	MADRAS SCHOOL OF ECONOMICS - KOTTURPURAM, CHENNAI						
	SUPPLY & INSTALLATION OF DG SETS & CONNECTED ELECTRICAL WORKS						
	(REVISED)						
S.No	Description of Item	Qty	Unit	Supply	Labour	S + L	Amount
				Rate	Rate	Rate	
				Rs.	Rs.	Rs.	Rs.
1	**125 KVA DG Set**						
	CUMMINS/KOEL/CATERPILLAR or equivalent make Diesel Engine with Radiator Water Cooled, turbocharged with after cooler, suitable for prime duty Generating Set application, with an output of 125 kVA/100 KW under NTP conditions of BS:5514, with an overload capacity of 10% for one hour in every 12 hours of Operation.						
	The DG Set should be capable of voltage buildup within 15 to 20 seconds after receiving start command and it should be ready to take first step load within 15 to 20 seconds after receiving start command on voltage buildup						
	DIESEL ENGINE:						
	The engine shall be with fhe following accessories						
	The total No. of Cylinders should be 4 Nos In-line type.						
	Engine cubic capacity should not be less than 4.5 L						
	Electronic Engine with electronic fuel injection system						
	Radiator with blower fan						
	Corrosion inhibitor/liqud coolanr						
	Spin-on filters-fuel & lube oil						
	Flywheel housing and flywheel to suit single bearing alternator						
	Dry type and replaceable paper element air cleaner with restriction indicator						
	Standard intergal set mounted radiator system, designed and tested for 50 Deg. C ambient temperture						
	Optimized turbocharger for increase altitude capabilities						
	Hospital Grade silencer mounted inside acoustic enclosure						
	Stainless steel exhaust flexible bellows						
	Electric starters with soft start engagement features						
	Battery charging alternator						
	Anti-vibration mounts of reputed make.						
	Protective guards for all rotating parts.						

	MADRAS SCHOOL OF ECONOMICS - KOTTURPURAM, CHENNAI						
	SUPPLY & INSTALLATION OF DG SETS & CONNECTED ELECTRICAL WORKS						
S.No	Description of Item	Qty	Unit	Supply	Labour	S + L	Amount
				Rate	Rate	Rate	
				Rs.	Rs.	Rs.	Rs.
	The engine should be Full Authority electronically controlled to meet compliance with stringent emission norms & improve overall performance efficiency and reliability.						
	ALTERNATOR:						
	"STAMFORD", or approved equivalent make standard design Alternator, suitably rated at 125 kVA/100 kW at 0.8 PF, 415 Volts, 3 Phase, 4 wires, 50 cycles/sec., 1500 RPM, self-excited and self-regulated, with brushless excitation,						
	Band of voltage regulaation =/- 0.5% of rated voltage, from no load to full load, insulation class "H". The alternaator generally confirming to BS - 5000/IS:4722						
	Brushless type, Screen protected, Revolving field, Self-excited alternator conforming to IS/IEC 60034-1						
	Better motor starting capability						
	Best in class efficiency						
	Compact design with sealed bearings for longer life and lesser maintenance						
	Impregnation on all wound components for better mechanical strength						
	The Diesel Exhaust Fluid tank (DEF tank) should be mounted in separate space inside acoustic enclosure to avoid corrosion effect on engine components. Exhaust After Treatment Systems should preferably manufactured by the engine manufacturer to ensure seamless integration, quality control & compliance with regulatory standards and reliability.						
	REMOTE MONITORING DEVICE:						
	A 4G compatible real time DG status monitoring device should be supplied as standard scope of supply along with DG set.						
	The monitoring device should be capable of conveying necessary alerts to the operator for safe operation of Engine, Alternator and Exhaust After Treatment system.						

	MADRAS SCHOOL OF ECONOMICS - KOTTURPURAM, CHENNAI						
	SUPPLY & INSTALLATION OF DG SETS & CONNECTED ELECTRICAL WORKS						
S.No	Description of Item	Qty	Unit	Supply	Labour	S + L	Amount
				Rate	Rate	Rate	
				Rs.	Rs.	Rs.	Rs.
	The remote monitoring device should have provision to monitor Fuel and DEF level to alert the customer suitably. The remote monitoring device should have a portal for the customer to login to monitor the DG set as per need.						
	INTEGRATED DG CONTROLLER:						
	AMF Functionality						
	SYNC compatible						
	Audible & Visual warning for inducement						
	Microprocessor based intuitive operator interface with LED backlit 128 X 64 pixel graphic display with tactile feel soft switches						
	Indicatons - Generator set status						
	Engine Metering: Oil pressure, Engine temperature, starting battery voltage, Engine running hours						
	AC Alternator Metering: L-L Voltage and L-N Voltage, Current (phase and total), kVA (phase and total) and Frequency, kWh, Total & per phase (kw & kVA), PF, Utility Voltage and Freq.						
	Engine Protection: Low lube oil pressure, High/Low coolant temperature, Battery Over/Under/Weak Volts, Fail to Crank/ Start, Sensor failure, Cranking lockout, Low fuel level.						
	AC Alternator Protection: Over/Under Voltage, Over/Under Frequency, Loss of AC sensing. Overspeed, Over Current, kW overload						
	Data Logging: Engine hours, Control hours and up to 5 recent fault codes						
	12/24 Volt DC operation						
	Sleep mode						
	Modbus interface (RS485 RTU)						
	Certifications - to meets the requirement of relevant ISO, EN, Mil Std. and CE standards						
	Maintenance due alarm based on Engine Run Time and due date						
	Fuel and DEF level visual Display						
	Exerciser scheduler						
	The manufacturing of the integrated controller should rest with the engine manufacturer to guarantee optimal integration and for better reliability						

	MADRAS SCHOOL OF ECONOMICS - KOTTURPURAM, CHENNAI						
	SUPPLY & INSTALLATION OF DG SETS & CONNECTED ELECTRICAL WORKS						
S.No	Description of Item	Qty	Unit	Supply	Labour	S + L	Amount
				Rate	Rate	Rate	
				Rs.	Rs.	Rs.	Rs.
	BASE FRAME						
	Sturdy, fabricated, welded construction, Base Frame for mounting the above Engine and Alternator. Required number of anti-vibrations mounting pads, charged battery, battery stand, battery charger and leads etc.,						
	FUEL TANK						
	Min 275 Liters capacity sub-base Fuel Tank complete with level indicator, fuel inlet and outlet, air vent, drain plug, and provision for fuel filling should be from outside acoustic enclosure with lock and key						
	WARRANTY						
	The DG Set shall be guaranteed against faulty workmanship / poor material quality and against failures due to the same, for minimum of two years or 5000 Hrs of operation whichever is earlier, from the date of commissioning						
	Apart from this warranty, Critical components of the engine viz Crank shaft, cam shaft, connecting rod, cylinder head and cylinder Block should carry warranty of 5 years from manufacturing date of engine or 5000 Hours of running whichever is earlier.						
	No compromise will be entertained on this clause. The warranty letter should be given from manufacturer of the engine not by assemblers or OEMs and any other agency. Any progressive component damage due to manufacturing defect of 5 critical parts also covered within this warranty.						
	In order to ensure timely service backup, in case of emergency, it is very essential that manufacturer sedrvice office is available closet to the site to ensure timely service, apart from their respecrtive service dealers.						

	MADRAS SCHOOL OF ECONOMICS - KOTTURPURAM, CHENNAI						
	SUPPLY & INSTALLATION OF DG SETS & CONNECTED ELECTRICAL WORKS						
S.No	Description of Item	Qty	Unit	Supply	Labour	S + L	Amount
				Rate	Rate	Rate	
				Rs.	Rs.	Rs.	Rs.
	The tenderer should submit the toll-free number details in India for the engine manufacturer to ensure speedy service support.						
	Non-compliance any of the above specs/requirements should be clearly mentioned in the tender, point by point.	1	each				
2	**200 KVA DG set**						
	Cummins/Koel/Caterpillar or equivalent make Diesel Engine with Radiator Water Cooled, turbocharged with after cooler, suitable for prime duty Generating Set application, with an output of 200 kVA/160 KW under NTP conditions of BS:5514, with an overload capacity of 10% for one hour in every 12 hours of Operation.						
	The DG Set should be capable of voltage buildup within 15 to 20 seconds after receiving start command and it should be ready to take first step load within 15 to 20 seconds after receiving start command on voltage buildup						
	DIESEL ENGINE						
	The Engine shall be complete with the following accessories:						
	The total No. of Cylinders ishould be 6 Nos In-line type.						
	Engine cubic capacity should not be less than 6.7 L						
	Electronic Engine with electronic fuel injection system						
	Radiator with blower fan						
	Corrosion inhibitor / liquid coolant						
	Spin-on filters - fuel & lube oil						
	Flywheel housing and flywheel to suit single bearing alternator						
	Dry type and replaceable paper element air cleaner with restriction indicator						
	Standard integral set-mounted radiator system, designed and tested for 50°C ambient temperature						
	Optimized turbocharger for increase altitude capabilities						
	MADRAS SCHOOL OF ECONOMICS - KOTTURPURAM, CHENNAI						
	SUPPLY & INSTALLATION OF DG SETS & CONNECTED ELECTRICAL WORKS						
S.No	Description of Item	Qty	Unit	Supply	Labour	S + L	Amount
				Rate	Rate	Rate	
				Rs.	Rs.	Rs.	Rs.
	Hospital Grade silencer mounted inside acoustic enclosure						
	Stainless steel exhaust flexible bellows						
	Electric starters with soft start engagement features						
	Battery charging alternator						
	Anti-vibration mounts of reputed make.						
	Protective guards for all rotating parts.						
	The engine should be Full Authority electronically controlled to meet compliance with stringent emission norms & improve overall performance efficiency and reliability						

	ALTERNATOR:						
	"STAMFORD", or approved equivalent make standard design Alternator, suitably rated at 200 kVA/160 kW at 0.8 PF, 415 Volts, 3 Phase, 4 wires, 50 cycles/sec., 1500 RPM, self-excited and self-regulated, with brushless excitation, Band of Voltage Regulation +/- 0.5% of rated voltage, from no load to full load, Insulation Class "H". The Alternator generally conforms to BS:5000/IS:4722.						
	Brushless type, Screen protected, Revolving field, Self-excited alternator conforming to IS/IEC 60034-1						
	Better motor starting capability						
	Best in class efficiency						
	Compact design with sealed bearings for longer life and lesser maintenance						
	Impregnation on all wound components for better mechanical strength						
	REMOTE MONITORING DEVICE:						
	A 4G compatible real time DG status monitoring device should be supplied as standard scope of supply along with DG set. The monitoring device should be capable of conveying necessary alerts to the operator for safe operation of Engine, Alternator and Exhaust After Treatment system						
	MADRAS SCHOOL OF ECONOMICS - KOTTURPURAM, CHENNAI						
	SUPPLY & INSTALLATION OF DG SETS & CONNECTED ELECTRICAL WORKS						
S.No	Description of Item	Qty	Unit	Supply	Labour	S + L	Amount
				Rate	Rate	Rate	
				Rs.	Rs.	Rs.	Rs.
	The remote monitoring device should have provision to monitor Fuel and DEF level to alert the customer suitably. The remote monitoring device should have a portal for the customer to login to monitor the DG set as per need.						
	INTEGRATED DG CONTROLLER						
	AMF Functionality						
	SYNC compatible						
	Audible & Visual warning for inducement						
	Microprocessor based intuitive operator interface with LED back lit 128 X 64 pixel graphic display with tactile feel soft switches.						
	Indications - Generator set status						

	Engine Metering: Oil pressure, Engine temperature, starting battery voltage, Engine running hours						
	AC Alternator Metering: L-L Voltage and L-N Voltage, Current (phase and total), kVA (phase and total) and Frequency, kWh, Total & per phase (kw & kVA), PF, Utility Voltage and Freq.						
	Engine Protection: Low lube oil pressure, High/Low coolant temperature, Battery Over/Under/Weak Volts, Fail to Crank/ Start, Sensor failure, Cranking lockout, Low fuel level.						
	AC Alternator Protection: Over/Under Voltage, Over/Under Frequency, Loss of AC sensing. Overspeed, Over Current, kW overload						
	Data Logging: Engine hours, Control hours and up to 5 recent fault codes						
	Configurable glow plug control						
	12/24 Volt DC operation						
	Sleep mode						
	Modbus interface (RS485 RTU)						
	Certifications - meets the requirement of relevant ISO, EN, Mil Std. and CE standards						
	Maintenance due alarm based on Engine Run Time and due date						
	Fuel and DEF level visual Display						
	Exerciser scheduler						
	MADRAS SCHOOL OF ECONOMICS - KOTTURPURAM, CHENNAI						
	SUPPLY & INSTALLATION OF DG SETS & CONNECTED ELECTRICAL WORKS						
S.No	Description of Item	Qty	Unit	Supply	Labour	S + L	Amount
				Rate	Rate	Rate	
				Rs.	Rs.	Rs.	Rs.
	The manufacturing of the integrated controller should rest with the engine manufacturer to guarantee optimal integration and for better reliability						
	BASE FRAME						
	Sturdy, fabricated, welded construction, Base Frame for mounting the above Engine and Alternator. Required number of anti-vibrations mounting pads, charged battery, battery stand, battery charger and leads etc.,						
	FUEL TANK						
	Min 395 Liters capacity sub-base Fuel Tank complete with level indicator, fuel inlet and outlet, air vent, drain plug and provision for fuel filling should be from outside acoustic enclosure with lock and key.						
	WARRANTY						
	The DG Set shall be guaranteed against faulty workmanship / poor material quality and against failures due to the same, for minimum of two years or 5000 Hours of operation whichever is earlier, from the date of commissioning. Apart from this warranty, Critical components of the engine viz Crank shaft, cam shaft, connecting rod, cylinder head and cylinder Block should carry warranty of 5 years from manufacturing date of engine or 5000 Hours of running whichever is earlier. No compromise will be entertained on this clause. The warranty letter should be given from manufacturer of the engine not by assemblers or OEMs and any other agency. Any progressive component damage due to manufacturing defect of 5 critical parts also covered within this warranty.						

	MADRAS SCHOOL OF ECONOMICS - KOTTURPURAM, CHENNAI						
	SUPPLY & INSTALLATION OF DG SETS & CONNECTED ELECTRICAL WORKS						
S.No	Description of Item	Qty	Unit	Supply Rate Rs.	Labour Rate Rs.	S + L Rate Rs.	Amount Rs.
	No compromise will be entertained on this clause. The warranty letter should be given from manufacturer of the engine not by assemblers or OEMs and any other agency. Any progressive component damage due to manufacturing defect of 5 critical parts also covered within this warranty.						
	In order to ensure timely service backup, in case of emergency, it is very essential that manufacturer Service office is available closest to the site to ensure timely service, apart from their respective Service Dealers. The tenderer should submit the toll-free number details in India for the engine manufacturer to ensure speedy service support.						
	Non-compliance any of the above specs/requirements should be clearly mentioned in the tender, point by point.						
3	**EB/DG Change Over**						
	Supplying and fixing the following in a suitable Powder coated enclosure made of 16G CRC sheet with cable boxes for termination of incoming and outgoing cables with removable type cable gland. The enclosure fixed on a suitable MS powder coated angle iron frame work. The rate should include for all connected civil works for grouting the frame as required						
	The rate should include for all connected civil works for grouting the frame as required						
	1 no. 320A 4 pole ATyS (AutomaticTransfer switching equipment with LVM (Line Voltage Monitor)						
	LVM for ATS motor protection should have OV & UV protection						
	ATyS should continue to feed supply even when one/two of the incoming phase fails						
	A neutral pole fully rated , identified and positioned on the right of phase poles						
	ATyS should have high short time curent with stand capability						

	MADRAS SCHOOL OF ECONOMICS - KOTTURPURAM, CHENNAI						
	SUPPLY & INSTALLATION OF DG SETS & CONNECTED ELECTRICAL WORKS						
S.No	Description of Item	Qty	Unit	Supply Rate Rs.	Labour Rate Rs.	S + L Rate Rs.	Amount Rs.
	1 set EB ON, DG ON, Load on EB/Load on DG LED indication lamp with control MCB **(For 200 KVA DG set)**	1	each				
4	Same as above, but the panel fitted with the following						
	1 no. 200A 4 pole ATyS (AutomaticTransfer switching equipment with LVM (Line Voltage Monitor)						
	LVM for ATS motor protection should have OV & UV protection						
	ATyS should continue to feed supply even when one/two of the incoming phase fails						
	A neutral pole fully rated , identified and positioned on the right of phase poles						
	ATyS shall have high short time curent with stand capability						
	1 set EB ON, DG ON, Load on EB/Load on DG LED indication lamp with control MCB **(For 125 KVA DG set)**						
	Connecting Cables						
5	Supplying and laying **3.5 core 300 sq.mm PVC armoured Aluminium conductor cable** 1.1 KV grade from the control panel in the DG set to the ATyS panel and to EB incomer main panel in the electrical room. Cable laid in wall/ceiling etc., with suitable powder coated clamps and fixing screws all as per site requirement. (**Main cable for 200 KVA DG set**)	80	mt				
6	Same as above, but supplying and laying 3.5 core 185 sq.mm PVC armoured cable with Aluminium conductor 1.1 KV grade (**Main cable for 125 KVA DG set**)Sensing cable)	180	mt				
7	Same as above, but supplying and laying 4 core 2.5 sq.mm PVC armoured cable with copper conductor 1.1 KV grade (Sensing cable)	250	mt				
8	Additional charges for excavation of cable trench, protectivecovering with sand cushioning (3" below the cable and 3" above the cable) and covered with well burnt bricks both on sides and on top						

	MADRAS SCHOOL OF ECONOMICS - KOTTURPURAM, CHENNAI						
	SUPPLY & INSTALLATION OF DG SETS & CONNECTED ELECTRICAL WORKS						
S.No	Description of Item	Qty	Unit	Supply Rate	Labour Rate	S + L Rate	Amount
				Rs.	Rs.	Rs.	Rs.
	Rate should include for back filling the cable trench with excavted soil, including tamming and making good the surface as required						
	Rate should also include for providing cable route indicaot at intevals of 20 mtts, road crossing and entry point of buildings all as per site requirement						
9	Providing end ternination for the above cbale using double compression brass cable glands and copper cable sockets. Rate should include for earthing the cable gland with earth clamp and copper wire as required						
a	for 300 sq.mm cable	8	each				
b	for 185 sq.mm cable	8	each				
c	for 2.5 sq.mm cable	4	each				
	EB Mains for SC 408						
10	Supplying and fixing 320A TP+N 36 KA double break MCCB Micro Processor based with adjustable over load, short circuit and earth fault protection. The MCCB shoukd be provided with extended rotary handle, spreders and phase barriers as required.						
	The MCCB should be housed in a suitable 16G thick Powder coated sheet steel enclosure with locking arrangement. The unit mounted on wall with suitable angle iron frame work. Rate should include for painting the angle iron frame and all connected civil work for grouting the frame	1	each				
	EB Mains for SC 373						
11	Supplying and fixing 200A TP+N 36 KA double break MCCB Micro Processor based with adjustable over load, short circuit and earth fault protection. The MCCB shoukd be provided with extended rotary handle, spreders and phase barriers as required.	1	each				
	MADRAS SCHOOL OF ECONOMICS - KOTTURPURAM, CHENNAI						
	SUPPLY & INSTALLATION OF DG SETS & CONNECTED ELECTRICAL WORKS						
S.No	Description of Item	Qty	Unit	Supply Rate	Labour Rate	S + L Rate	Amount
				Rs.	Rs.	Rs.	Rs.
	The MCCB should be housed in a suitable 16G thick Powder coated sheet steel enclosure with locking arrangement. The unit mounted on wall with suitable angle iron frame work. Rate should include for painting the angle iron frame and all connected civil work for grouting the frame	1	each				
	Earthing						
12	Providing earth electorde all as per IS-3043 with 10 feet long 100 mm dia. 8 -10 mm thick cast iron pipe with flange welded on top including providing double clamp arrangement using 2 nos. 25 x 3 mm copper flat run along the pipe up to flange with holes drilled for tapping connection with brass botl and nuts as requried						
	The electrode should be buried in alternate layers of salt/charcoal mixture						

	Rate should include for providing all connected civil work including masonry chamber construction of size 450 x 450 mm (inner dimension) and SFRC cover with (Precon or equivalent) RCC frame with lifting arrangement and holes for receiving water to the earth pit (4 nos. for DG Body and 4 nos. for DG Neutral)	8	each				
13	Supplyig and laying 25 x 3 mm copper flat from the earth electrode to the panel. Copper flat buried in ground with suitable dia 2 mm thick PVC conduit. All the tapping connection in the earth flat to be tinned.	200	mt				
	Mechanical Installation:						
	Exhaust pipe:						
14	Supplying and fixing 6" dia. ' B ' class MS pipe for exhaust system complete with all accessories including bends, flanges etc. The exhaust pipe fixed on surface of wall/ceilin g etc., with suitable MS Powder coated bracket suppoart. Rate should include for all connected civil work for grouting the supporat as required. For 200 KVA DG set	20	mt				

	MADRAS SCHOOL OF ECONOMICS - KOTTURPURAM, CHENNAI						
	SUPPLY & INSTALLATION OF DG SETS & CONNECTED ELECTRICAL WORKS						
S.No	Description of Item	Qty	Unit	Supply Rate	Labour Rate	S + L Rate	Amount
				Rs.	Rs.	Rs.	Rs.
15	Same as above, but supplying and fixing 5" dia. ' B ' class MS pipe for exhaust system complete with all accessories including bends, flanges etc. For 125 KVA DG set	20	mt				
16	Providing Thermal insulation for the exhaust pipes with 50 mm thick mineral wool bound with chicken mesh and cladding with 26 SWG Aluminium foil up to the top of the Acoustic Enclosure all as per IS 3677/1073	40	mt				
17	Same as above, but for hospital type silencer	2	set				
18	Supply and erection of MS supports with suitable MS Channel/Angle/flat etc., in welded construction for supporting the Exhaust pipe. Rate should include for all civil work for grouting the supports and painting the supports with approved colouor paint complete as requried. (Rate per Metric Tonne)	5	MT				
19	Charges for unloading the 200 KVA DG set complete with Acoustic Enclousre, isolation panel. Fuel tank and all other accessores at site including positioning the DG set in the existing foundation bed.						
	Rate should include for all tools & tackles for unloading the DG & Freight charges from the works upto the site installation complete as required	1	job				
20	Same as above but for 125 KVA DG set	1	job				
21	Charges towards testing and commissioning 200 KVA DG sets complete with Acoustic Enclosue for full load, for 8 Hrs. contineous operation including all consumables like lube oil, diesel etc., and initial charging of batteries complete as requried.	1	each				
22	Same as above, but for 125 KVA DG set	1	each				
23	Providing Emission sampling point in the exhaust pipe line as per standard norms	2	each				

MADRAS SCHOOL OF ECONOMICS - KOTTURPURAM, CHENNAI

SUPPLY & INSTALLATION OF DG SETS & CONNECTED ELECTRICAL WORKS

S.No	Description of Item	Qty	Unit	Supply Rate Rs.	Labour Rate Rs.	S + L Rate Rs.	Amount Rs.
24	Charges for preparation of necesssary drawings for submission to Chief Electrical Inspector to Governmeent of Tamilnadu, getting approval all as per relevent coes and standards as applicable.						
	Rate should include for submission of completion certificate, arranging inspection, submission of rectification report and obtaining Safety Certificate for the installation complete. For both 200 KVA & 125 KVA DG sets	1	job				
	Total						

NOTE:

1. The vendor should make their own arrangemeent for storage of material at site

2. Rate should include for all tools and tackles for unloading/positioning of the DG, scaffoliding works for erection of exhaust pipes including civil work for erection of supports

3. The foundation for erection of both the DG will be under the scope of MSE

4. Power will be available on chargable basis at one point near the site of work. The vendor should pay the electricity charges as per the rates prescribed by MES

Date:

Signature of Vendor
