

BROAD RESPONSIBILITY MATRIX BETWEEN BHEL & QEM FOR EXECUTION OF PROJECT ON EPC BASIS				
Sl.No.	SCOPE DESCRIPTION	BHEL	QEM	REMARKS
A	POWER GENERATION EQUIPMENT			
A.1	GENERATING SET			
A.1.1	Main Engine		√	
A.1.1.1	Engine Accessories		√	
A.1.1.2	Common base frame		√	
A.1.1.3	Flexible connections between engine and external piping		√	
A.1.1.4	Generating set assembly		√	
A.1.1.5	Set steel springs		√	
A.1.2	GENERATOR			
A.1.2.1	Alternator and Excitation System	√		
A.1.2.2	Flexible Coupling		√	
A.1.2.3	Flywheel cover		√	
A.1.2.4	External Terminal Box for surge capacitors and arrestors if applicable	√		
A.1.2.5	Generator type test	√		
A.1.3	ENGINE PLATFORM	√		
A.2	MECHANICAL AUXILIARY SYSTEMS			
A.2.1	AUXILIARY MODULES		√	
A.2.2	FUEL SYSTEM		√	
A.2.3	LIGHT FUEL OIL SYSTEM		√	
A.2.4	GAS SYSTEM			
A.2.4.1	Plant Isolation Valve (manual)		√	
A.2.4.2	Real time gas analyser		√	
A.2.4.3	Main Safety shut off valve - engine specific		√	
A.2.4.4	Gas regulating unit (GRU)		√	
A.2.4.5	Flow meter for gas regulating unit		√	
A.2.4.6	Gas Flow Measuring unit		√	
A.2.4.7	Piping and valves - gas system		√	
A.2.5	LUBRICATING OIL SYSTEM			
A.2.5.1	ENGINE LUBE OIL SYSTEM			
A.2.5.1.1	Lube oil separator		√	
A.2.5.1.2	Lube oil cooler		√	
A.2.5.1.3	Pre lub pump set		√	
A.2.5.1.4	Lub oil filter		√	
A.2.5.1.5	Thermostatic valve		√	
A.2.5.1.6	Oil Mist Coalescer		√	
A.2.6	PLANT LUBE OIL SYSTEM		√	
A.2.7	COMPRESSED AIR SYSTEM		√	
A.2.8	STARTING AIR SYSTEM		√	
A.2.9	WORKING AIR SYSTEM		√	
A.2.10	COOLING SYSTEM		√	
A.2.11	ENGINE COOLING SYSTEM		√	
A.2.12	CHARGE AIR SYSTEM		√	
A.2.12.1	Intake air filters - Combined Oil wetted and dry type		√	
A.2.12.2	Rain hood for charge air filters		√	
A.2.12.3	Insect screen for charge air filters		√	
A.2.12.4	Charge air silencer (mounted on the EGM)		√	
A.2.12.5	Intake air ducting (between engine & air filter(s))		√	
A.2.13	EXHAUST GAS SYSTEM			
A.2.13.1	Exhaust gas branch pipe (mounted on the exhaust gas module)		√	
A.2.13.2	Exhaust Gas Silencer		√	
A.2.13.3	Expansion bellows		√	
A.2.13.4	Exhaust gas ventilation fan (mounted on the exhaust gas module)		√	
A.2.13.5	Safety vent		√	
A.2.13.6	Exhaust gas duct		√	
A.2.13.7	Exhaust gas steel stack		√	
A.2.13.8	Exhaust duct and stack insulation		√	
A.2.13.9	Piping and valves - exhaust gas system		√	
A.2.14	OILY WATER HANDLING SYSTEM			
A.2.14.1	Oily Water Transfer Pump Unit	√		
A.2.14.2	Oily water settling tank	√		
A.2.14.3	Oily water settling tank equipment	√		
A.2.14.4	Underground oil trap	√		
A.2.14.5	Sewage Treatment System	√		
A.2.14.6	Piping and valves - oily water handling system	√		
A.2.15	WATER TREATMENT SYSTEM	√		

A.2.16	FIRE FIGHTING SYSTEM	√		1.DG Plant Fire Protection system shall be in BHEL's scope. However, Fire Protection & detection requirements , specific to DG sets , shall be in OEM's scope. From TP , further hooking up to centralised system shall be in BHEL's scope. FPS of DG's day oil storage tank(if applicable) and other Lube Oil tanks shall be in BHEL's scope 2. FPS Sub-systems for DG set provided by OEM : Details to be informed by OEM for further interface with Plant FPS by BHEL. Typical scheme and layout + design documents, Hazardous area classification to be shared with BHEL for study.
A.2.17	PIPE SUPPORTS AND STRUCTURAL	√		
A.2.18	EMISSION CONTROL AND MONITORING SYSTEMS		√	
A.2.1.18.1	Ambient Air Quality Monitoring Station (AAQMS)		√	
A.2.19	PLC FOR ENGINE AND AUXILIARY CONTROL		√	
A.2.20	CONTROL SYSTEM/PANEL			
A.2.20.1	ENGINE CONTROL PANEL		√	Engines is supplied with a dedicated engine mounted control panel which is a PLC based control panel with remote communication facility.
A.2.20.2	GENESET CONTROL PANEL (Engine and Alternator control including synchronisation)		√	The GCP controls and supervises the Genset (Engine and Alternator) and their related systems in combination with the local engine control and common control. It realizes the control, synchronization and protection of the alternator circuit breaker in MV (Medium Voltage) switchgear.
A.2.20.3	COMMON CONTROL PANEL (CCP) FOR SYNCHRONISATION AND CONTROL		√	Load sharing controller among DG sets shall be by DG vendor, same will be installed in CCP (free issued to BHEL), all interfacing system of load sharing controller also shall be by DG vendor.
A.2.20.4	SCADA INCLUDING EWS & OWS etc.		√	the entire plant can be operated depending on each SCADA panel (back up to CCP).
A.2.21	AUTOMATIC VOLTAGE REGULATOR (AVR)		√	
A.2.22	415V DG AUXILIARY MCC		√	
A.2.23	DC SYSTEM FOR ENGINE STARTING (IF APPLICABLE)		√	
A.2.24	ENERGY METERING PANEL	√		
A.2.25	LV DISTRIBUTION TRANSFORMERS (IF APPLICABLE)	√		
A.2.26	POWER TRANSFORMERS	√		
A.2.27	HT SWITCHGEAR	√		
A.2.28	LT SWITCHGEAR (PMCC/MCC/ACDB)	√		
A.2.29	CABLES, TRAYS AND ACCESSORIES	√		
A.2.30	ELECTRICAL PROTECTION SYSTEM FOR TRANSFORMERS	√		
A.2.31	NEUTRAL GROUNDING SYSTEM	√		
A.2.32	FIRE PROOF MATERIALS	√		
A.2.33	DC and UPS SYSTEM	√		
A.2.34	CCTV	√		
A.2.35	PLANT ILLUMINATION	√		
A.2.36	PLANT EARTHING	√		
A.2.37	PLANT COMMUNICATION SYSTEM	√		
A.2.38	LT EMERGENCY CUM BLACK START DG SET PACKAGE IF APPLICABLE	√		
A.2.39	ELECTRICAL SYSTEM STUDIES AND RELAY COORDINATION	√		
A.2.40	TOOLS			
A.2.40.1	Tools for engine and turbocharger		√	
A.2.40.2	Hand Tools	√	√	For Respective Items
A.2.40.3	LO separator Tools	√	√	For Respective Items
A.2.40.4	Electrical System Tools	√	√	For Respective Items
A.2.41	SPARES			
A.2.41.1	Commissioning spares	√	√	For Respective Items
A.2.41.2	Mandatory Spares	√	√	For Respective Items
A.2.42	OUTDOOR SWITCHYARD (IF APPLICABLE)	√		
A.2.43	POWER PLANT - BUILDING	√		
A.2.44	POWER HOUSE	√		
A.2.45	POWER PLANT - CIVIL CONSTRUCTION	√		
A.2.46	VENTILATION & AIR CONDITIONING	√		
A.2.47	LIFTING SYSTEM	√		
A.2.48	SERVICES	√	√	
A.2.48.1	ENGINEERING		√	
A.2.48.2	SUPERVISION OF ERECTION	√	√	
A.2.48.3	TESTING & COMMISSIONING	√	√	For Respective Items
A.2.48.4	Training	√	√	For Respective Items
B	DOCUMENTS DURING PRE AND POST -BID STAGE OF TENDER			
B.1	Design Engineering		√	For Respective Items
B.2	Plot Plan	√	*	For Respective Items
B.3	Layout and GA details		√	For Respective Items
B.4	Equipment foundation details		√	For Respective Items
B.5	Equipment loading Details	√	√	For Respective Items
B.6	Design basis report		√	
B.7	BOQ (Structures , pipes ,valves and cables)	√	√	For Respective Items

C	Other			
C.1	Statutory clearance- Explosives	√	*	
C.2	Statutory clearance- Electrical	√	*	
C.3	Statutory clearance- Pollution	√	*	
C.4	Statutory clearance- Factory inspectorate	√	*	
C.5	Statutory clearance- All other clearances	√	*	
C.6	Sea shipment -freight charges	√	√	For Respective Items
C.7	Inland transportation to site - imported eqpt.	√	√	For Respective Items
C.8	CIP-Site / FOR-Site (as per INCOTERMS 2010)	√	√	For Respective Items
C.9	Unloading of eqpt. at site	√		
C.10	Port clearance		√	
C.11	Customs Duty Payment		√	
C.12	Transit insurance upto Indian port		√	
C.13	Transit insurance -Port to site		√	
C.14	Transit insurance -Ex-works to site	√	√	
C.15	Erection & Commissioning Insurance	√		
C.16	Cleared & fenced space for Erection & Commissioning	√		
C.17	Construction Power	√		
C.18	Construction Water	√		
C.19	Local Transportation	√	√	
C.20	Vehicle	√	√	
C.21	Security for personnel and Items during installation	√	√	
C.22	Site Office	√	√	
C.23	Site accomodation	√	√	
D	OPERATION & MAINTENANCE OF PLANT	√	√	
	LEGEND			
	QEM - Qualified Engine Manufacturer			
	√ Prime Responsibility			
	* Support to Other Partner			

Note : Above mentioned items or Quantity or both(Item & Quantity) are indicative in nature.The items or Quantity or both(Item & Quantity) may change as per OEM recommendation.In case of any change in above mentioned items or Quantity or both(Item & Quantity),bidder to furnish proper justification for the same.Applicability of items & quantity shall be checked during detail engg.