

# **ATTACHMENT 1 TO KYMEA RFP No: 2023-1 TECHNICAL SPECIFICATIONS**

## **1. PROJECT INFORMATION:**

These specifications describe reciprocating internal combustion (“RICE”) engines, generator sets, certain associated auxiliary equipment, and related materials to be delivered to the KYMEA site in Madisonville, Kentucky<sup>1</sup>. These specifications cover the furnishing of the major equipment required for the power island at a new KYMEA facility. A separate Installation Contractor will be responsible for construction of the new power plant building, offloading and installation of the equipment supplied under this contract, and piping and wiring of the systems to make the facility operational. The new facility is anticipated to begin commercial operations no later than the spring of 2027.

KYMEA is studying whether a single fuel RICE or a dual fuel RICE is more beneficial to their system. Proposer shall provide its best selection for either option as described below.

The prices stated in the bid shall include all materials, freight to the plant site, and supervisory services to assure KYMEA that the equipment will be installed and tested as specified. The Proposer shall further provide engineering and design support, start-up and commissioning assistance, testing, checkout, and training as described in later sections of this specification for the material supplied.

The RICE Power Island and Proposer supplied auxiliary equipment to be furnished under this contract includes the following:

- RICE engine-generator sets with control and indication equipment, and other accessory equipment.
- Major auxiliary equipment associated with the power plant such as fuel control equipment, lubrication, and radiators.
- All RICE engine-generator sets and associated auxiliaries shall be identically sized, with identical model numbers in a quantity sufficient to meet a minimum of 60 MW net power output.

The equipment and systems which will be furnished and constructed by others includes, without limitation, the following:

- Site work includes grading, fill, drainage, and surfacing.
- Construction of the power plant building includes foundations, floors, walls, roofing, insulation, and finishes.
- Exhaust stacks and structures, excluding exhaust silencers.
- Installation of equipment supplied under this contract.

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<sup>1</sup> The site is located in Madisonville, KY outside of a populated area, with approximate coordinates of 37.321534, - 87.551519.

## **GENERAL REQUIREMENTS:**

The generator sets and all supplied auxiliary equipment shall be new, unused, and completely assembled and factory tested by a manufacturer which has built, sold, and serviced generating equipment of a similar design and size for at least 5 years. No unit assembled by anyone other than a recognized manufacturer will be accepted. The generator set and supplied equipment shall be identical in size and model number and capable of delivering a minimum of 60 MW net.

The Power Island and associated equipment shall be designed for the following conditions and requirements, in addition to any other conditions and requirements set forth in the RFP documents (including Appendix A attached hereto):

- Option 1: Net minimum output capacity of the plant shall be a nominal natural gas only fired 60 MW at the generator terminals at 80% power factor.
- Option 2: Net minimum output capacity of the plant shall be a nominal dual-fuel 60 MW at the generator terminals at 80% power factor
- Output voltage shall be 60 Hz, 13,800 volts, 3 phase
- Equipment shall be designed for full output capability at the full range of ambient temperatures of -40 deg F to +105 deg F. The engine hall ventilation system will be designed to provide a maximum average temperature rise (above ambient) of 15 deg F.
- Provide vibration isolation of the engine and generator equipment.
- Provide earthquake restraints as applicable to this specific seismic zone.

All work and equipment provided shall be designed, tested, rated, assembled, and installed (by others) in strict accordance with the current state and local codes and with all applicable standards including ANSI, IEEE, NEMA, NEC, NESC, NFPA, IEC, and UL.

**English units of measurement and English text shall be supplied for all systems, gauges, and documentation.**

## 2. SUBMITTALS:

The following submittals shall be furnished at the times indicated:

Description	When Due
Complete description of material contained in the bid submitted.	With bid package
Complete list of equipment manufacturers that the Proposer intends to provide equipment for this project.	With bid package
List of at least three references of similar units and facilities, preferably located in the US.	With bid package
Performance and emissions data	With bid package
Maintenance schedule with recommended intervals for oil changes, overhauls, and other major maintenance items	With bid package
Drawings of generator sets and major equipment indicating physical dimensions	With bid package
Minimum and recommended spare equipment/parts lists with associated pricing	With bid package
Estimated lead time for manufacturing and delivery of all supplied equipment and corresponding delivery date to KYMEA site in Madisonville, KY.	With bid package

Provide submittal drawings as Size D and Size E.

## 3. SHIPPING AND DELIVERY PROCEDURES:

- A. The Bid(s) shall include freight on board delivery (F.O.B) to the project location in Madisonville, Kentucky, located outside of a populated area, with approximate coordinates of 37.321534, -87.551519.
- B. The Proposer shall investigate all limitations regarding shipping and offloading the equipment and include the costs for such limitations in the Bid.

\*\*\*END OF SECTION\*\*\*

## **TECHNICAL REQUIREMENTS**

### **1. GENERAL TECHNICAL REQUIREMENTS**

Proposer shall provide the engines and all associated auxiliary necessary to achieve the performance standards (i.e., net output and net heat rate, ramp rates, etc.) as outlined in Appendix A attached hereto. The following sections cover the general technical requirements and quality control for the engine, generator and associated auxiliary equipment.

#### **1. RICE Power Island Auxiliary Equipment**

- a. Equipment such as pumps, motors, valves, and similar small pieces of equipment and accessories shall be of a type which is readily available in the North America market.
- b. The equipment is to have a history of reliability and be supported by a reputable manufacturer.

#### **2. General Electrical Requirements**

- a. Unless otherwise specified herein, all equipment shall conform to all applicable standards of the authorities having jurisdiction as specified herein.
- b. All technical requirements and manufacturer' guarantees shall be based on operation under these conditions.
- c. Provide means in two (2) places on equipment frames of all major electrical equipment for connection of 4/0 AWG copper cable to the station ground system.

#### **3. Electrical Digital and Analog Indicating Instruments**

- a. They shall be calibrated and suitable for the application, with an accuracy of at least 1% of their range. Additional features shall include zero and span adjuster accessible from the front.
- b. Indicating instruments shall conform to ANSI C 39.1.

#### **4. Instrumentation**

- a. Instrumentation shall be provided for complete monitoring of all equipment. Instruments of the same type (e.g., pressure gauges) shall be of the same manufacturer and series. All instrumentation shall be industrial grade suitable for use in a utility power plant application and shall be from vendors approved by KYMEA.
- b. Minimum accuracy of any instrument shall be 0.25% span. Instrument output, calibration, and setting shall be stable for the full range of process and ambient temperatures to be experienced. Maximum drift shall be 0.1% span/year.

## **2. ENGINES:**

The engines shall be a stationary, natural gas fired, liquid cooled four cycle design, and designed for continuous operation while maintaining compliance with emissions requirements at any load between 30 – 100 percent of nominal power (lower minimum load levels are acceptable so long as emissions compliance is achieved). The engine shall be equipped with an embedded control system to control the combustion process individually in each cylinder. It shall include all ignition, turbocharging, intercooling, lubricating, fuel, and other systems necessary for operation. An option for dual fuel (natural gas and ultra-low sulfur diesel fired) engines design shall be considered when available.

Generator set shall be certified by the engine manufacturer to be suitable for use at the installed location and anticipated duty.

The engines shall meet applicable U.S. EPA, State, and Local emission regulations.

The engine and unit control system (“UCS”) shall be equipped with such devices that in the event of abnormally high engine temperature, excessively low oil pressure, overcrank or overspeed conditions, etc.; the UCS will automatically shut the engine down. Pre-alarms shall be provided where appropriate for approach to such abnormal conditions. The manufacturer shall establish the proper settings for these levels based on the engine supplied. Engines shall also use detonation sensitive timing sensors. A safety device to detect detonation in the gas engine and retard timing to eliminate it or shut down the engine if retarding the timing cannot stop detonation. The engines shall provide control of the air/fuel mixture for performance and efficiency throughout the operating range of the engine.

The engine generator set shall be common frame or base mounted utilizing high efficiency spring/pad type vibration isolators. The quantity of vibration isolators shall be provided as recommended by the engine manufacturer.

All custom or specialty tools required for operating or maintaining the engine/genset and related components shall be provided by the Proposer, including any electronic tools, software, and related licenses needed to adjust or maintain onboard engine or related control systems.

## **3. GENERATOR:**

The generator shall be designed and constructed to match the life of the engine and have the following electrical and mechanical characteristics.

The generator shall be rated at no less than the maximum engine MW rating at 80% power factor and at the voltage and frequency as indicated. All insulation system components shall meet

NEMA MG1 temperature limits for Class F insulation systems. The NEMA kW rating at the rated voltage shall be stamped on the nameplate.

The generator shall be three-phase, synchronous, and air cooled, and suitable for direct coupling to the engine. It shall be connected to the engine through a semi-flexible coupling. The excitation system shall be of brushless construction.

A digital regulator shall be provided to match the characteristics of the generator and engine, including Allen Bradley Combination Generator Control Module or approved equal. The regulator shall be equipped with three-phase RMS sensing and shall control buildup of AC generator voltage to provide a linear rise and limit overshoot. The voltage regulator shall be equipped with overexcitation protection, volts per Hertz regulation, loss of sensing protection, and temperature compensation. Voltage regulation shall be plus or minus 0.5% for any constant load from no load to full rated load for both parallel and non-parallel applications. Voltage level adjustment shall be a minimum of plus or minus 5%. The regulator module shall be shock mounted and suitably protected against vibration and atmospheric deterioration, if installed on the generator.

RTDs shall be provided and monitored in the stators and bearings. An anti-condensation heater shall be provided for the generator. Current transformers and potential transformers shall be provided for differential protection as well as local measurement and control needs.

The generator shall be provided with a junction box large enough for wiring access and connections to the generator leads. Terminal pads shall be provided, suitable for connection of 2-hole NEMA spades.

#### **4. COOLING WATER AND LUBRICATING OIL MODULES:**

The modules shall contain auxiliary equipment (listed below) which are completely assembled and fitted offsite. The complete auxiliary module shall be pressure and function tested, flushed, painted, and corrosion protected prior to shipment. All external connection points shall be sealed and covered with steel plates. All steel structures shall be painted. Pumps and related equipment shall be adequately sized to accommodate the installed location of the modules from the engine/generator set and from the cooling system radiator. Modules shall be configured for ease of maintenance.

The following items shall be included on the auxiliary water and lubricating oil modules:

- Jacket water pre-heating unit utilizing the facility hot water system.
- Lube oil pre-heating unit utilizing the facility hot water system.
- Lubricating oil heat exchanger
- Full engine pre-operation (pre-lube) and post-operation (post-lube) lubrication systems
- Redundant pumps, for each system, each rated for 100 percent flow / duty
- Piping as required.

- Valves and gauges, including module isolation valves
- Instrumentation
- Module control panel

## **5. GENERATOR SET LUBRICATING OIL SYSTEM:**

Control lubricating oil flow automatically with a thermostatic valve(s) in system to maintain optimum oil temperature. Control shall be capable of full flow and designed to be fail-safe. Size and furnish an oil cooler (heat exchanger) where recommended by manufacturer. Furnish a thermostatically controlled oil heater to improve starting under cold ambient conditions where recommended by manufacturer.

The level of filtration in the engine oil lubrication system shall be determined by the manufacturer and based on their recommendations. The filtration system must be designed to allow for changing all filters while in operation.

The engine lubricating oil system shall include redundant pre/post-lube pumps, each sized for 100 percent duty, and piping to assure engine oil pressure and lubrication before start-up and after operation. Provide automatic control that will prevent starting or operation of the engine without adequate lube oil pressure. Also provide with automatic control to allow scheduling of pre-lube function during non-operational hours.

Furnish with manual means to determine lubricating oil system level. Furnish provisions for the addition of lubricating oil from the plant related lubricating system (described within). Furnish additional means to remove a small volume of lubricating oil from the system for use in sampling and testing.

The crankcase drain shall be arranged for complete gravity drainage with no disassembly and without use of pumps, siphons, special tools, or appliances. Furnish provisions to pump lubricating oil to either the maintenance or waste oil tank.

Furnish each engine with an open- or closed-type crankcase ventilation system as recommended by the manufacturer. The system shall remove gases from the crankcase to maintain pressure within acceptable limits. Contaminants shall be filtered from the crankcase gases, and at the recommendation of the manufacturer, exhausted outdoors or returned to the engine combustion air system. Residuals from the filter may be pumped to the waste oil tank or returned to the engine lubricating system at the recommendation of the manufacturer.

## **6. GENERATOR SET FUEL GAS SYSTEM:**

The fuel gas system shall be controlled electronically by the engine control system. Include a complete NFPA 37 compliant, natural gas fuel train including the following components:

- Manual isolation valves
- Fully redundant gas coalescing filters with pressure differential gauges.

Recommended filtration level to be specified by engine manufacturer. Include bypass piping around each filter which allows for engine operation during filter replacement.

- Pressure regulators
- Safety valves with vent, sized to handle large load swings, especially those experienced in isolated mode
- Low gas pressure switch (auto reset) and high-pressure switch (manual reset).
- Gas flow meters and flow accumulators. Gas flow meters shall be temperature and pressure compensated and measure individual engine fuel consumption. The gas flow meters shall be volumetric type display of both flow rate and total accumulated volume and shall be integrated with the plant control system to allow for display and recording of this information. Meter accuracy shall be plus/minus 2 percent.
- Instrumentation
- Connections shall be standard ASME/ANSI flanges. The fuel gas system skid will be mounted near the engine and piped to the generator set by others.

A main safety shut off valve will be installed/provided by others on the power plant gas inlet located outside the engine hall room, to isolate the outside gas system in case of emergency.

Ultra-low sulfur diesel (“ULSD”) components must comply in the same manner as outlined above for the natural gas system.

#### **7. GENERATOR SET COOLING SYSTEM:**

The cooling system shall provide adequate cooling of critical engine components such as cylinder jackets, cylinder heads and turbochargers as well as the lubrication oil and charge (combustion) air entering the cylinders after it has been compressed by the turbocharger.

The cooling system shall utilize a mixture of inhibited glycol-based heat transfer fluid and high-quality water furnished and installed as recommended by the engine manufacturer for local conditions.

#### **8. GENERATOR SET CONTROL PANEL:**

Each generator set shall be provided with a local microprocessor-based control system for complete control and monitoring of the engine and generator set functions. The control system shall be mounted on a freestanding panel adjacent to the generator set and shall allow local monitoring and control of the generator set, and remote monitoring and control as described in a later section of this specification. The generator set control panel shall be designed and built by the engine-generator manufacturer and shall be vibration isolated and environmentally sealed. The panel shall be properly labeled for identification of all meters, control switches, and functions. The panel shall incorporate self-diagnostics capabilities and fault logging. A touchscreen panel (15” min.) shall be provided on each generator control panel with full monitoring and control of the respective generator set. All panels with A/C shall include an easily accessible condensate collection reservoir.



A red local emergency stop pushbutton shall be provided. Depressing the emergency stop pushbutton shall cause the generator set to immediately shut down and be locked out from automatic restarting. Multi-colored rotating alarm beacons and audible alarms shall be provided at the generator control panels to indicate various stages of alarms.

All points for connection to remote devices shall be on a common terminal block strip or adjacent terminal block strips, permanently labeled for ease of connection by Others. Panel shall be designed for bottom cable entry.

## **9. EXECUTION:**

The Proposer shall provide engineering and design support, start-up, and commissioning assistance, and testing and checkout services.

The following articles and paragraphs are intended to define acceptable procedures and practices for constructing, installing, inspecting, and testing the generator sets, auxiliary systems, switchgear, supervisory system, and associated equipment.

### **Shop, Control, and Construction Drawings:**

Prior to ordering materials and/or constructing equipment the Proposer shall prepare, examine, approve, and submit promptly to the Engineer shop drawings as specified in the contract. After examination of such drawings or schedules and return thereof by KYMEA, the Proposer shall make the indicated corrections to the drawings or schedules and shall furnish the Purchaser corrected copies.

The Proposer shall submit, on compact discs, USB drives, or by e-mail, at the direction of KYMEA, AutoCAD - compatible files of all as-built drawings to the Purchaser prior to final payment. In addition, the Proposer shall submit four (4) paper copies of all final, as-built drawings to KYMEA.

### **Detailed Engineering and Design Support:**

The Proposer shall provide the necessary information, engineering, support, and coordination with KYMEA on final design issues associated with the equipment to be supplied. This includes the furnishing of the necessary drawings, schematics, wiring lists, equipment details, and information to allow for the construction design of the plant piping, wiring, and connections associated with the equipment being supplied, as well as installation of the equipment being supplied.

Design coordination meetings shall be conducted with KYMEA to assist in covering these items. AutoDesk AutoCAD drawing files shall be supplied of the engines, modules, and major components being furnished, for inclusion into the installation design. Proposer shall further provide input on and review of Purchaser/KYMEA provided final design drawings.

Items to be provided shall include, but not be limited to, the following:

- Typical engine generator set foundation drawings
- Engine generator set heat displacement requirements and ventilation demand data
- Equipment dimensional drawings with weights for major equipment
- Noise profile data sheets/curves for supplied equipment including generator sets, radiators, and charge air and exhaust silencers
- Flow and P&ID drawings for natural gas, lube oil, SCR/urea, working and instrument air, charge air, exhaust, emission, and cooling water systems
- One line diagram, control schematics, interconnection diagrams, and wiring lists for supplied electrical systems
- Emissions data sheets
- Preliminary protective relay settings and calculations

#### **Factory Testing and Inspection:**

KYMEA reserves the right to witness the tests at the manufacturer's facilities and perform an inspection of the manufactured equipment prior to shipment. Proposer shall provide a minimum notice of 4 weeks prior to factory testing.

The Proposer shall perform a complete operational test on each generator set prior to shipping from the factory. All equipment shall be fully tested at the factory for function and performance. Certified test reports shall be furnished to KYMEA after completion of factory testing.

#### **Shipment to Jobsite:**

Delivery of all supplied equipment shall be FOB to the jobsite. The jobsite is KYMEA, located in Madisonville, Kentucky. The Proposer shall investigate all limitations regarding shipping the equipment. Equipment shall be shipped as completely assembled as transportation limits allow. Approximate coordinates/specifications for the site are 37.321534, -87.551519.

All supplied parts shall be individually barcoded. Barcodes shall be clearly identified. All shipping containers shall also be barcoded. A detailed list of all parts contained within each shipping container shall be provided prior to equipment delivery, with corresponding descriptions of the equipment being shipped that are tied to the barcode numbers. Barcode scanner and associated software shall be provided to KYMEA.

#### **Placement and Installation:**

Guidance and technical assistance shall be provided by the Proposer regarding placement and installation of the supplied equipment by the installation contractor. Detailed assembly instructions and parts inventories shall be provided in English for all equipment

supplied. The Proposer shall be responsible for final alignment of all major components, including but not limited to engines, generators, and associated equipment.

**Spare Parts:**

A full set of spare parts comprising the manufacturer recommended spare parts shall be provided by the Proposer. This shall include all major equipment and associated subsystems.

**Field Testing and Start-Up:**

A full functional test of the complete system shall be performed after installation, to ensure that all systems are operational, and that the equipment will run at the ratings specified.

**Orientation/Training:**

The Proposer shall provide complete orientation and training for KYMEA's maintenance personnel. Orientation shall include both classroom and hands-on instruction. Topics covered shall include control operation, meters, indicators, warnings/annunciation, shutdown of system, and maintenance and testing. The operator training shall include the generator sets, switchgear, operating modes, supervisory system, and emission control system. Orientation and training shall be conducted separately from the startup and testing required herein. A sufficient amount of training and instruction shall be supplied to KYMEA's staff to allow them to competently operate and maintain the generating plant and its equipment. All training will take place at KYMEA.

**Operator's Manuals, Parts Books, and Specialty Tools:**

Detailed assembly instructions and parts inventories shall be provided in English for all equipment supplied. The Proposer shall furnish four (4) copies each of the manuals and books listed below for materials under this contract:

**Operating Instructions** - with description and illustration for the safe and reliable operation of all equipment provided by the Proposer including all major equipment and all components and subcomponents associated with each piece of equipment.

**Programming and Logic Instructions** for all switchgear controls and indicators, engine and generator controls, and supervisory system controls and equipment. Ladder logic shall be provided for all programmable logic controllers in the system. All licenses required to operate all software will also be provided. Proposer will also provide any specialized instrumentation, monitors, or controllers required to read and write to all control software.

**Parts Books** - that illustrate and list model and serial numbers for equipment provided by the Proposer including all major equipment and all components and subcomponents associated with each piece of equipment

**Preventative Maintenance Instructions** – for equipment provided by the Proposer including all major equipment and all components and subcomponents associated with each piece of equipment covering daily, weekly, monthly, biannual, and annual inspection, maintenance, or calibration requirements.

**Routine Test Procedures** - for equipment provided by the Proposer including all major equipment and all components and subcomponents associated with each piece of equipment.

**Troubleshooting Chart** - covering all equipment provided by the Proposer including all major equipment and all components and subcomponents associated with each piece of equipment.

**Wiring Diagrams and Schematics** - showing function of all electrical components.

All manuals and books described above shall be contained in rigid plastic binders. In addition, an electronic copy of these items shall be provided on a USB drive and/or CD-ROM (at the direction of KYMEA), and they shall be loaded on the local workstation at the plant. All manuals and books shall be developed in English.

Any specialty tools needed to operate and/or maintain the system and its components shall be supplied. This shall include all specialized hardware and software (including diagnostic software) tools, and the relevant licenses, if required.

\*\*\*END OF SECTION\*\*\*

## **Appendix A: Information to be Submitted with Proposal**

### **Data to be Submitted**

#### **Option 1 Single Fuel RICE Engine Generators- Natural Gas Only**

- Engine size (MW per engine)
- Number of engines
- Total net output of all engines at 100% load and 80% power factor
  - Net engine output and net heat rate (higher heating value) at the generator terminals @ 100%, 75%, 50% and minimum emissions control level (“MECL”) load engine capacity at the following ambient conditions:
    - ISO
    - Average (68 F)
    - Summer (95 F)
    - Winter (24 F)
  - Engine emissions (NO<sub>x</sub>, CO, VOC, CO<sub>2</sub>, PM) at the generator terminals @ 100%, 75%, 50% and minimum load engine capacity (MECL)
  - Estimated performance (output and heat rate) degradation curves up to 100,000 hours of operation
  - Ramp rate in kW/minute
  - Start times (minutes)
  - Minimum on-line/offline times (minutes)
  - Lube oil consumption guarantees 100% load.
- Information regarding the capability of the engines to burn hydrogen, including percent of hydrogen that can be burned (on both a volume and heat content basis), incremental capital and operating costs per engine associated with hydrogen-capable engines, and any changes to the net output, net heat rate, emissions, ramp rate, start time, and minimum on-line/off-line times specified above.
- Comprehensive List of Initial Spare Parts Provided for Option 1
- Detailed Summary of Technical Training Provided with Option 1
- Confirmation that all requirements of Proposer as delineated in the Division of Responsibilities are included
- Date by which all equipment included in Proposer’s scope will be delivered to the site
- Documentation of any exceptions with explanation in writing and delineated on the Division of Responsibilities document (included as Attachment 2 to the RFP)

#### **Option 2 Dual Fuel RICE Engine Generators- Natural Gas and ULSD Fuels**

- Engine size (MW per engine)
- Number of engines
- Total net output of all engines at 100% load and 80% power factor

- Performance on Natural Gas Fuel
  - Net engine output and net heat rate (higher heating value) at the generator terminals @ 100%, 75%, 50% and minimum (MECL) load engine capacity on natural gas fuel at the following ambient conditions:
    - ISO
    - Average (68 F)
    - Summer (95 F)
    - Winter (24 F)
  - Engine emissions (NO<sub>x</sub>, CO, VOC, CO<sub>2</sub>, PM) at the generator terminals @ 100%, 75%, 50% and minimum load engine capacity (MECL)
  - Estimated performance (output and heat rate) degradation curves up to 100,000 hours of operation
  - Ramp rate in kW/minute
  - Start times (minutes)
  - Minimum on-line/offline times (minutes)
  - Lube oil consumption guarantees 100% load.
- Performance on Ultra Low Sulfur Diesel Fuel
  - Net engine output and net heat rate (higher heating value) at the generator terminals @ 100%, 75%, 50% and minimum (MECL) load engine capacity on ULSD fuel at the following ambient conditions:
    - ISO
    - Average (68 F)
    - Summer (95 F)
    - Winter (24 F)
  - Engine emissions (NO<sub>x</sub>, CO, VOC, CO<sub>2</sub>, PM) at the generator terminals @ 100%, 75%, 50% and minimum load engine capacity (MECL)
  - Estimated performance (output and heat rate) degradation curves up to 100,000 hours of operation
  - Ramp rate in kW/minute
  - Start times (minutes)
  - Minimum on-line/offline times (minutes)
  - Lube oil consumption guarantees 100% load.
- Information regarding the capability of the engines to burn hydrogen, including percent of hydrogen that can be burned (on both a volume and heat content basis), incremental capital and operating costs per engine associated with hydrogen-capable engines, and any changes to the net output, net heat rate, emissions, ramp rate, start time, and minimum on-line/off-line times specified above.
- Comprehensive List of Initial Spare Parts Provided for Option 2
- Detailed Summary of Technical Training Provided with Option 2
- Confirmation that all requirements of Proposer as delineated in the Division of Responsibilities are included
- Date by which all equipment included in Proposer's scope will be delivered to the site

- Documentation of any exceptions with explanation in writing and delineated on the Division of Responsibilities document

**Option 3 Purchase of additional RICE Engine Generator Sets with Associated Auxiliaries**

Proposer will provide pricing for additional RICE engine generators and associated auxiliaries. This pricing shall be all inclusive of the scope delineated in the Division of Responsibilities. Proposer should state the price and confirm the scope of supply provided with this pricing. The Proposer should also state the timeframe for which this pricing for this additional purchase will remain fixed.

**Option 4 Purchase of a Long-Term Service Agreement (“LTSA”) for all RICE Engine Generator Sets with Associated Auxiliaries Provided**

Proposer will provide pricing for the purchase of a Long-Term Service Agreement for all the engine generator sets and auxiliaries provided. The Proposer will include a detailed explanation of spare parts and services and associated discounts included in the LTSA set of comprehensive services. This pricing shall assume annual operating hours of up to approximately 5,500 hours per year and approximately 500 annual starts per unit. The term of the LTSA should be through the completion of the first Major Maintenance cycle, and Proposer shall provide details regarding cumulative hours or annual starts and associated maintenance activities, as applicable.

If the engines are capable of burning hydrogen (as specified for Option 1 and Option 2), proposer will provide pricing for the LTSA described above assuming operation on hydrogen.

**Option 5 Purchase of Operations and Maintenance Services from the Original Equipment Manufacturer**

Proposer will provide pricing for providing comprehensive operations and maintenance by the Original Equipment Manufacturer (“OEM”). This scope of services would include but not be limited to providing all management, operations, and maintenance personnel to effectively operate and maintain the facility for an initial period of three years, with options to extend these services for up to two consecutive one-year periods. The Proposer will provide a detailed explanation of the staffing and scope of services to be provided under this agreement if the option is selected.

If the engines are capable of burning hydrogen (as specified for Option 1 and Option 2), proposer will provide pricing for the operations and maintenance described above assuming operation on hydrogen.