

	Purchase specification, Group: Photovoltaics DESIGN. SUPPLY AND I&C OF CCTV SYSTEM AT 50MW RAMAGUNDAM SOLAR PV PLANT AT TELANGANA	PS-439-1286
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**Technical specification
For**

**Design, Engineering, Supply, Installation and Commissioning of CCTV system at 50 MW
Ramagundam Solar Photovoltaic (SPV) power plant for M/s SCCL, Telangana**

Revision details :R 00	Prepared <i>Suresh Prasad</i> SP	Approved <i>Rachin</i> PR	Date 15/07/2019
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I. INTRODUCTION:

This technical specification provides BHEL's requirement for Design, Engineering, Supply, Installation and Commissioning of CCTV system in 50 MW Ramagundam Solar Photovoltaic (SPV) power plant for M/s SCCL, Telangana.

1. GENERAL INSTRUCTIONS:

- Vendor is advised to visit site to familiarize with conditions and site layout.
- Bidders are advised to comply to specifications in total, unless the requirement is not feasible. Incomplete offers will be rejected without intimating to bidders. In case feasible deviations are proposed by the bidder and subsequently withdrawn, no commercial implications can be claimed by the bidder.
- Bidders to quote models and brands with proven track record of testing and successful operation.
- In the event of any conflict between these specifications, data sheets, related standards, codes etc. the bidder shall refer the matter to the purchaser for clarifications and only after obtaining the same shall proceed with the manufacture of the items in question.
- CCTV System is meant for gathering video information from the various areas of the powerplant with display and recording facilities as per requirement. It is the responsibility of the bidder to select proper models, which meet the technical requirements mentioned in this specification. If there is any deviation then it shall be brought to Purchaser's attention & written approval shall be taken.
- Vendor has to enclose the deviation sheet clause wise separately in case any deviations are sought by the vendor. Absence of any deviation sheet shall be taken as compliance of BHEL specification in total without any deviation.

2. SCOPE:

The scope of this tender includes Design, engineering, supply, transport, store, install, cabling and commissioning of complete CCTV system at 50 MW Ramagundam Solar Photovoltaic (SPV) power plant for M/s SCCL, Telangana as per the technical specification. The vendor shall provide IP Based CCTV Camera for the Monitoring of Control Room, Inverter Rooms, Entry & Exit Gates, Switchyards complete in all respect including necessary Camera, Network Video Recorder (NVR), Network Switch, cables, Active & Passive Components, mounting structure, Software, minimum 40" LED monitor etc. Vendor has to design the CCTV system considering the locations, distance and relevant standards applicable. OFC and auxiliary power cable of CCTV system shall be laid in underground trenches through HDPE pipe as per standard practice. The tentative layout of the Solar PV power plant is attached.

3. STANDARDS AND REFERENCES:

The equipment furnished under this section shall meet the requirements of all the applicable international codes and standards or their latest amendments. Camera certification shall be CE/FCC/UL or equivalent.

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II. GENERAL REQUIREMENT:

1. CCTV Cameras along with monitoring stations (sufficient numbers) and all other accessories required for its proper operation must be installed to have complete coverage of following areas for 24 hours.

(i) Main plant entries (6 entry gates): Covering all the entry/exit gates

(ii) PTZ camera along the Plant Perimeter (Boundary length 11.5km approx): Covering complete perimeter of Plant Area to capture all possible intrusion

(iii) Control/Inverter Rooms (1 no control room, 9 nos Inverter rooms): Covering Entry/Exit in the room and Dome camera for activities within equipment area in Control/Inverter Rooms and lobby area in control room

(iv) WMS system

(v) Storage area

(vi) The Vendor has to propose the locations and number of cameras required for the Plant during detailed engineering. However approver's decision on number of cameras shall be final.

2. Monitoring stations of the CCTV Network shall be installed in Main Control Room.

3. The CCTV system shall be designed as a standalone IP based network architecture. System shall use video signals from different cameras at defined locations, process the video signals for viewing on monitors at control room and simultaneously record all video streams using latest compression techniques.

4. Camera shall be colour, suitable for day and night surveillance (even under complete darkness) and network compatible.

5. It shall be possible to control all cameras i.e., PTZ auto/ manual focus, selection of presets, video tour selection etc. The software shall support flexible 1/2/4 windows split screen display mode or scroll mode on the display monitor for live video.

6. The system shall support video analytics in respect of the following:

(i) Video motion detection

(ii) Object tracking

(iii) Object classification

(iv) Camera server shall be provided with sufficient storage space to storage recordings of all cameras at HD mode for a period of 15 days. All recordings shall have camera ID, location, date and time of recording.

7. CCTV supply scope will include cameras with night vision, mounting poles, Power supply units, layer-3, Ethernet network solution with single IP management, LIU, Server with VMS software, recording software and license for all cameras and clients, 40-inch LED industrial monitor, PC, Keyboard, joy-stick, Field network switches with minimum layer-2 functionality, fibre optic / SFP/ RJ-45 ports with surge protective devices, 42U panels, network switches, Single mode 6C OFC cable, Cat-6 cable, power supply cable, Passive fibre optic components & termination kit consisting of fibre panel, information outlet, cabinets, face plates, SC coupler, Fibre optic drawer with pig-tail, UTP cat-6 patch cords, various connectors, cable ties, multi-stranded copper wire for equipment ground, PVC conduit with couplers and any other supply items not covered in above required for completion of the CCTV system.

All related supplies, installation including trench work, civil works etc for CCTV system shall be in scope of vendor. All necessary labour, machinery, tools, instruments shall be in vendor scope

III. TECHNICAL SPECIFICATION:

a. Camera Specification (Outdoor Bullet Type):

1/3" CMOS HD sensor, Out Door Bullet H.264 Compression, 2 mega Pixels CMOS, 3DNR, The highest resolution can be up to 1920 × 1080 Low Lux, DWDR, Support Voice talk, 1CH Audio in/1CH Audio Out, Mobile P2P Viewing, Support Protocol: TCP, UDP, IP, HTTP, FTP,

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SMTP, DHCP, DNS, ARP, ICMP, POP3, NTP and RTSP, Support ONVIF 2.0, Lens : 2.8-12mm Megapixel lens (4-9mm lens optional), IR Distance: 50m, POE (802.3af). Support ROI function, Built-in Micro SD/SDHC/SDXC card slot, Ingress Protection level: IP66, Video Bit Rate 32 Kbps –8 Mbps, Audio Compression G.711/G.722.1/G.726/MP2L2, Dual Stream, BLC, ROI STANDARD: ONVIF, PSIA, CGI, ISAPI, Operating Conditions -30°C to 60°C (-22°F to 140°F).

b. Camera Specification (Indoor Dome Type):

1/3" CMOS HD sensor, Indoor Dome fix Lens H.264 Compression, 1.3 mega Pixels CMOS, 3DNR, The highest resolution can be up to 1280×960, Shutter Speed: 1/3 s to 1/100,000s, Min. Illumination:0.01Lux @ (F1.2, AGC ON) ,0 Lux with IR 0.028 Lux @ (F2.0, AGC ON) ,0 Lux with IR, Video Bit Rate 32 Kbps – 8 Mbps, Support Protocol: TCP, UDP, IP, HTTP, FTP, SMTP, DHCP, DNS, ARP, ICMP, POP3, NTP and RTSP, Support ONVIF 2.0, Lens : 3.6mm 1.3Mega Pixel Lens SD, 3DNR, D-WDR, Motion Detection, Privacy Mask, 24pcs LED, 20m IR distance, POE(802.3af), Support Dual stream, Impact protection:IK10, operating condition, Support ROI, BLC, Standard : ONVIF, PSIA, CGI, ISAPI, Image Settings: Rotate mode, Saturation, Brightness, Contrast adjustable by client software or web browser, H.264 Type: Baseline Profile / Main Profile.

c. Camera Specification (Outdoor PTZ Type):

Image Sensor - 1/2.8", 2 MP progressive scan CMOS, PoE type, IP-66 Outdoor type, Effective Pixels 1920(H) x1080(V), Scanning System Progressive, Backlight Compensation BLC / HLC / WDR (120dB), IR LEDs Length 150m, Focal Length 4.5mm~135mm, Max Aperture F1.6 ~ F4.4, Compression H.265+/H.265/H.264+/H.264, Auto Tracking Support, IVS - Tripwire, Intrusion, Abandoned/Missing, Face Detection, Heat Map, Memory Slot Micro SD 128GB, Angle of View H: 67.8° ~ 2.4°, Close Focus Distance 100mm~ 1000mm, Optical Zoom 30x. Camera shall be suitable for operating temperature up to 60 deg Celsius ambient.

d. Technical Requirement:

- The monitoring of cameras shall be done at Main Control room. The required no. of hardware/ software licenses to meet the requirements shall be supplied by the bidder.
- All the designing of hardware / software required for the CCTV system along with erection & supervision and commissioning of the same shall also be in the scope of bidder. Layout location, architecture and configuration scheme will be prepared and submitted by bidder in the event of order placement. It is the responsibility of bidder to provide a new system and supply suitable hardware/software & accessories.
- All video and control signals from cameras shall be connected via Cat-6 Cable for distances up to 90m and FO Cables for distances more than 90m. FO cable shall be of single mode and of minimum 6 cores. All unarmoured and FO cables shall be routed through flexible conduits. Weather proof JB shall be provided for housing network equipment for connecting outdoor cameras with Control room/Inverter room rack.

e. Power supply:

- BHEL will supply one (1) Nos. of 230V, 1-φ AC, 50Hz of 500 VA capacity UPS power supply at locations of Control rooms (Vendor may indicate if additional load is required).

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Further distribution of power through 3cx1.5 sq.mm copper armoured cable to equipment inside Junction box/rack and to cameras installed in the field shall also be in the scope of bidder.

- Power/Voltage conversion equipment if required shall be in scope of bidder. Further distribution of power within equipment inside Junction box/ rack and to camera shall also be in the scope of bidder.

f. GI 50mm, mounting poles 5m above ground with minimum IP-65 junction box for outdoor cameras

1. Outdoor Cameras to be installed in any particular location shall be mounted on rigid vibration proof CCTV Pole protected against corrosion. The height shall be 5m above ground level. Mounting locations shall be easily accessible for servicing purposes. They shall be fitted with climbing and relevant safety facility.
2. Local junction boxes for cameras shall be of weather-proof, of minimum protection Class IP-65. Junction Boxes shall be suitable for accommodating Network Equipment, LIU & Power Distribution Equipment.
3. 5-metres camera Pole with Required Foundation Bolt/Frame shall be supplied. Civil foundation works is in vendor's scope.
4. Camera structures shall have hoisting facility, fixing facilities for cables along the whole structure and for the cameras to be installed with ample space for servicing purposes.

g. Min 40-inch LED industrial monitor

1. One LED colour monitor (min 40 inch diagonally) will be installed in Control room Building. Industrial grade monitor shall only be supplied.
2. The monitors shall be versatile and aesthetic units. It shall also be S-VHS/composite video compatible and shall have built in audio. Monitors are to be operable at 230V AC, 50 Hz (Power supply shall be arranged by supplier from CCTV Rack).
3. They shall comply to the following specifications:
 - i. General Automatic degaussing, fast warm up time Display tube, integral implosion protection.
 - ii. Resolution: 1920 x1080. Minimum Controls Colour system select, volume, colour, brightness, contrast, power, video input select and Y/C termination.

h. Approved Vendor List:

The offered make shall be reputed make. Before procurement Vendor shall take approval from BHEL/End User for make of items.

IV. SPARES-

Bullet Camera - 1 No
 Dome Camera – 1 No
 PTZ Camera -1 No,
 Network Switch -1 No (each type)
 Patch Card (cat-6 Cable) – 2 No's
 Media converter- 2 nos

Notes:

1. The items mentioned shall be supplied by bidder as minimum requirement. However, any material not listed in above but required by bidder for successful completion and guarantee run of the project / system shall be included in the scope of the bidder on EPC basis and shall be done by bidder without any commercial implication to BHEL.

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2. I&C Prices shall be inclusive of travel expenses, lodging, transport and complete man day charges. No extra charges will be paid.

3. The vendor shall guarantee satisfactory performance of the equipment under stipulated variations of voltage and frequency. The design and manufacture shall be such that equipment / components of same type and rating are interchangeable.

4. Camera and database servers shall offer both video stream management and video stream storage management. These servers shall also manage and store configuration information/database for the whole system. Recording frame rate & resolution in respect of individual camera shall be programmable. It shall be possible to view and record at different resolutions and frame rates and this shall be individually programmable on every camera. It shall be possible to take back-up of system configuration and database on portable media device and restoring the same if required. System shall ensure that once recorded, video cannot be altered. It shall be possible to view, record, search and replay simultaneously without affecting performance of the system.

4. The system shall be complete in all aspects for reliable performance. The contractor shall submit the detailed block schematic, video, signal & power wiring diagram, describing the connections between the network switch/camera server systems and various cameras, monitors, keyboard etc.

IV. Documents to be submitted along with offer

1. Data sheets / catalogs of cameras
2. BOM
3. Deviation sheet if any. Absence of deviation sheet will be considered as No-deviation to the specification

V. Factory Acceptance Test (FAT):

Factory Acceptance Test procedure shall be prepared by vendor along with Quality Assurance Plan. The document shall be subject to BHEL/End User approval. The entire CCTV system items shall be made available at vendor's work for inspection (FAT) which will include complete integrated test for checking that the equipment offered is meeting the design standards and functional requirements mentioned in this specification. As a minimum, BOM verification, physical verification, integrated test shall be performed on true sample of items selected by BHEL shall be part of FAT. BHEL reserves right to check power ON functionality of entire active components of CCTV system BOM. QAP and FAT procedure shall be subject to BHEL/ End User approval.

One month prior to the FAT, Bidder shall submit a test procedure and QAP to BHEL for approval. BHEL/ End User representative may, at BHEL/ End User sole discretion, attend the FAT. In this event, Bidder shall ensure all tests are carried out in the presence of BHEL/ End User personnel. If BHEL/ End User declines to attend the FAT, Bidder shall carry out these tests and submit the results to BHEL for review.

Factory Acceptance Tests (FATs) result shall be documented and the test results shall be submitted to BHEL/ End User prior to clearance for dispatch.

VI. COMMISSIONING

Vendor is responsible for delivering a fully functional equipment that meets all the requirements of the Specification and applicable standards. The Commissioning processes will demonstrate the above to BHEL/ End User, before handing over of the System. System Commissioning shall comprise of a number of different activities culminating in the acceptance of the operational System by BHEL/ End User. Bidder

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shall provide all necessary test equipment required to carry out the commissioning and acceptance testing.