

TENDER DATA

Project title:	Appointment of a panel of manufacturers, assemblers and resellers of standby generators and standby generator control panels service providers for the Manufacturer, Supply, Deliver, Rigging, Installation, Commissioning and SLA maintenance agreement for open sets, containerised and canopy standby generators (STG) at various Sentech transmitter sites as and when required basis for the period of three (3) years.
Bid no:	SENT-023-2022-23

1. BACKGROUND

Sentech is a state-owned company and is the largest broadcasting signal distributor in South Africa. Sentech is a licensed Electronic Communications Network Service provider in South Africa. It currently operates many telecommunication networks for Satellite, Television, Radio, Internet and more. As such, Sentech is a global enabler of broadcasting and digital content delivery.

Appointment of a panel of manufacturers, assemblers and resellers of Standby Generators and Standby Generator Control Panels service providers for the Manufacturer, Supply, Deliver, Rigging, Installation, Commissioning and SLA maintenance agreement for Open sets, Containerised and Canopy Standby Generators (STG) at various Sentech Transmitter Sites as and when required bases for the period of three (3) years. Sentech intends to appoint a panel of service provider(s) with successful bidders. It is imperative to state that Sentech promises no successful bidder any quantum of work.

The bid is divided into three (3) sections of which any bidder may offer a bid for any one or a combination of the sections or for all the sections. If the bidder chooses to bid for more than one section, they ought to separate the evidence substantiating their claims under mandatory and functional evaluation criteria clearly marked for each section bid for. Bidders are required to indicate which section they are bidding for.

The sections are:

No	Description	Please tick (✓)
1	SECTION A = up to 100kVA (SMALL)	
2	SECTION B = above 100kVA but less than 350kVA (MEDIUM)	
3	SECTION C = 350kVA and more (LARGE)	

Table 1: Different Generator sizes

Bidders will be categorised by province

Bidders must indicate their province/s of choice as well as the preferred Operational Centre/s (OC) in the table below:

Operation Centre	Preferred Operational Centre (Yes/No)	Province
East London		Eastern Cape
Port Elizabeth		
Middleburg		
Umtata		
Bloemfontein		Free state

Operation Centre	Preferred Operational Centre (Yes/No)	Province
Johannesburg		Gauteng
Durban		KwaZulu Natal
Vryheid		
Ermelo		Mpumalanga
Polokwane		
Nelspruit		
Vryburg		North West
Upington		Northern Cape
Cape Town		Western Cape
George		
Vredendal		

Table 2: Preferred Operational Centres and Provinces

2. SUBMISSION OF BIDS and CLOSING

This Bid closes at the stipulated date and time as stated in SBD 1 Notice and Invitation to Bid. Bids must be submitted by hand to the Bid Administrator at SENTECH, Octave Road, Radiokop Ext 3, Honeydew, Johannesburg.

Bidders that choose to submit their bid documents before the closing date and time may do so during working hours only (08:30-15:30).

It is the Bidder's responsibility to ensure that their bid submissions reach the Bid Administrator before the bid closing time as no late submissions will be accepted.

Telegraphic, telephonic, telex, facsimile, e-mail and late Bids will not be accepted. Proposals may be opened in public. Bidders will be advised of the outcome by letter, facsimile or e-mail.

This is a one-envelope system for Bid Evaluation. Bidders must submit their proposal and all supporting documentation in a sealed envelope, clearly marked as follows:

Envelope One "Original Technical Proposal" and one "Copy of Technical Proposal" together with a soft copy in PDF format of an electronic medium e.g. USB etc. The soft copy will consist of a single PDF document containing the complete response. The envelope must contain all information and documents relating to the Bid. (Refer to list of returnable documents).

The sealed envelope or container must be marked with the following information:

- **For Attention**
- **HEAD OF SUPPLY CHAIN MANAGEMENT**
- **BID REFERENCE NO:** ##
- **TECHNICAL AND FINANCIAL PROPOSALS**
- **INSERT CLOSING DATE AND TIME**
- **BIDDER'S NAME AND ADDRESS**

The Bidders shall insert a table of contents and bind (ring bind or similar method) the proposal documents and verify the page numbers, as Sentech will not accept any liability with regard to any disputes arising from pages that are missing or duplicated in the aforementioned documents.

Bidders are required to complete and sign all the returnable documentation (refer to list of returnable documents) and initial all pages, drawings and brochures which are included in the reply as Sentech will not accept any liability with regard to any disputes arising from pages that are missing or duplicated in the aforementioned documents.

Late submissions will not be considered.

3. SIGN AND INITIAL

Bidders are required to complete and sign the Bid Forms where required and initial the bottom of all pages, drawings and brochures which are included in the submission as Sentech will not accept any liability with regard to any disputes arising from pages that are missing or duplicated in the aforementioned documents. Only original signatures will be accepted.

4. COMPLETION OF BID DOCUMENTS

Bidders must ensure that they complete all sections of the Bid Documents as per the requirements in the Bid.

Bidders must use only the Bid documents provided by Sentech. Photocopying of the Bid document is permitted however Bidders must not retype or redraft the Bid documents.

5. COSTS OF PREPARING THE BID SUBMISSION

Bidders shall bare all costs associated with the preparation and submission of the proposals. Sentech shall under no circumstances be held responsible or liable for any costs incurred during the bidding process.

6. ADMINISTRATIVE RESPONSIVENESS CRITERIA

Bidders are required to ensure that they meet all the Administrative Responsiveness Criteria.

7. BBBEE CODES AT SENTECH

Sentech complies with the codes of good practice as prescribed by the DTI, to advance Broad Based Black Economic Empowerment.

8. Pre-qualification criteria

With the objective of advancing designated groups, the Bidding condition applicable to this Bid is _____(Specify targeted companies (EME / QSE) or minimum B-BBEE status level of contributor) as contemplated in PPPFA regulations, 2017 sub regulation 4(1). A Bidder must provide documentary evidence to support their compliance with this prequalification criteria. A Bidder that fails to meet any pre-qualifying criteria stipulated in this Bid document is an unacceptable Bid.

9. Subcontracting as a condition of Bid

The successful Bidder must subcontract a minimum of _____% of the value of the contract to _____ (specify the designated group targeted) as contemplated in the PPPFA regulations, 2017 sub regulation 9(1);

10. Transformation Plan

A transformation plan is a record of activities an entity intends to undertake to improve its BBBEE Level through Ownership, Management and Control; Skills Development; Enterprise and Supplier Development and Socio-Economic Development.

Sentech reserves the right to request a BBBEE transformation plan with clearly defined timelines and milestones if the recommended Bidder does not meet Sentech's transformation goals. These milestones must be achieved over the term of the contract. This transformation plan must be submitted within 10 working days from the written request, failing which Sentech reserves the right to withdraw its appointment of the preferred recommended Bidder.

11. LOCAL PRODUCTION AND CONTENT

In the case of designated sectors, where in the award of Bids, local production and content is of critical importance, such Bids will contain a specific bidding condition that only locally produced goods, services

or works or locally manufactured goods, with a stipulated minimum threshold for local production and content will be considered.

Does this requirement fall under any designated sector as prescribed by the DTI?	Yes	No
If yes, specify the sector		
Specify minimum threshold applicable		

*Bidders must fill in the SBD6.2 for Local Content and Production

12. EVALUATION CRITERIA

The evaluation criteria are stipulated in 18 below. It is the Bidder's responsibility to ensure that it has responded to the evaluation criteria. Failure to meet the evaluation criteria will result in the Bidder not being evaluated further. Bidders must ensure that they have included all supporting documentation required to support their response to the Bid.

13. BRIEFING SESSION

Should there be a compulsory briefing session for this Bid, Bidders must ensure that they attend the briefing session and sign the attendance register, as non-attendance or failure to sign the attendance register will automatically disqualify a Bidder from submitting a proposal for this Bid.

All questions raised by Bidders post the briefing session will be consolidated and shared with all Bidders at least seven (7) calendar days prior to closing.

14. CLARIFICATION

Enquiries related to Bid documents may be addressed to the Bid Administrator and Supply Chain Official as stated in SBD 1 Notice and Invitation to Bid.

15. BID EVALUATION METHOD

This Bid will be evaluated as described in the table below.

<p>A One Envelope system will be followed for Technical and Price offer</p>	<ol style="list-style-type: none"> 1. Stage 1 – Administrative Responsiveness Evaluation All the Technical Proposals will be evaluated against the Administrative responsiveness requirements as set out in the list of returnable documents. 2. Stage 2 – Technical Evaluation Total minimum qualifying functional score is 40 points out of 75 points. A Bidder must score more than 0 points in each criterion to be evaluated further 3. Stage 3 – Panel Appointment Financial Proposals for Qualifying Bidders will be opened and evaluated. Bidder's financial offers and BEE certificates will be ranked according to price and preference points from the highest number of points to the lowest.
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16. ADMINISTRATIVE RESPONSIVENESS REQUIREMENTS

To be administratively responsive, Bidders must ensure that they meet all the below mentioned criteria. Bidders that do not meet all the below mentioned criteria may not qualify to be awarded the Bid. Sentech reserves its rights in respect of the below criteria.

- Complete and return all documentation stipulated in the LIST OF RETURNABLE DOCUMENTS.
- All correspondence must be in English.
- Bidders must fill in all sections of this document (where applicable).
- **BLACK INK** must be used when completing the Bid documents.
- Bidders must use only the Bid documents provided by Sentech. Photocopying of the Bid document is permitted however Bidders must not retype or redraft the Bid documents.

- All corrections must be initialled. The use of corrective fluid is strictly prohibited.
- Bidders are required to fill in and sign the Bid Forms and initial all pages, drawings and brochures which are included in the reply as Sentech will not accept any liability with regard to any disputes arising from pages that are missing or duplicated in the aforementioned documents.
- Bidders must complete an attendance register at each compulsory site meeting attended.
- Appointment of a Bidder will be subject to signing, declaration and submission of SBD 1, 3.1, 3.2, 3.3, 4, 5, 6,1, 6.2 8, and 9 depending on applicability.
- Complete and sign the Contract Data.
- Should this be a 2 envelope or 2 stage system, Bidders MUST separate the technical proposal from their financial proposal. The technical and financial proposals must be placed in two separate sealed envelopes.

16.1 AUTOMATIC DISQUALIFICATION

Sentech reserves the right to automatically disqualify Bidders from being awarded this Bid. The following will lead to automatic disqualification:

- Failure to submit a financial proposal, if required.
- The Bidder is or has been involved in any act of corruption or fraud or bribery or collusion or attempt to influence any employee of Sentech to award this Bid or any other Bid to it.

17. TECHNICAL RESPONSIVENESS COMPLIANCE

The Technical Evaluation will encompass evaluation of:

- Mandatory Criteria
- Functional / Technical Criteria

18. TECHNICAL EVALUATION CRITERIA

18.1 Mandatory Eligibility Criteria

The follow in criteria are mandatory to ALL BIDDERS:

OCM – Original Component Manufacturer. 3 Tiers: Engine / Alternator / Controller supplier --- STG Manufacturer---Reseller. The reseller must have a Back-to-Back agreement with the STG manufacturer. The Manufacturer needs to have a letter from the Engine / Alternator / Controller Supplier. This letter needs to be in the tender for the reseller.

Mandatory Eligibility Criteria	Compliant (Indicate Yes or No)	Reference documentation supplied (Indicate Yes or No and reference page number)
OCM accreditation for Engine		Provide a valid OCM letter or certificate or maximum of 3 tiers Back-to-Back Support Agreement
OCM accreditation for Alternator		Provide a valid OCM letter or certificate or maximum of 3 tiers Back-to-Back Support Agreement
OCM accreditation for dedicated generator controller		Provide a valid OCM letter or certificate or maximum of 3 tiers Back-to-Back Support Agreement

NOTE: Bidders that do not comply with all the above criteria will not be evaluated further.

18.2 Functional Criteria

No	CRITERIA	POINTS	ATTACHED PROOF
1.	Overall experience- number of years in the manufacturing/assembler, supply, delivery, rigging, installation, commissioning and maintenance of Open sets, Containerized and Canopy Standby Generators. (Company) Number of years of experience Less than 1 year.....0 1-3 years.....10 4-9 years.....15 10 years and more.....20	20	Provide evidence of Previous Experience (Company) in similar work (manufacturer, assembler or reseller of Standby Generators, Standby Generator Control Panels, delivery, rigging, installation, commissioning and SLA maintenance agreement for Open sets, Containerized and Canopy Standby Generators)
2	Track record: Company must supply references of similar projects as section tendered for e.g Section A, B or C. Points will be allocated based on the number of relevant references supplied. No reference.....0 1 reference.....10 2 references.....15 3 references.....20 4 references.....25 5 references.....30	30	Complete Company Reference Table: (Table 2). References for section B can be used for A, section C can be used for A & B but section A references will not be used for B or C. If using a partner, please provide the references from the partner.
3	Key technical staff to be assigned to the project: applicable for section A, B, C and D. If a bidder does not supply any evidence, they will score 0 points.	25	Please provide CV's for each discipline requested in the column on the left and indicate in who's employ they are. If you are a reseller/assembler, please ensure that your identified partner provides the CV's of their staff in each category requested.
	A. The tenderer demonstrates that key staff are well qualified and competent in the application of their skills that relate to the scope of the project (programmer, installation electrician & diesel mechanic)	25	If using a partner, please provide the references from the partner.
	B. The tenderer demonstrates that key staff are qualified and competent in the application of their skills that relate to the scope of the project (electrician & diesel mechanic)	20	
	C. The tenderer demonstrates that key staff are qualified and competent in the application of their skills that relate to the scope of the project (installation electrician)	15	
	D. The tenderer demonstrates that key staff are qualified and competent in the application of their skills that relate to the scope of the project (diesel mechanic)	10	
	Maximum Points Allocated	75	

Table 1: Functional Criteria

Total minimum qualifying functional score is 40 points. A bidder must score more than 0 points in each criterion to be evaluated further

Risk Assessment

All bidders who pass the mandatory and technical evaluation will be subjected to a factory visit to ensure local production or assembly as required by this tender. Where the bidder is a reseller, they must indicate the partner who will be manufacturing for them. The partner's premises will be visited. The following will be assessed

- All the necessary equipment to manufacture and assemble standby generator such as but not limited to: Workshop, Sheet Metal Forming, Bending & Punching Equipment, welding equipment – e.g. MIG, TIG, arc, spot welding, hoists, milling machines, lathes, grinders – large and small all hand tools required for metal work – e.g. hammers, hacksaw, holesaw, drill bits, screw drivers, punches, Allen Keys, open/ring spanners, socket set, all Personal Protective equipment. Assortment of fasteners, nut, bolts, rivets, concrete anchors, concrete drilling machines, paint booth, etc. Rigging equipment to install the standby generators on site – lifting equipment, slings, trolleys, etc.
- A production facility showing the logical steps of manufacturing/assembling standby generators. That is:
 1. A design office
 2. An assembly section
 3. A testing and commissioning facility
 4. A rigging section to install standby generators on site
- Human Resource capacity - Skills required as it relates to Functional criteria 3 in Table 1 as well as additional skills that are required to be able to design, manufacture/assemble standby generators, these are manufacturing and rigging skills required from each discipline in the factory – CAD design, Electrical Design, Mechanical Design, Functional testing (load testing up to 500kVA) of the completed unit, Rigging team to install the generators on Sentech sites.

19. Evaluation of Price and Preference

This Bid will be evaluated on a points system based on weighted average score for Price and Preference as per Preferential Procurement Framework Act of 2000 (Act 5 of 2000).

20. Preference Point allocation – 80/20

Price / Preference	Weighting percentage
Preference:	20%
Price:	80 %
Total must equal:	100%

80/20-point scoring system			
Preference: 20 Points		Price: 80 points	
Other: B-BBEE Status Level Contributor			
B-BBEE Level	Number of Points	Price:	100 % (of 80)
1	20	Quality / Functionality:	0 % (of 80)
2	18		
3	14		
4	12		
5	8		
6	6		
7	4		
8	2		
Non-Compliant contributor	0		
Total must equal:			100% (of 80)

21. Price Calculation 80/20

The following formula will be used to calculate the points for price.

$$P_s = 80 \left[1 - \frac{(P_t - P_{min})}{P_{min}} \right]$$

Where:

- P_s = Points scored for price of bid under consideration
- P_t = Rand value of bid under consideration
- P_{min} = Rand value of lowest acceptable bid

THE SCOPE, OBJECTIVES AND EXPECTED OUTPUTS

TECHNICAL SPECIFICATION REFERENCE ONLY

1. Background

This specification covers the requirement for a self-contained automatic starting diesel Standby Generating set, which shall operate as a standby back-up power source. A weatherproof canopy with soundproof shall be provided if called for.

The system as described in this document will be used to power a transmitting station at a remote location.

A highly reliable and stable electrical supply must be generated under varying load condition without increasing the ambient noise level above acceptable limits.

2. System Description

The system shall consist of a diesel driven generating set mounted on a duplex base frame capable of delivering the power rating specified for each Sentech station / OR as listed in the schedule of information as requested by Sentech.

The generating set shall be housed within an engine room or Container / Canopy on site as specified by Sentech.

The control panel shall be housed within the said engine room as specified above.

An oil make up tank and auxiliary filler equalizer tank with ball valve be housed in the engine room or Container / Canopy.

All other requirements are detailed elsewhere in this specification.

3. Extent of Work

The extent of work covered by this specification includes the, design, manufacture, works testing and delivery of a complete operating system as specified.

In addition, twelve(12) months warranty must be provided.

Three (3) hour full load factory witness test (fuel for same to be provided by tenderer). Additionally, the provision of all handbooks, workshop manuals, drawings and circuit diagrams.

4. Cooling System

The control equipment shall be cooled by radiation and convection only and no cooling fans will be acceptable.

All equipment shall be capable of a continuous operation within their specified performance at transmitting sites having the worst physical compatible combination of the following environment factors:

- Altitude : 2000 meters above sea level
- Temperature : worst possible minimum room ambient - 5°C

Normally: expected minimum room ambient + 10°C

Worst: possible maximum room ambient + 45°C

Normally expected maximum room ambient + 30°C

- Relative humidity : between 20% and 90% RH

5. Exhaust System

The exhaust system shall be designed in accordance with recommendations by the diesel manufacturers to obviate excessive back pressure under full and overload conditions.

Flexible connections of the bellows type shall be used between the engine exhaust manifold and exhaust pipe.

Flanged bolt-on type connections with suitable gaskets shall be used on the entire exhaust system.

The Exhaust Silencer to be Stainless steel clad.

6. Oil-Make-up Tank

The lubricating oil system in the engine sump shall contain sufficient oil to allow 24 hours continuous running at full load without the need for replenishment. An oil-make-up tank shall be supplied to allow for prolonged continuous running.

7. Miscellaneous Requirements

A drip-tray large enough to catch drops from anywhere on the engine or cooling system and at least 25mm deep shall be provided and installed such that easy removal is possible.

All wiring shall be carried out in PVC insulated conductors of adequate size, and no joints shall be allowed.

An approved trap filter assembly (**Or Equal Approved**) (**Duvalco Mk 4 DSF – 6.5L / min.**) or (**Duvalco Mk 3 – 4.5 L / min.**) with a minimum useful life of 200 hours shall be fitted in the engine fuel lines.

A synchronous electrical hour control counter shall be connected to the engine output to indicate true engine hours.

The engine shall be fitted with heavy duty air, fuel and oil filter cartridges with a minimum useful life of 200 hours.

The tenderer shall supply the specific fuel consumption of the set with auxiliary equipment in 1/hour at full and half load.

The completed diesel alternator set shall comply with the Occupational Health and Safety Act 85 of 1993 as amended.

Approval of working drawings to be obtained before any assembly can begin.

8. Earthing

All metal parts shall be solidly bonded and electrically connected to each other and to a common earth point. The neutral of the system shall be solidly connected to this point.

In case of a Cambus 2 engine controls, Surge arrestors need to be fitted on the communication line 1 at ECU and 1 at the controller.

9. Labelling

All controls, meters and switches shall be labeled in English.

Wires shall be clearly marked at all termination points in accordance with the numbering of the manufacturer's diagram.

Engine

Multi cylinder diesel engine running at 1500 rpm and rated for continuous duty in accordance with B.S. 5514 shall be provided. Water cooled engine is preferred.

The engine shall be fine governed to a tolerance of plus / minus 5 rpm for all loads.

Transient speed variations on change of load on or off by 50% shall not exceed 50 rpm and recovery shall be within 5 seconds.

All ratings shall be for 2000 meters altitude, 40°C and a relative humidity of between 20% and 90%.

NOTE: ENGINE TO BE ABLE TO DELIVER MAXIMUM ALTERNATOR OUTPUT – CONTINUOUSLY AT UNITY POWER FACTOR (PF 1) ON SITE.

The engine shall be equipped with the following facilities:

- Cooling Radiator if water cooled engine is offered.
- Engine starter motor.
- Automatic Radiator Louver arranged to close when engine is stationary – ONLY in some instances when required.
- Cold starting equipment – engine heater system
- Fuel pump solenoid arranged to be energized to run.
- Fuel lift pump.
- Fuel filters.
- By-pass type lubricating oil filter.
- Lubricating oil level dipstick.
- Easy facilities for draining lubricating oil sump.
- Dry type replaceable cartridge air filter.
- Engine driven battery charging alternator.
- Low oil pressure switch arranged to shut down plant on low oil pressure.

- Low coolant level switch arranged to shut down plant on low coolant level.
- Electrical sensors for remote indication of oil pressure and water temperature.
- Fixed overload stop set at 10%.
- High engine temperature switch fixed in a suitable position on the engine and arranged to shut down the plant on high engine temperature.
- Over speed shut-down device to protect against run-away.
- Instrument panel containing engine hour meter, oil pressure and water temperature gauge, H.E.T. and L.O.P. test buttons mounted conveniently on Generator Base Frame.

The lubricating oil system in the engine sump shall contain sufficient oil to allow 24 hours continuous running at full load without the need for replenishment.

Should an oil make-up tank be supplied in order to meet the above requirements, it shall comply with the following:

- An equalizing device shall be fitted in order to maintain the sump oil level constant – **Murphy type oil device recommended. (Or Equal Approved)**
- An isolating valve shall be fitted between the tank and engine sump.
- The filler cap shall be such that the tank may be easily filled, but once closed, no spillage can occur in transit.

10. Battery

A 12V/24V fully charged heavy duty **Delco type 1250 (high cycle) maintenance free battery (Or Equal Approved)** rated for the voltage and current requirements of the starting motor(s) and control equipment shall be supplied. The battery discharge capacity at 0°C shall be such that the full cranking current may be drawn for three (3) successive engine start attempts lasting 10 seconds with 10 second rest periods without the voltage falling below 1, 3 volts per cell.

The battery shall be maintained in a fully charged state by an engine driven battery charging alternator with automatic charge rate control.

The battery shall stand in an acid spillage tray treated with acid resistant paint, positioned in such that adequate ventilation is provided.

Adequate natural ventilation shall be provided between and around the batteries.

The battery shall be date stamped with the year and month of manufacturing.

11. Alternator

The alternator shall be of the two bearing type coupled to the engine through a suitable flexible coupling. It shall be of the brushless, self-excited screen protected drip proof type, and shall comply with the following conditions:

Output Voltage	400 / 231 Volts
Voltage Waveform	Sinusoidal
Max acceptable wave-form distortion	5%

Power factor	Between 0, 8 lagging to unity
Phases and Wires	3 phase 4 wire
Frequency	50 Hz
Insulation class	H
Speed	1500 rpm
Overload rating and 300% for 10 Seconds	10% for 1 hour
Max. & Min. operating temperatures	+45°C and -5°C
Voltage regulation	Plus/minus 3% from 0 to 100% load at any power factor between 0, 8 lag and unity inclusive of speed variation of 4.5%
Transient recovery	To within 3% of steady State value in less than 1second upon application of full load at 0, 8 lagging
Steady state voltage	0, 5% of rated voltage
Max. Voltage dip on application of Load	<20% of rated full load voltage

Radio and TV interference suppression shall comply with local legislation.

12. Control Panel

The control panel shall be controlled by a dedicated generator controller (Deep Sea Electronics Model 7320) or equal approved/ equivalent , which shall be suitable for 12 Volt/24 Volt DC Power supply and have a suitable amount of inputs and outputs for the control of a standby diesel generator plant with all the related indications and alarms required in the specification. It must have a front panel graphic user interface and it must be remotely configurable(via IP network) with separate access levels(operator, programmer)

Control Panel Needs to have the facility to be remotely accessed, This must be via a Network

All Control Circuits to be protected with Circuit Breakers.

The control panel shall be fitted with a suitable Circuit Breaker sized to the set output and in some instances change-over equipment is required. Note: - NS 100 frame size – with electronic trip to suit application – no Isolators to be used.

The control panel shall be supplied and due consideration shall be given to protecting it from ingress of moisture. Adequate working space shall be provided in front of the panel and it shall be complete with the following instruments and facilities:

- Stop/start buttons where applicable.
- Frequency meter, Read or digital read-out type in the range 47 to 53Hz with an accuracy consistent with frequency stability being achieved
- "Alternator output available" LED indicating lamps
- "Mains available" LED indicating lamps
- Auto/manual/test selector switch
- Over speed alarm indication
- Engine temperature high alarm indication
- Engine oil pressure low alarm indication
- Engine low coolant indication (Warning) (To indicate that the coolant needs to be topped Up)
- Second Low coolant sensor (Shutdown) (To indicate that the coolant is to low for the Engine to Operate without harm)
- Mains contactor or Motorized breaker failure
- Alternator overload alarm indication

- Start failure alarm indication
- Abnormal voltage alarm indication
- Faulty switch position indication
- Battery charger Warning alarm indication

It should be noted that the operation of any alarm condition should cause the engine to stop.

Should the engine stop due to the operation of any of the protection circuits, a light shall indicate why the engine has stopped. This indication shall remain on until cancelled and no secondary light shall come on which could confuse fault diagnoses.

13. System Operation

The power supply control unit is required to:

- Monitor the mains supply continuously
- Disconnect the load in the event of a mains fail or Mains Dip
- **Mains contactor or Motorized breaker monitoring.**
- Start the diesel driven power generating set and connect to the load as soon as the alternator output voltage is within specification
- Provide the necessary protection to the generating equipment and load equipment while the standby generator is in operation
- Reconnect the load to the normal mains supply when the mains fault has been cleared
- Provide a single switch to facilitate bypass to mains direct or alternator direct (part of Controller) With Visible Standard operating Procedure
- The system shall operate in a Fail Safe Mode (In the event of a Controller Failure)
- Mains failure counter
- Hour meter- Engine Operating Hours

The abovementioned functions shall be performed in the following sequence:

When main contactor opens the start command to the diesel engine shall be delayed for 6 seconds after the detection of an "out of specification" mains condition.

Should the mains "out of specification" condition causes the mains contactor to drop out, then the engine shall be forced to run and accept the station load.

Should the Mains contactor fail under normal conditions the STG needs to be started (with a 50 second Delay) take the load with an indication.

Three start attempts of 10 second duration with ten second intervals between attempts are required.

The starter motor shall be disengaged immediately after the engine has started and engine protection devices to be activated ten seconds later to allow for oil pressure to reach working pressure.

The alternator contactor shall be closed six seconds after the alternator output has reached the correct voltage and frequency.

In the event of a start failure or any alarm condition causing failure of the standby plant the mains shall be reconnected to the load.

When the mains supply is reinstated the standby generator shall continue to operate on load for a further fifteen to thirty minutes. Any further mains faults registered during this load rundown period shall reset the timing sequence and keep the standby plant on load until the mains has stabilized.

Two 6 seconds delays are required when changing back from the standby power to mains, i.e. between opening of alternator contactor and closing of mains contactor.

A five (5) minute no-load rundown time shall be required for cooling of the diesel engine.

In the event of the mains failure during the no-load rundown period the same delay of six seconds as specified in 14.2.8 shall be introduced between mains contactor opening and alternator contactor closing.

On a mains failure, within ten seconds after the rundown period has lapsed; the system shall ensure that a start command shall not be given whilst the diesel engine may still be rotating.

In the event of the mains contactor opening, re-closure of same shall be delayed for 6 seconds irrespective of the reason for opening.

Two voltage monitoring facilities shall be provided, one each for mains and alternator, and shall comply with the following requirements:

- The voltage/phase sensing circuitry shall be physically isolated from the rest of the control circuitry in order to limit possible lightning damage to one area only.
- Voltage sensing between phases and phase and neutral.
- Over voltage drop-out shall be adjustable between 110% and 120% of the normal supply voltage (230V) and adjusted to 115%.
- Under voltage drop-out shall be adjustable between 80% and 90% of normal supply voltage (230V) and set at 85%.
- The monitors shall be of the eleven pin circular plug type and shall be Electrometric or equivalent.
- The alternator shall be provided with a frequency monitor, set to limits of plus/minus 10% to 50Hz.

The following timing functions are required:

- Mains contactor opening on detection of a voltage or phase fault – 1, 5 / 3, 0 seconds.
- Mains contactor closing - Two (6) seconds.
- Start command - Initiated by mains contactor opening – six (6) seconds
- Start attempts - Three of ten seconds duration with ten second intervals between attempts.
- Alternator contactor closing - Six seconds after output has reached voltage and frequency specification.
- Alternator to mains changes-over - Adjustable from 10 to 60 minutes after restoration of mains supply.
- Alternator to mains contactor delay - A six second delay is required between alternator contactor opening and mains contactor closing.
- No-load rundown time - Five minutes.

- Mains to alternator contactor delay - A six second delay are required between mains contactor opening and alternator contactor closing when a mains failure occurs during rundown period.
- Engine protection bypass (for oil pressure) - A ten second delay is required after the diesel has started.
- Override facility - This facility shall be provided to switch back to the mains, should the alternator fail to take load after a mains failure - bearing in mind the 6 second delay required as stipulated above.

A parallel protection circuit with individual indications shall be provided for the following functions:

- Engine oil
- Engine temperature

The following alarm outlets shall be provided for remote indication via a dedicated generator controller Remote monitoring Unit.(Deep Sea 892) or equal approved/ equivalent . It must be SNMP enabled for remote connectivity to Sentech's NMS system.

- Mains out of specifications
- Diesel Engine running
- Alternator on load
- Mains on load
- Urgent alarm
- Common / deferred alarm

Above alarm outlets shall consist of one voltage free change over contact, and shall be locked till the condition has been reset.

One mains operated battery charger complete with ammeter, voltmeter and protection, shall simultaneously charge the engine starter battery and control battery (if provided), the latter via isolating and limiting circuitry.

The Battery charger shall operate in parallel with the engine driven generator and shall have self-adjusting step less control characteristics (constant voltage, current limiting) to prevent excessive loss of water under float conditions.

A loss-of-charge current alarm shall be provided to indicate failure of the mains charger. This may be a current or voltage monitor. The alarm signal (contacts or voltage) shall be brought to terminals for connection to an external monitoring system.

An earth bar to which the metal parts of all individual units and sub-units are connected shall be provided in the equipment racks. The neutral point of the system shall be solidly connected to the bar. Suitable terminals shall be provided on the earth bar for connection of the main earth conductor.

Suitable surge suppression devices shall be included in the design to combat line voltage surges resulting from cloud induced charges and lightning. Surge suppression devices shall be **Dehnventil /Dehngaurd /Blitzductor type (Or Equal Approved)**

Equipment racks shall be of the free-standing floor mounted type of folded sheet steel construction having a minimum thickness of 2mm.

Bottom or top cable entry with gland plates shall be provided.

Adequate vermin-proof ventilation openings shall be provided at the bottom and top parts of the cabinets.

Painting of equipment racks shall be done as follows:

- The interior of all equipment racks shall be painted with two coats of best quality "Enamel" paint and the outside shall be painted with two coats of approved colour paint.
- All metal parts to be degreased, rinsed, pickled, rinses, phosphate, neutralized and then to be thoroughly dried. This process shall be followed up within 48 hours by application of one layer of high quality zinc chromate primer of minimum thickness 0,04mm.
- The abovementioned primer to be followed by two coats of a good quality alkyd-based baked enamel. The minimum film thickness of the paint after baking shall not be less than 0,06mm.

The colors of the panel shall be as follows:

- All the frames to be **Electric Orange, code B26 SABS 1091-1975.**
- All doors and removable panels shall be **Red, code CA11 SABC 1091-1975.**

The control equipment shall be cooled by radiation and convection only and no cooling fans shall be acceptable. All equipment shall be capable of a continuous operation with their specified performance at transmitting sites having the worst physical compatible combination of the following environmental factors:

Altitude	-	2000 meters above sea-level
Temperature	-	<u>Worst possible</u> minimum room ambient -5°C
	-	<u>Normally</u> expected minimum room ambient 10C
	-	<u>Worst possible</u> maximum room ambient 45°C
	-	<u>Normally</u> expected maximum room ambient 30°C
Relative humidity	-	Between 20% and 90% R.R.

14.Spare Parts and Component List for Control Panels

Every handbook supplied shall contain a comprehensive parts list of spare parts considered necessary for the proper operation and maintenance of the plant.

A first spare set of Filters and V-Belts to be supplied with Generator set

15.Drawings and Handbooks

- Three complete handbooks, drawings, circuit diagrams and workshop manuals for the engine and alternator in English language shall be supplied.
- Tenderers are to note that until all of the abovementioned quantities of these handbooks have been delivered to Sentech, delivery will be deemed to be incomplete even though the equipment may have been delivered and put into scheduled service.
- The contractor shall provide Sentech with one transparency of each approved arrangement and final detailed working drawing of all plant.
- All drawings to be supplied by the contractor in terms of this clause shall be used by Sentech for its own purposes only. Sentech shall not knowingly allow the said drawings to be used by others for purposes contrary to those stated above. The undertaking shall also apply to drawings made by approved sub-contractors.

16. Commissioning and Test Facilities

- Tests shall form part of the contract and the contractor is to provide test facilities, instruments and dummy loads including reactive elements and contactors to suit the alternator capacity. Tenderers to specify where the test facilities are available.
- The terminal voltage across each battery is to be checked. The density of the electrolyte in each cell of the lead-acid starter batteries is to be checked.
- The system operation and faults protection circuits have to be tested to the satisfaction of Sentech.
- Comprehensive commissioning tests shall be carried at the contractor's premises.
- The contractor shall be responsible for the provision of all the necessary fuel and equipment in order to carry out the above tests.
- The diesel-alternator set is to undergo a 3-hour load test at the supplier's premises or as mutually agreed under the supervision of Sentech. The set shall be subjected to a full load test for 2-hours followed by 10% overload for one hour. The load shall include reactive elements for a power factor of ~~0.8~~ 1 (Unity)
- All the following readings have to be taken at 15 minutes intervals :
 - Engine temperature
 - Oil pressure
 - Oil temperature
 - Frequency
 - Alternator voltage and load
 - Alternator current
 - Power factor (alternatively wattage)
 - Ambient temperature

At the end of the test, the temperature of the alternator is to be checked and the fuel consumption is to be determined.

17. DELIVERY

The completed and tested unit shall be delivered to Sentech premises as specified by Sentech.

Approval of working drawings to be obtained before any assembly can take place.

The contractor shall provide Sentech with working drawings, Maintenance and Operating manuals as well as any other documents / drawings which are called for in the Technical Specification or documentation forming part of this contract or as agreed upon.

Every handbook supplied shall contain a comprehensive parts list considered necessary for the proper operation and maintenance of the plant.

A detailed program of the design and manufacturing periods subsequent to the contract being awarded shall be submitted.

NB: Spare set of Filters, Belts and dedicated generator (utilized in the control panel) Controller (to be supplied with every Control Panel / Generator set

Pricing Schedule (not for evaluation purposes)

In the case of equipment supplier from outside the Republic of South Africa, prices must be quoted in the currency of the country of origin. Prices must be based on a delivered, duty paid cost (VAT, Ad Valorem, insurance etc.) for delivery to Sentech in Honeydew, Gauteng, South Africa. Sentech will apply the prevailing exchange rate to convert the price to Rand at the time of evaluation in order to reduce all price offers to a comparative price.

Table 1: Pricing Schedule

Unit Price (Model and description)			
A	500kVA Standby Generator (as described in the Part C3: Scope of Work)	Inclusive Unit price (applicable currency)	
		Installation and Commissioning rate	
		Lead time (days)	
B	250kVA Standby Generator (as described in the Part C3: Scope of Work)	Inclusive Unit price (applicable currency)	
		Installation and Commissioning rate	
		Lead time (days)	
C	100kVA Standby Generator (as described in the Part C3: Scope of Work)	Inclusive Unit price (applicable currency)	
		Installation and Commissioning rate	
		Lead time (days)	
		Lead time (days)	
Travelling rate/km (Services and maintenance)			
Travel Airfare (percentage on real cost)			

Accommodation and Subsistence costs will be agreed upon in line with the LATEST Tariffs /Rates as set out by the Department of Public Service and Administration. (www.dpsa.gov.za)

22. Declaration of Authority

The undersigned, who warrants that he / she is duly authorised to do so on behalf of the enterprise, confirms that the contents of this Bid Data is understood and all requirements will be adhered to.

Name of Bidder	Signature	Date	Designation

TABLE 1: REFERENCES

Please complete the customer reference table and relevant Contact telephone number and attach reference letters.

Customer	Service Provided	Contact Person	Contact no.	tel.	Contractual commencement date	Contractual completion date
1						
2						
3						

Customer	Service Provided	Contact Person	Contact no.	tel.	Contractual commencement date	Contractual completion date
4						
5						

Name of Tenderer	Signature	Date