1. **ANNEXURES** 
   1. **Annexure 1 – Compulsory Cover Sheet (To be Completed)**
2. Company Name:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Main Contact person and contact details

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Company experience in PHOTO VOLTAICS (Years)

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1. Number of plants designed and fully installed. Also indicate the Energy Producing Capacity of each completed installation in (Watts i.e. KW, MW).

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1. Single biggest successfully installed PV system (kWp, Name, Value (R); year completed, Reference)

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1. Number of installations greater than >180kWp delivered by the proposed team for this project

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1. Successfully completed ground mounted PV system. (Not Carport or rooftop) (Size kWp, Location, Value R)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Type of Modules proposed (Name, Size, Technology)

|  |  |
| --- | --- |
| Name |  |
| Size (kWp) |  |
| Technology (poly, mono, thin film) |  |
| Is it a Tier 1 panel |  |

1. Type of inverters proposed (Name, Size)

|  |  |
| --- | --- |
| Name |  |
| Size (kVA) |  |
|  |  |
| **Minimum Mandatory Certifications (Proof needs to be supplied in returnable)** | |
|  | Tick if adhered to |
| IEC 62109-1/2 |  |
| IEC 61727 |  |
| NRS 097-2-1 (2017) |  |
| IEE 1547 |  |
| IEE 1547.1 |  |
| IEE 1547.2 |  |

1. Type of Mounting structure (Is it ground mounted? Name, Material)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Size of Plant proposed (kWp & kVA AC)

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1. First year yield (P50 MWh and P90 MWh)

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1. Proposed monitoring system

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1. Installation/Project timeline (Calendar weeks including lead times)

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1. Delivery time of Modules

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1. Delivery time of Inverters

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1. Proposed antitheft fixing measures (spec sheet to be included in returnables)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Proposed solution to reduce the risk of veld fires damaging the PV plant (Small write up)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Is the installation electrician a qualified three phase installation electrician? (Proof to be submitted in returnables)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Electrical contractor must be registered with the CIDB and have a rating of 3EP or better. Please provide rating below. (Proof to be submitted in returnables)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Annexure 2 – Compulsory returnables schedule (To be completed)**

**STAFF AND COMPANY INFORMATION**

Any information not declared below for which reason whatsoever might put the contractor at a disadvantage during adjudication stages

|  |  |  |  |
| --- | --- | --- | --- |
| Address of Company | |  | |
| Number of full time technical staff employed | |  | |
| Number of full time technical staff to be assigned to the project | |  | |
| Number of full time **South African** technical staff to be assigned to the project | |  | |
| How long has your company been in the PV industry? | |  | |
| **Company’s first successfully installed PV system** | | | |
| Installed PV capacity [kWp] | Project Value | | Reference |
|  |  | |  |
| **Five large (>180kWp) installations completed in the last 5 years** | | | |
| Installed PV capacity [kWp] | Project Value | | Reference |
|  |  | |  |
|  |  | |  |
|  |  | |  |
|  |  | |  |
|  |  | |  |
| **Three ground mounted installations completed (Not carports)** | | | |
| Installed PV capacity [kW] | Project Value | | Reference |
|  |  | |  |
|  |  | |  |
|  |  | |  |
|  |  | |  |
| **Team Leader Details** | | | |
|  |  | | |
| Name: |  | | |
|  |  | | |
| Team leader years’ experience in PV |  | | |
| Team leader number of installations >180kWp |  | | |

The project requires a high level of internal project management to interface to the Professional Project Team. Installation team shall be required to attend weekly site meetings.

How do you intend to satisfy this requirement?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**PROJECT PROGRAM**

Please provide estimated start and completion dates for the project. Furthermore, provide a detailed installation programme.

|  |  |
| --- | --- |
| **Project milestone dates** | |
|  |  |
|  |  |
| Start Date |  |
| Handover Date |  |
| Duration - from letter of intent to handover (Calendar weeks) |  |

**INSTALLATION INFORMATION**

**Specification sheet to be included**. If it is not included it might put the contractor at a disadvantage during adjudication stages

**Support structure**

|  |  |
| --- | --- |
| **Support Structure (Specification sheet to be added)** | |
|  |  |
| structural shape (tubular/angular steel) |  |
| corrosion protection and uv protection |  |
| wind stability or maximum wind speed (km/h) |  |
| weight per m² |  |
| installation method (eg: assembled on site, pre-assembled and rigged into POSITION, ETC.) |  |
| modular or stand-alone system (are the support structures modular, do they clip together or is support structure custom made, etc.) |  |
| durability and lifespan in years |  |
| inclination to the horizontal |  |
| dimensions |  |
| If highest part of structure is higher than 1.8m please provide a description as to how these panels will be serviced |  |

**Anti-theft connectors**

|  |  |
| --- | --- |
| **Antitheft connectors (Specification sheet to be added)** | |
|  |  |
| Does the fixing include the clamp or is it only the nut/bolt for fixing the PV module to the substructure |  |
| corrosion protection and uv protection |  |
| manufacturer |  |
| material (Stainless steel, galvanised etc.) |  |
| warranty/guarantee |  |

**Fence**

|  |  |
| --- | --- |
| **Clearvu fence or similar -High security level (Specification sheet to be added)** | |
|  |  |
| Manufacturer name |  |
| corrosion protection and uv protection |  |
| material (Stainless steel, galvanised etc.) |  |
| warranty/guarantee |  |
|  |  |

**Electric fence**

|  |  |
| --- | --- |
| **Electric fence (Specification sheet to be added)** | |
|  |  |
| Manufacturer name of energizer |  |
| Energizer joule output |  |
| wire material (Stainless steel, galvanised etc.) |  |
| High tensile wire? |  |
| Thickness of wire |  |
| type of insulators |  |
|  |  |
| Energizer warranty |  |
| System warranty |  |

**PV Module**

|  |  |  |
| --- | --- | --- |
| **PV Module (Specification sheet to be added)** | | |
|  |  | |
| Peak Power (PMPP) |  | |
| Open Circuit Voltage (VOC) |  | |
| Short Circuit Current (ISC) |  | |
| Maximum Power Voltage (VMPP) |  | |
| Maximum Power Current (IMPP) |  | |
|  |  | |
| Maximum System Voltage |  | |
| Working Temperature range |  | |
| Hailstone Impact |  | |
| **Mechanical Characteristics** | |  |
| Dimension (length x width x depth) |  | |
| Weight |  | |
| Connector type and manufacturer |  | |
| Junction Box type and manufacturer |  | |
| Cell (poly crystalline or mono  crystalline) and size |  | |
| No. of cells and connections per panel |  | |
|  | | |
| **Temperature/Coefficients** | | |
| Temperature Coefficient VOC |  | |
| Temperature Coefficient ISC |  | |
| Temperature Coefficient PMPP |  | |
|  |  | |
| **Quality Assurance** |  | |
|  |  | |
| **Dust reduction factor** |  | |
| IEC/ISO/SABS Certification |  | |
| Product warranty/guarantee  [panel, junction box] |  | |
| Performance  warranty/guarantee  [include power depreciation graph as a function of time for a 25 year period] |  | |
| After Sales Support Availability for panel |  | |

**Inverter**

|  |  |
| --- | --- |
| **Inverter (Grid Connected) (Specification sheet to be added)** | |
|  |  |
| **Electrical Characteristics** |  |
| Recommended power from PV array (kWp) |  |
| Output Power from inverter |  |
| AC Nominal Voltage |  |
| Nominal frequency |  |
| Maximum line current |  |
| AC current distortion (% THD) |  |
| Open circuit maximum voltage |  |
| Inverter efficiency (maximum) |  |
|  | |
| **Mechanical Characteristics** | |
| Dimension (length x breadth x width) |  |
| Weight |  |
| IP rating |  |
| Operating temperature range |  |
| Cooling system |  |
|  | |
| **Safety** | |
| In built protection functions |  |
| Self-monitoring system and alarms |  |
|  | |
| **Quality Assurance** | |
| IEC/ISO/SABS Certification |  |
| Product warranty/guarantee |  |
| Performance warranty/guarantee |  |

Please provide any particular plant room requirements if the inverter specified needs to be inside. Submission must include details of space requirements and ancillary services needed.

**SCADA**

|  |  |
| --- | --- |
| **SCADA System (Specification sheet to be added)** | |
|  | |
| **Displayed Parameters** |  |
| Array voltage - VDC (V) |  |
| Grid voltage - VAC (V) |  |
| Array current - IDC (A) |  |
| Grid (injected) current - IAC (A) |  |
| Array power - PDC (W) |  |
| Grid (injected) power - PAC (W) |  |
|  |  |
| Module temperature - Tmodule (°C) |  |
| Ambient temperature - Tamb (°C) |  |
| Solar radiation - (W/m2) |  |
| Wind speed (km/h) |  |
| Alarms |  |
|  | |
| **Functionality** |  |
| Data logging capability with a user friendly GUI and automated report generation capability. |  |
| Communications interface (Ethernet, Internet, dial up access, GSM) |  |
| SMS alerts |  |

**SURGE PROTECTION**

Due to the sensitive nature of Sentech’s equipment, only the best lightning protection and surge protection equipment shall be used:

|  |  |
| --- | --- |
| **Surge protection (Specification sheet to be added)** | |
|  |  |
| Manufacturer name |  |
| surge protection conforms to requirements as set out in the specificattions (Y/N) |  |
| Min of Type 2 on DC side of inverter (Y/N) |  |
| Combined Type 1 & 2 at the AC combiner (Y/N) |  |
| Combined Type 1 & 2 at the AC Point of Connection (Y/N) |  |
|  |  |

**POST- HANDOVER and SERVICING**

**Post-Hand-over Maintenance and service programme**

Upon final completion, the Solar Contractor shall enter into on-going services and maintenance associated with the operation of the solar project. These costs shall be priced for in the BOQ and shall be for duration of 12 months.

During commissioning, the Solar Contractor will also train staff in the routine operation, maintenance and safety of the PV system as well as the SCADA system.

Sentech reserves the right to appoint any service provider post the initial 12-month maintenance period

How does the bidder propose to fulfil the above maintenance requirements?

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**SYSTEM SUMMARY**

|  |  |  |
| --- | --- | --- |
| **Summary of the Systems** | | |
|  |  |  |
| 1 | Power (kWp & kVA AC) | kWp:  kVA: |
| 2 | Number of PV modules |  |
| 3 | Wattage per panel |  |
| 4 | Total area of modules |  |
| 5 | Tilt of modules (degrees) |  |
| 6 | Azimuth |  |
| 7 | Number of inverters |  |
| 8 | Estimated annual production of energy (P50 and P90) | P50:  P90: |
| 9 | Producibility (kWh/kWp) |  |
| 10 | Connection to the grid | Three phase low voltage |
| 11 | Voltage supply | 400V |
|  |  |  |

**The table as shown above must be completed by the Solar Contractor.**

**CHECK SHEET**

|  |  |  |  |
| --- | --- | --- | --- |
| **Check sheet for drawings/schematics to be submitted** | | | |
|  |  |  | |
|  |  | **(Y/N)** | **Where can this info be found** |
| 1 | PV panel site layout |  |  |
| 2 | Earthing and lightning protection drawing |  |  |
| 3 | Antitheft fixing specification sheet |  |  |
| 4 | Clearvu or similar specification sheet |  |  |
| 5 | PV module specification sheet |  |  |
| 6 | Inverter specification sheet |  |  |
| 7 | PV support structure drawing/specification sheet |  |  |
| 8 | Monthly energy yield simulations |  |  |
| 9 | P90 and P50 yield graphs (probability distribution) |  |  |
| 10 | Veld fire prevention/control explanation |  |  |
| 11 | Monitoring specification sheet |  |  |
| 12 | DC schematic |  |  |
| 13 | AC schematic |  |  |
| 14 | Monitoring schematic (including all items measured from weather station) |  |  |
| 15 | Electric fence energizer spec sheet |  |  |
| 16 | Project plan/timeline |  |  |
| 17 | Proof of Registration with department of labour (As three phase electrician) |  |  |
| 18 | Proof of CIDB rating |  |  |
| 19 | Surge protection specification sheet |  |  |
| 20 | Latest tier 1 PV module list |  |  |
| 21 | BBBEE certificate |  |  |