vi. **Web Portal:** published and managed by bidder which will be accessible to registered CESL users for data/report view and download purpose. CESL may request bidder for alteration in data view format and online portal formats, bidder will make changes as per CESL requirementwithout any addition cost.

vii. **Web user management:** All user registrations will be managed by bidder. There will be Max. 2Users for each generating sites and minimum 10 Users for Central office/decentralized offices for monitoring.

viii. Device registration: Managed by bidder, which includes the registration of new solar stations, Meters, Modem, SIM management

2.3 APPLICABLE STANDARDS

2.3.1 STANDARDS

The equipment shall conform (for testing, performance and accuracy) in all respects the relevant Indian/ International metering standards with latest amendments thereof unless otherwise specified.

S. No.	Standard No.	Title
1.	IS 14697	AC static transformer operated Watt-hour and VAR-hour meters for class 0.2s and 0.5s
2.	CBIP technical report no. 304 (magnet immunity)	Specification for AC static electricity energy meters Immunity against magnetic interference up to 0.27T
3.	IS 15959 DLMS companion Standard (ICS)	AC static transformer operated Watt-hour and VAR hour meters for class 0.2s category B (ABT compliant) metering

2.3.2 CLIMATIC CONDITIONS

The meters to be supplied against this specification shall be required to operate satisfactorily and continuously under the following tropical conditions of hot, humid, dusty, rust and fungus prone environment.

i. Max. ambient air temperature: 55 ºC
ii. Min. ambient air temperature: (-) 5 ºC
iii. Average daily ambient air temp: 32 ºC
iv. Max. Relative Humidity: 95 %
v. Max. Altitude above mean sea level: 2000 m
vi. limit range of operating: (-)25ºC to +70 ºC
vii. Storage temperature range: (-)40ºC to +80ºC
viii. Operating temperature range: (-)10 to +60

ix. Display operating temperature range: (-)20 to +70

2.3.3 PRINCIPAL PARAMETERS

The energy meter shall be indoor type connected with the secondary side of outdoor current and voltage transformers and mounted in suitable panel/ cubicles.

S. No.	Item	Specification
1.	Type of Installation	Indoor installation
2.	VT secondary	3x110V/√3 Phase to Neutral (3P4W) 3x110V Phase to Neutral (3P3W) Variation -30% to +30%
3.	CT secondary	3 x /-1 Amps or 3 x /-5 Amps (site configurable)
4.	Auxiliary AC/ DC Supply	60-240 V AC/DC ± 20%, 50/60 Hz or 24-48 V DC ± 20% Or VT powered Note: Any of the two auxiliary supply shall be available at a time
5.	System frequency	50HZ +/- 5%

2.3.4 DISPLAY

The meter shall have Graphical LCD with backlight for proper depicting of values in user friendly manner like values with unit, OBIS codes, negative signs, favourite page etc.

2.3.5 POWER FACTOR RANGE

The metering system shall be suitable for full power factor range from zero (lagging) through unity to zero (leading). The meter shall work as an active energy import and export meter along with reactive (lag and lead) meter. The energy measurement should be true four quadrant type.

2.3.6 ACCURACY

Class of accuracy of the metering system shall be 0.2S for energy measurement. The accuracy should not drift with time.

2.3.7 POWER CONSUMPTION OF METER

The meter must be capable to operate with the power drawn from the Auxiliary Power supply (AC/DC) and station VT power supply.

i. Power Consumption in case of Aux supply:

Voltage circuit < 0.1VA/phase
Current circuit < 0.1VA/phase @1A Ibasic, <0.5VA/phase @ 5A IbasicAuxiliary APS < 10VA

ii. Power consumption in case of Self power supply:

Voltage circuit<6VA/phase
Current circuit<0.1VA/phase @ 1A Ibasic, <0.5VA/phase @ 5A Ibasic

2.3.8 STARTING CURRENT

The meter should start registering the energy at 0.1% Ib and unity power factor.

2.3.9 MAXIMUM CURRENT

The rated maximum current shall be 200% of basic current (Ib).

2.3.10 The meter shall work accurately irrespective of phase sequence of the mains supply.

2.3.11 GENERAL CONSTRUCTIONAL REQUIREMENTS

Meters shall be designed and constructed in such a way so as to avoid causing any danger during use and under normal conditions. However, the following should be ensured:

- **i.** Personnel safety against electric shock
- **ii.** Personnel safety against effects of excessive temperature
- **iii.** Protection against spread of fire
- **iv.** Protection against penetration of solid objects, dust and water in normal working condition

All the materials and electronic power components used in the manufacture of the meters shall be of highest quality and reputed make to ensure higher reliability, longer life and sustained accuracy. The meters shall be designed with application specific integrated circuits. The electronic components shall be mounted on the printed circuit board using latest Surface Mount Technology (SMT).

All insulating materials used in the construction of meters shall be non-hygroscopic, non-aging and of tested quality. All parts that are likely to develop corrosion shall be effectively protected against corrosion by providing suitable protective coating.

The metering system when mounted in panel shall conform to the degree of protection IP54 in the normal working condition for protection against ingress of dust and moisture.

2.3.12 MANUFACTURING ACTIVITIES

Meter should be manufactured using SMT (Surface Mount Technology) components and by deploying automatic SMT pick and place machine and reflow solder process; the Bidder should own such facilities. Quality should be ensured at the following stages:

- **i.** At PCB manufacturing stage, each board shall be subjected to computerized bare board testing.
- **ii.** At insertion stage all components should undergo computerized testing for conforming to design parameters and orientation
- **iii.** Complete assembled and soldered PCB should undergo functional testing using Automatic Test Equipment.
- **iv.** Prior to final testing and calibration, all meters shall be subjected to accelerated ageing test to eliminate infant mortality.
- **v.** The calibration of meters shall be done in-house.

2.3.13 SEALING

Proper sealing arrangement shall be provided as follows:

- **i.** 2 nos. sealing arrangement between cover and base.
- **ii.** 2 nos. sealing arrangement between top cover and front cover.
- **iii.** 2 nos. sealing arrangement between base and ETBC.
- **iv.** 1 no. sealing arrangement on optical port.

The sealing arrangement should be suitable for application of Polycarbonate seals.

2.3.14 MARKING OF METER

The marking on every meter shall be in accordance with IEC. The basic marking on the meter name plateshall be as follows:

i. Manufacturer's name and trade mark
ii. Serial Number
iii. Year of manufacture
iv. Type Designation
v. Number of phases and wires
vi. VT commissioning information
vii. CT commissioning information
viii. Reference frequency
ix. Accuracy Class

Additionally, following information shall also be available on name plate.

i. Property of "Purchaser name" optional
ii. P.O. No. "Number" optional

The connection diagram of the connecting 3P4W/3P3W meter shall be depicted on meter. The meter terminals shall be properly marked to identify voltage, Current and Auxiliary supply.

2.3.15 The meters shall be suitable for being connected directly through its terminals to VT's having a rated secondary line- to- line voltage of 110 V, and to CTs having a rated secondary current of 1A or 5A. Any further transformers/ transducers required for their functioning shall be in-built in the meters. Necessary isolation and/or suppression shall also be built-in, for protecting the meters from surges and voltage spikes that occur in the VT and CT circuits of extra high voltage switchyards.

2.3.16 The meters shall compute the active energy and load import; active energy and load export from the substation bus bars during each successive 15/30 minute integration period block and store it in its non volatile memory.

2.3.17 The meter shall compute the average frequency during each successive 15 minute block and store inits memory.

2.3.18 The meter shall have Inputs/ Outputs pulsing pins availability. This shall help in transferring the same Energy parameters being recorded inside the meters on pulse output as well for SCADA application at remote distance. Also, the pulse input shall be used for time synchronization pulse input. The meter shall have 7 fixed pulse outputs and 4 configurable as pulse input/output.

2.3.19 The meter shall compute the reactive power, with an accuracy as per relevant IS/ IEC standards, and integrate the reactive energy algebraically into two separate reactive energy registers, one for the period for which the average RMS voltage is greater than 103% (Reactive High), and the other for the period for which the average RMS voltage is below 97.0% (Reactive Low). When lagging reactive power is being sent out from substations bus bars, reactive registers shall move forward. When reactive power flow is in the reverse direction, reactive registers shall move backwards.

2.3.20 Reactive energy shall be available in below different registers as-

i. Reactive import while active import
ii. Reactive import while active export
iii. Reactive export while active import
iv. Reactive export while active export
v. Reactive import

vi. Reactive export
vii. Reactive inductive
viii. Reactive capacitive
ix. Net reactive energy (Q1+Q2-Q3-Q4)
x. Reactive high import
xi. Reactive low import
xii. Reactive high export
xiii. Reactive low export
xiv. Net Reactive high
xv. Net Reactive low

2.3.21 Active and Apparent energies shall also be made available by meter in separate energyregisters as –

a. Active energy Import total
b. Active energy Export total
c. **Active energy Import fundamental**
d. Active energy Export fundamental
e. Net active energy (import – export)
f. Active energy import total (Phase wise) Active energy export total (Phase wise)
g. Apparent energy (while active import)
h. Apparent energy (while active export)

2.3.22 Meter shall have provision to compute apparent energy based on lag only or lag+lead.The same shall be configured at factory end.

2.3.23 The meters shall be compatible with ABT tariff as well as TOD tariff and as per MSEDCL's specifications

2.3.24 For reactive power and reactive energy measurement, limits of errors all the fourquadrants shall be in accordance to IEC 62053-23/ IS14697.

2.3.25 Each meter shall have two calibration LEDs (visual) for checking the accuracy of active energy and apparent/reactive energy measurement. Further, it shall be possible to switch over the same test output device to apparent or reactive energy via suitable means provided on the meteringsystem. This LED shall be visible from the front side.

2.3.26 The metering system shall normally operate with the power drawn through the auxiliary ACor DC supply. The metering system design should enable the auxiliary supply to be switched automatically between the AC and DC voltage, depending upon their availability.

2.3.27 Meter shall have a built-in calendar and clock, having an accuracy of Accuracy: <2 min/yearor better. The calendar and clock shall be correctly set at the manufacturer's works.

2.3.28 TOD (Time of day registers): The meter shall have TOD registers for active energy importand export, apparent energy import and export and apparent MD import and export. Maximum eighttime of day registers including universal (0-24 hrs) register can be defined. It shall be possible to program number of TOD registers and TOD timings through suitable high level software/ MRI as an authenticated transaction.

2.3.29 Maximum Demand (MD) Registration: The meter shall continuously monitor and calculate the average demand of configured parameter during the integration period set and the maximum, out of these shall be stored along with date and time when it occurred in the meter memory. The maximum demand shall be computed on fixed block principle. The maximum registered value shall be made available in meter readings. The integration period shall be set as 15minutes that shall be capable to change to other integration period (30/ 60 minutes), if required, through suitable high level software/ MRI as an authenticated transaction.

2.3.30 Maximum Demand Reset:

Following provisions shall be available for MD reset in meter

a. **Auto billing at predefined date and time**
b. **Manual via common MD reset button (optional)**
c. Authenticated transaction through suitable high level software/ MRI (optional)

2.3.31 The display shall be of Graphical LCD type with colored back-lit and soft push button.

The display shall indicate direct values (i.e. without having to apply any multiplying factor) of measured/ computed parameters as per the meter commissioning. It should be possible to easily identify the single or multiple displayed parameters through legends on the metering system display like OBIS codes etc.
The register shall be able to record and display starting from zero, for a minimum of 1500 hours, the energy corresponding to rated maximum current at reference voltage and unity power factor. The register shall not roll over in between this duration.

2.3.32 Each meter shall display on demand & in Auto scroll mode the following quantities/ parameters:

i. LCD segment check
ii. Date
iii. Time
iv. Cumulative active energy import
v. Cumulative active energy export
vi. Cumulative net active (Import – Export) energy
vii. Cumulative reactive energy lag while active import
viii. Cumulative reactive energy lead while active import
ix. Cumulative reactive energy lag while active export
x. Cumulative reactive energy lead while active export
xi. Cumulative apparent energy (while active import)
xii. Cumulative apparent energy (while active export)
xiii. Last 15 minutes block average of active import energy
xiv. Last 15 minutes block average of active export energy
xv. Last 15 minutes block average of the net active (Import – Export) energy
xvi. Last 15 minutes block average frequency
xvii. MD reset count
xviii. Maximum demand apparent (while active import) for current month (0-24 hrs)
xix. Maximum demand apparent (while active export) for current month (0-24 hrs)
xx. Cumulative active import energy reading of predefined date and time for monthly billing purpose
xxi. Cumulative active export energy reading of predefined date and time for monthly billing purpose
xxii. Cumulative net active (Import – Export) energy reading of predefined date and time for billing purpose
xxiii. Cumulative apparent energy (while active import) reading of predefined date and time for monthly billing purpose
xxiv. Cumulative apparent energy (while active export) reading of predefined date and time formonthly billing purpose
xxv. Maximum demand for apparent (while active import) of predefined date and time for monthlybilling purpose
xxvi. Maximum demand for apparent (while active export) of predefined date and time for monthlybilling purpose
xxvii. Present anomaly status
xxviii. Date of first occurrence of anomaly
xxix. Time of first occurrence of anomaly
xxx. Time of last restoration of anomaly
xxxi. Date of last restoration of anomaly
xxxii. Total anomaly count

There should a facility to configure the display parameters in favorite pages.

2.3.33 Load Survey Profile: Each meter shall have a non-volatile memory in which the configuredenergy parameters and instantaneous parameters shall be automatically stored for each successive fifteen (15) minute block. Meter shall have capability to store 9600 parameter- days load survey data, not exceeding 1000 days/parameter.

i.e. If meter is configured for 5 load survey parameters with 15 minute block, then 960 days data shall be available for configured parameters.It shall be possible to select either energy or demand view at base Computer Software (BCS) end. The load survey data should be available in the form of bar charts as well asin spreadsheets. The BCS shall have the facility to give complete time synchronized load survey data both in numeric and graphic form.

2.3.34 Billing parameters: The predefined date and time for registering the billing parameters of shall be 00.00 hours of the first day of each calendar (billing) month. Each meter shall store the configured billing parameters corresponding to defined bill dates. Up to max 53 billing dates can beconfigured

2.3.35 Daily midnight parameters: The meter shall store the configured energy parameters at predefined time in a day. Maximum 100 days data can be stored

2.3.36 Data Communication Capability:

The meter shall have following communication ports for local/remote reading:

(i) IEC 1107 optical port
(ii) RS485 port (should be configurable on DLMS/MODBUS)
(iii) RS232 port (for remote communication)
(iv) TCP/IP Ethernet (should be configurable on DLMS TCP/MODBUS TCP) Note: RS232,

RS485 ports shall be modular and IEC1107, Ethernet ports shall be fixed.

2.3.37 Each meter shall have a unique identification code i.e. serial number, which shall be markedon name plate as well as in its memory.

2.3.38 Each meter shall have a non volatile memory in which the parameters as mentioned in this specification shall be stored. The non volatile memory shall retain the data for a period not less than 10 years under un-powered condition; battery backup memory shall not be treated as NVM.

2.3.39 Meter shall have the capability and facility to compensate for errors of external measurement transformers i.e. CT and VT:

Linear compensation for measurement PT errors (ratio and phase); there shall be linear adjustment whichshall be applied across the complete measurement range of the transformer.

(i) Non-linear compensation for measurement CT errors (ratio and phase) compensation; this shall allow multiple ratio and phase adjustments to be applied for different load points per phase input of the meter.

(ii) It should be possible to program the errors of CT and VT in meter through front optical communication port using compatible high level software. Metering system design should support this feature and further it shall be possible to configure & incorporate this feature in meter at later stage whenever required.

2.3.40 Meter shall have capability and facility to compensate power transformer losses; percentageiron and copper losses shall be configured in the meter for compensation.

2.3.41 The meter display should depict the total harmonic distortion (THD) of current and voltagesup to 31st level of power quantity for providing the feature of supply monitoring to Utility.

2.3.42 Calibration and Periodical Testing of meters:- At the time of commissioning, each ABTTariff meter shall be tested at own cost by the bidder at NABL Lab. All meters shall be tested at least once

in five years. These meters shall also be tested whenever the energy and other quantitiesrecorded by the meter are abnormal or inconsistent with electrically adjacent meters. Whenever there is unreasonable difference between the quantity recorded by interface meter and the corresponding value monitored at the billing center via communication network, the communicationsystem and terminal equipment shall be tested and rectified. The meters may be tested using NABLaccredited mobile laboratory or at any accredited laboratory and recalibrated if required at manufacturer's/bidder's work

2.4 ANOMALY DETECTION FEATURES

2.4.1 The meter shall have features to detect and log the occurrence and restorationof following anomalies, along with date and time of event:

a. **Phase wise Missing Potential –** The meter shall detect missing potential (1 or 2 phases) provided the line current is above a specified threshold. The voltage at that stage would be below a specified threshold.
b. **Phase wise Current Circuit Reversal –** The meter shall detect reversal of polarity provided the current terminals are reversed. This shall be recorded for 1 or 2 phase CT reversal.
c. **Voltage Unbalance –** The meter shall detect voltage unbalance if there is unbalance in voltages.
d. **Current Unbalance –** The meter shall detect current unbalance if there is unbalance in load conditions. Meter should ensure true system conditions before going for current unbalance checks.
e. **CT Miss –** The meter shall detect current miss if the current is below a defined threshold, provided the phase voltage is above a specified threshold.

Following additional tampers should also be provided in the meter:

i. Over voltage
ii. Under voltage
iii. Voltage sag (power quality)
iv. Voltage swell (power quality)
v. Voltage interruption (power quality)
vi. Voltage unbalance (power quality)
vii. Power fail/power on-off
viii. Neutral disturbance
ix. Magnet detection
x. Meter cover open detection

2.4.2 Compartment wise event logging should be available in the meter. Total 11 compartments with 100 events /compartment should be stored in meter. The events (occurrence + restoration), in total, shall be stored in the meter memory on first in first out basis.

2.4.3 There shall be at least eleven separate compartments for logging of different type of anomalies:

Once one or more compartments have become full, the last anomaly event pertaining to the same compartmentshall be entered and the earliest (first one) anomaly event should disappear. Thus, in this manner each succeeding anomaly event shall replace the earliest recorded event, compartment wise. Events of one compartment/ category should overwrite the events of their own compartment/ category only. In general persistence time of 5 min. for occurrence and restoration respectively need to be supported in meter.

2.4.4 Anomaly count should increase as per occurrence (not restoration) of anomaly events. Total no. of counts shall be provided on BCS.

2.5 TYPE TEST CERTIFICATES

The meters shall be fully type tested as per relevant standards IS 14697. The type test report of the meters shall be submitted by bidder along with the offer. Type test reports shall not be more than 2 years old.

2.6 Highlights of web portal

Bidder will publish a web portal for CESL to view dashboard and reports with selective data downloading facilities and bidder will facilitate CESL for dash board/report format customization/alteration on web portal.

i. Daily generation (cumulative):

The dashboard will show the daily cumulative generation data. There will be selection for Individualplant or group. Data can be viewed based on date selection.

ii. Daily generation profile:

The dashboard will show the daily generation profile for each 15 min integration period. There will be selection for Individual plant or group. Data can be viewed based on date selection.

iii. Monthly generation:

This dashboard will show the monthly generation data (month wise). There will be selection for Individual plant or group. Data can be viewed based on month selection.

iv. Yearly generation:

This dashboard will show the yearly generation data (year wise). There will be selection for Individual plant or group. Data can be viewed based on year selection.

v. Events:

This dashboard will show the any abnormal events recorded by meter. There will be selection for Individual plant or group. Data can be viewed based on time selection.

vi. Grid Outage report:

This dashboard will show Grid Outage duration for Individual plant or group.
Outage duration will be generating based on the meter's power on off events.

- Events duration less than 5 min will not consider for total duration calculation.
- Outage occurred during 8 am to 6 pm will be considered for calculation.

Grid Outage Report					
Report Period		**01-Jul-20**	**To**	**01-Aug-20**	
Area	**Gen. Station**	**Meter Number**	**Outage start**	**Outage end**	**Total Duration (HH:MM)**
Area 1	Test 01	X1234567	16-07-2020 10:01:06	16-07-2020 17:28:42	07:27
Area 1	Test 01	X1234567	17-07-2020 12:01:06	17-07-2020 14:28:42	02:27
Total Outage					**09:55**

vii. CUF (Capacity Utilization Factor) report-Daily Utilization factor report

Daily - CUF (Capacity Utilization Factor) report						
Report Period		**01-Jul-20**	**To**	**10-Jul-20**		
Area	**Gen. Station**	**Meter Number**	**Date**	**Plant Capacity (kW)**	**Generation (kWh)**	**CUF**
Area 1	Test 01	X1234567	01 July 2020	2100	1000	2%
Area 1	Test 01	X1234567	02 July 2020	2100	9000	18%

Note: CUF = Energy measured (kWh) / (1*24*installed capacity of the Plant)

Yearly Utilization factor report

Yearly - CUF (Capacity Utilization Factor) report						
Report Period		**2020**				
Area	**Gen. Station**	**Meter Number**	**Year**	**Plant Capacity (kW)**	**Generation (kWh)**	**CUF**
Area 1	Test 01	X1234567	2020	2100	1000	2%
Area 2	Test 03	X1234568	2020	2100	9000	18%

Note: CUF = Energy measured (kWh) / (365*24*installed capacity of the Plant)

2.7 List of activities to be performed during the contract period

Following are the list of activities that should be carried out during this project:

Activity	Scope Description
Panel Installation	• Meter connections up to the panel will be done by utility • Meter mounting accessories and meter boxes will be supply and install by bidder
Commissioning of Meters	• Meters will be installed and commission by bidder services team. • Suitable IPCT will be supply and install by bidder if CT correction required at any site.
Commissioning of Modem	• Bidder services team will setup the Modem with meters. • Bidder services team will collect the assets details and other relevant information in prescribed format. • Bidder services team will send the assets details to datacentre for define on AMR server. • Bidder datacenter will upload this information and confirm the end to connectivity of meters and modem.
Configure new solar plant details on web portal and make it online	• Bidder services team will collect the details of installation and send this to data centre. • Bidder data centre team will define the new site on web portal and make it online for data viewing.

Registration of utility users for online access	• Utility will share the user details with Bidder data centre team. • Bidder data centre team will register the user and share the details of online portal. **Note: Complete user management will be managed by bidder only.**
Maintenance and Support to maintain the higher success rate of AMR	• Third-party hardware will be supplied by bidder . • Bidder should keep adequate number of spare reserve/stock as required against the devices/equipment's whose failure may stop the business operations completely. Ex. Converters, SIM etc. • Based on the AMR performance bidder central team will inform to field service teams to perform the required maintenance of AMR devices.
Reading of non AMR meters	• For non AMR meters resources like Laptop/MRI/Mobile will be provided by Bidder. • Appropriate support from utility will required in some cases.

2.8 SLA for service delivery

SLA (service level agreement) to provide the daily generation reports and dash board or all enrolled AMR meters are mentioned below:

- 90% of the metering point's data shall be read through AMR which included reading through modems and through MRI/Mobile APP.
- These SLA will be applicable after 3 months of PO received for stabilization period.

S No.	Service area	Service criteria	Acceptable limit	Dependencies
1.	Meter data reading and publish the data on web portal after processing	Meter reading data is collected and stored in database. Published the samedata on web portal daily before 10AM	90% of meter data available on daily basic. 10% of non AMR meters data is available based on monthly basic.	• SLA calculation shall exclude meters those are not read due to network/ communication issue. • SLA calculation shall exclude data availability of those meters where identification of communication issues is underway & require more time to debug. • SLA calculation shall exclude scheduled system down time. • Any other dependencies of delays attributable to Utility on their supplied/serviced items e.g. SIMs, MU burnt/defective, required data for network.

Annexure - I

1. Guaranteed Technical Particulars – GSM/ GPRS Modem

S. No.	Technical Specification / Requirements	Bidder's Offer
1.	Operating Band	
2.	GPRS class	
3.	Interface with electronic energy meter	
4.	External Antenna	
5.	Power Supply	
6.	Enclosure material	
7.	Indicator LEDs	
8.	SIM card holder	
9.	Internal Memory	
10.	Installation type	