

ATTACHMENT 1

TECHNICAL SPECIFICATIONS

Tygarts Creek Station

Reciprocating Engine-Generator Sets, Outdoor Enclosures, Switchgear, Controls, and
Auxiliaries

KYMEA RFP No. 2026-1
September 2026

1. Scope and Order of Precedence

These Technical Specifications define the minimum technical and performance requirements for the Tygarts Creek Station equipment procurement. KYMEA is soliciting diesel-fueled proposals, natural gas-fueled proposals, or both. Each Base Proposal shall consist of two identical modular stationary reciprocating engine-generator sets, outdoor enclosures, switchgear, controls, auxiliaries, fuel-system equipment, and related services appropriate for the proposed fuel technology. The Proposer shall separately price a third engine-generator set identical to the applicable Base Proposal units and the associated incremental equipment and services.

For proposal evaluation, Proposers shall state net dependable output at 95°F ambient temperature, 764 feet elevation, and the Proposer's stated design humidity. Proposers shall also provide output and derating curves across the guaranteed ambient operating range.

The Proposer shall provide a complete, coordinated equipment package within the Supplier scope identified in Attachment 2, Division of Responsibilities. Omissions that are reasonably necessary for safe, reliable, and compliant operation within the Supplier battery limits shall not relieve the Proposer of responsibility.

If requirements conflict, the following order of precedence applies unless KYMEA directs otherwise in writing:

1. The negotiated procurement agreement, including its amendments and incorporated exhibits.
2. Issued addenda and written clarifications.
3. Attachment 2, Division of Responsibilities, for scope allocation and battery limits.
4. These Technical Specifications.
5. The main RFP and proposal forms.
6. The accepted Proposer proposal, excluding unaccepted exceptions.

2. Project and Site Information

Item	Project Basis
Location	Olive Hill, Kentucky, adjacent to the AEP 69 kV substation.
Coordinates	Approximately 38.293433 degrees N, 83.183361 degrees W.
Elevation	Approximately 233 meters (764 feet) above mean sea level.
Interconnection	Olive Hill single distribution feeder at or near the KYMEA PJM/AEP billing meter.
Nominal voltage	The facility interconnection shall be based on Olive Hill's 12.47 kV nominal, three-phase, 60 Hz, grounded- wye distribution system. The Proposer shall state the proposed generator terminal voltage and include all generator step-up transformers, if required.
Arrangement	Outdoor, self-contained, weather-protective, sound-attenuated packages.
Base quantity	Two identical engine-generator sets.
Expansion option	One additional engine-generator set identical to the Base Proposal units.
Expected operation	Diesel operating scenario: approximately 240 hours per year. Natural gas operating scenario: approximately 2,000 hours per year. Individual runs may range from approximately one hour to as long as one week. These estimates do not guarantee minimum operating hours.
Fuel availability	Ultra-low sulfur diesel delivered by truck for diesel-fueled proposals. For natural gas-fueled proposals, a 4- inch natural gas pipeline operating at approximately 100 psig is located within several hundred feet of the project site. Final available pressure, flow capacity, gas quality, utility metering requirements, service conditions, and point of delivery remain subject to coordination with the serving natural gas utility.
Operating classification	Stationary non-emergency economic, peak-reduction, reliability, and island operation.
Site design range	Proposer shall identify guaranteed ambient operating range and all deratings. Equipment shall be suitable for year-round outdoor service in Kentucky.

3. Facility Configuration and Performance Basis

3.1 Vendor-Neutral Unit Sizing

KYMEA is not prescribing an exact generator-set rating. The Proposer shall select standard commercially available equipment that provides aggregate Base Proposal net dependable output generally near 5 MW in a two-unit configuration while optimizing lifecycle cost, no-export load following, reliability, maintainability, emissions compliance, island performance, and expansion capability.

- State gross kW and kVA per unit, rated power factor, site derating, package auxiliary load, common auxiliary load, electrical losses, and net dependable output at the point of interconnection.
- State net dependable output of the two-unit Base Proposal and the three-unit expanded configuration.

- Identify any proposed configuration that materially departs from two identical Base Proposal units plus an optional third identical unit as an exception.

3.2 Net Dependable Output

Net Dependable Output means the maximum continuous real-power output delivered at the 12.47 kV facility point of interconnection under the specified site conditions, after deduction of all generator-set and facility auxiliary loads and losses necessary for normal operation.

Each unit and the complete facility shall be capable of continuous operation at 100 percent of rated net dependable output. Normal dispatch may target less than maximum output for no-export control, import margin, operating reserve, or engine loading optimization. No blanket 90 percent nameplate limitation is acceptable.

3.3 Operating Modes

- Grid-parallel, behind-the-meter, no-export operation.
- Automatic unit commitment and load following.
- Intentional island operation serving the Olive Hill feeder.
- Black start without normal external AC service.
- Dead-bus energization and staged load addition.
- Load shedding and stable operation with one, two, or three units available.
- Controlled resynchronization and return to grid-parallel operation.

3.4 Minimum Loading and Dispatch Data

Complete the following table using the Proposer's recommended unit-commitment and dispatch strategy. Fuel use shall represent total facility fuel consumption for all online engine-generator sets and shall be stated in gallons per hour for diesel-fueled proposals and in MMBtu/hr and standard cubic feet per hour for natural gas-fueled proposals. Net facility heat rate shall be stated on a higher heating value (HHV) basis using net output at the facility point of interconnection and shall reflect all required auxiliary loads and electrical losses. State the assumed fuel higher heating value used in calculating net facility heat rate. For each output level, identify any operating restrictions, maximum permitted operating durations, aftertreatment limitations, emissions limitations, or maintenance consequences. Identify whether the stated output is achievable with the two-unit Base Proposal or if the stated output requires the optional third engine-generator set. If an output level cannot be achieved continuously within the recommended operating range, enter "Not Recommended" and explain the limitation in the Restrictions/Comments column.

Facility Net Output	Units Online	Gross kW per Online Unit	Percent Load per Online Unit	Total Facility Fuel Use Diesel: gal/hr Natural gas: MMBtu/hr and scfh	Net Facility Heat Rate, HHV (Btu/kWh)	Restrictions/Comments
1 MW						
2 MW						
3 MW						
4 MW						
5 MW						
6 MW						

Assumed fuel higher heating value:

Diesel, Btu/gal: _____

Natural gas, Btu/scf: _____

Minimum-Load Parameter	Proposer Response
Minimum stable load per engine-generator set, kW and % of rated load	
Recommended minimum continuous load per engine-generator set, kW and % of rated load	
Maximum continuous operating duration below the recommended minimum continuous load	
Required recovery, regeneration, or full-load operating procedure following low-load operation	

4. Engine Requirements

- Provide new, unused, stationary, liquid-cooled, four-stroke reciprocating internal combustion engines manufactured and assembled by a recognized original equipment manufacturer (OEM).
- Engines shall be prime-rated or otherwise appropriately rated for planned stationary non-emergency economic dispatch, repeated starts, peak reduction, grid-parallel operation, island operation, and the applicable annual operating profile.
- Diesel-fueled proposals shall use compression-ignition engines designed for ultra-low sulfur diesel.
- Natural gas-fueled proposals shall use spark-ignited or other appropriately designed engines suitable for the specified pipeline natural gas supply and approximately 2,000 operating hours per year.
- Proposer shall identify the applicable rating standard, duty classification, permissible annual operating hours, annual start limitations, overload capability, and all operating restrictions.
- Provide complete starting, intake, turbocharging, charge-air cooling, lubricating, cooling, fuel, ignition where applicable, control, protection, and monitoring systems.
- Provide automatic shutdown and pre-alarm functions for overspeed, overcrank, low oil pressure, high coolant temperature, low coolant level, gas detection where applicable, and other OEM-protected conditions.
- Provide pre-lube and post-lube systems where required by the OEM.
- Provide closed crankcase ventilation or an equivalent system suitable for the enclosure and emissions configuration.
- Provide all specialty tools, diagnostic interfaces, software, cables, and owner-use licenses required for routine operation and maintenance.
- For natural gas-fueled proposals, identify knocking and misfire detection, ignition-system maintenance requirements, spark-plug replacement intervals, lube-oil consumption, and major-overhaul intervals based on approximately 2,000 operating hours per year.
- Proposers offering propane backup capability shall identify fuel-switching procedures, allowable propane composition, output derating, heat-rate changes, emissions impacts, required equipment, and operating limitations.

5. Generator Requirements

- Provide a three-phase synchronous generator suitable for integration with the facility's 12.47 kV nominal, three-phase, 60 Hz, grounded-wye interconnection. The Proposer shall state the proposed generator terminal voltage and shall include all generator step-up transformers, if required, within the proposed equipment scope. The proposed electrical configuration shall support grid-parallel operation, intentional island operation, black start, motor starting, protection, and grounding requirements.
- Generator kW and kVA ratings sufficient for maximum engine output, specified site conditions, reactive-power duty, island operation, and motor starting.
- Form-wound stator, moisture-resistant insulation system, anti-condensation heaters, and RTDs in stator windings and bearings.
- Brushless excitation with permanent-magnet generator where required for transient and fault performance.
- Digital automatic voltage regulator with voltage, volts-per-hertz, overexcitation, loss-of-sensing, reactive-power, and power-factor control functions.
- Phase and neutral terminal boxes, CTs and VTs/PTs required for protection, metering, synchronizing, and control.
- Provide the generator capability curve, reactances, time constants, efficiency curve, short-circuit decrement data, and motor-starting capability with the Proposal.

6. Outdoor Enclosures

- Weather-protective, sound-attenuated enclosure for year-round outdoor industrial service.
- Structural frame, roof, walls, lockable doors, weather seals, safe egress, removable panels, and major-maintenance access.
- Interior LED lighting, GFCI receptacles, space heating, ventilation, motorized dampers, and controls.
- Local exterior emergency stop, fire detection, fuel-leak detection, local alarms, and remote alarm contacts.

- Internal package wiring, piping, tubing, supports, labels, guards, and connection points completed and tested before shipment to the extent practical.
- Certified dimensions, weights, center of gravity, lifting points, foundation loads, operating clearances, and removal paths.

7. Cooling and Exhaust Systems

- Integral radiator system preferred, including fans, drives, guards, expansion provisions, controls, coolant, and package piping.
- Full-load enclosure heat balance and guarantee at stated maximum ambient condition.
- Combustion air intake, filters, weather protection, screens, ductwork, and flexible connections within package scope.
- Exhaust flexible connector, silencer, required emissions aftertreatment, expansion provisions, drains, and package-side piping.
- Certified backpressure calculation for the complete installed exhaust system, including fouling allowance.
- Stack and external support requirements shall be coordinated with the Division of Responsibilities and final air permit.

8. Fuel Supply, Storage, and Delivery

8.1 General

The Proposer shall provide a complete fuel-system design appropriate for the proposed fuel technology and shall clearly define all Supplier, Contractor, utility, and KYMEA battery limits. Fuel-system equipment shall support safe, reliable, remotely operated grid-parallel, island, and black-start service.

8.2 Diesel Fuel System

For diesel-fueled proposals, the Base Proposal shall include a complete diesel fuel-storage and delivery system providing at least 12 hours of operation at full net dependable output. The Proposer shall separately price an increase to 24 hours of full-load autonomy.

- Recommend individual sub-base or day tanks, common bulk storage with individual day tanks, or another technically justified arrangement.
- Provide listed double-wall tanks with gross, usable, reserve, and unusable volumes identified.
- Provide continuous level indication, high/high-high and low/low-low alarms, leak detection, and overfill protection.
- Provide truck-fill connection, spill container, grounding point, vents, drains, inspection access, and emergency shutoff.
- Provide transfer pumps, strainers, isolation and check valves, pressure relief, filtration, water separation, and fuel cooling where required.
- Provide package piping and flexible engine connections and clearly define field-piping battery limits.
- Separately price a diesel fuel-polishing system unless required for warranty or reliable operation.

8.3 Natural Gas Fuel System

For natural gas-fueled proposals, a 4-inch natural gas pipeline operating at approximately 100 psig is located within several hundred feet of the project site. The Proposer shall identify the gas flow, pressure, temperature, and quality required at the facility and at each engine-package gas inlet.

- State minimum, normal, and maximum required gas pressure.
- State maximum hourly and instantaneous gas demand for the two-unit Base Proposal and optional three-unit configuration.
- State natural gas consumption in MMBtu/hr and standard cubic feet per hour at 25%, 50%, 75%, 90%, and 100% unit load and at each requested facility-output level.
- Identify allowable heating-value range, Wobbe index range if applicable, methane number, moisture, sulfur, siloxane, hydrocarbon-dew-point, and contaminant limitations.

- Provide all engine-package gas trains and all package-level filtration, pressure regulation, overpressure protection, shutoff valves, venting, instrumentation, gas detection, and controls required by the engine OEM. The Contractor will design and furnish the common natural gas receiving station and site gas-distribution piping as assigned in Attachment 2. The Proposer shall define and guarantee the required pressure, flow, temperature, gas quality, flange rating, and other interface requirements at the flanged connection at each engine-package gas inlet.
- Identify whether gas heating or compression is required and state all supporting assumptions.
- Define the natural gas battery limit and identify all utility, Contractor, and KYMEA responsibilities.
- Identify required responses to low pressure, high pressure, loss of gas supply, gas-quality excursions, regulator failure, and gas-detection alarms.
- Provide fuel-system P&IDs, hazardous-area classifications, ventilation requirements, relief and vent termination requirements, and applicable code-compliance information.
- Identify any natural gas utility studies, service agreements, metering facilities, pressure-regulation facilities, or other third-party work required for the proposed facility.

8.4 Optional Propane Backup

For natural gas-fueled proposals, provide separately priced options for 12 hours and 24 hours of full-load operation on propane if the proposed engines are capable of propane operation.

- Identify required propane composition and quality.
- State propane consumption, usable storage volume, output derating, heat-rate change, emissions impacts, maintenance impacts, and operating limitations.
- Describe whether fuel transfer is automatic or manual and whether interruption of generator output is required.
- Provide the propane storage, vaporization, pressure regulation, heating, gas train, controls, detection, emergency shutdown, and other equipment required for a complete and operable backup-fuel system.
- Clearly identify any components shared between the natural gas and propane systems.
- If propane operation is unavailable for the proposed engine, state "Not Available."

9. Emissions and Environmental Compliance

Equipment shall be legally certified or otherwise approved for stationary non-emergency operation. Equipment certified solely for emergency stationary use is not acceptable as the Base Proposal.

- Meet all applicable U.S. EPA stationary reciprocating internal combustion engine requirements for the proposed fuel and engine technology, all Kentucky air-permitting requirements, and all final permit limitations. Proposers shall identify whether the proposed engines are compression-ignition or spark-ignition and shall identify the applicable federal regulatory subcategory and compliance basis.
- Provide certified emissions data and potential-to-emit data for NO_x, CO, VOC, PM, PM₁₀, PM_{2.5}, SO₂, CO₂, hazardous air pollutants, and other regulated pollutants requested by KYMEA.
- Provide exhaust flow, temperature, oxygen, moisture, stack data, deterioration factors, fuel consumption, and aftertreatment operating windows.
- Provide monitoring, alarms, recordkeeping interfaces, sampling ports, and OEM support required for commissioning and compliance testing.
- Provide emissions and potential-to-emit calculations based on 240 annual operating hours for diesel-fueled proposals and 2,000 annual operating hours for natural gas-fueled proposals. For proposals offering propane backup, separately state the assumed annual propane operating hours and resulting emissions and potential-to-emit calculations.

10. Noise Requirements

The preliminary maximum facility sound level is 65 dBA at the nearest off-site property line or occupied receptor with all installed units operating at full load, unless a more restrictive applicable requirement governs. Provide a separately priced 60 dBA alternate if practical.

For proposal purposes, the Proposer shall clearly state the assumed equipment arrangement, receptor locations, distances, terrain, reflecting surfaces, and other acoustic-model assumptions. Final property-line compliance

guarantees will be adjusted, if necessary, based on the final approved site layout, provided the Supplier-furnished equipment does not exceed the guaranteed source sound levels.

- Submit octave-band sound-power data for enclosure breakout, radiator fans, combustion air, exhaust, and other significant sources.
- Submit cumulative acoustic model for two-unit and three-unit configurations, assumptions, receptor locations, tonal corrections, and guaranteed result.
- Support post-installation sound testing and correction of deficiencies attributable to Supplier equipment.

11. 15 kV-Class Switchgear and Electrical Equipment

- Provide metal-clad or other suitable listed 15 kV-class switchgear with generator breakers, transformer-primary breakers where applicable, and the utility-intertie breaker as defined by the final one-line diagram.
- Bus and physical provisions sized for the optional third identical unit.
- Automatic and manual synchronizing, synch-check, dead-bus logic, protective-relay hardware, lockouts, test switches, and multifunction meters.
- Station-service transformer, AC and DC control power, chargers, and distribution required within Supplier scope.
- Surge protection, neutral grounding equipment, cable termination provisions, equipment grounding pads, and internal bonding.
- KYMEA will establish the final protection philosophy and relay settings. Supplier shall provide complete OEM requirements, data, settings for package devices, and test support.

12. Controls, No-Export, Islanding, and SCADA

- OEM local controller and HMI for each engine-generator set, with alarm/event logs and self-diagnostics.
- Master plant controller coordinating the two Base Proposal units and optional third unit.
- Automatic synchronization, kW dispatch, ramping, import/export regulation, reactive-power and power-factor control.
- Continuous monitoring of power flow at the Olive Hill/AEP billing point and adjustable minimum-import margin.
- Fast runback, unloading, unit shutdown/trip, meter-failure, communications-failure, and load-step response logic to prevent unintended export.
- Isochronous frequency control, voltage control, load sharing, island transfer, load shedding, black start, dead-bus closing, and resynchronization.
- Modbus TCP and/or DNP3, complete point list and register map, time synchronization, managed network equipment within package scope, and owner-controlled remote vendor access.
- KYMEA will perform master SCADA programming and provide the external communications network unless included in a turnkey alternate.
- For natural gas-fueled proposals, identify all fuel-system equipment requiring AC or DC power and demonstrate that the complete natural gas fuel system will support black start without normal external AC service. If gas compression, heating, ventilation, or other fuel-system auxiliaries require external power, include the equipment and starting sequence necessary to make those systems available during black start.

13. Submittals with Proposal

- Proposal and associated pricing demonstrating compliance with the Division of Responsibilities set forth in Attachment 2.
- Manufacturer, model, unit count, ratings, and emissions configuration.
- Gross and net output for Base Proposal and third-unit option.
- Site derating and auxiliary-load reconciliation.
- Fuel consumption at 25%, 50%, 75%, 90%, and 100% unit load and at 1 MW facility-output increments.
- Minimum-load, unit-commitment, fuel-specific low-load effects, aftertreatment, and maintenance information, including wet-stacking information for diesel-fueled proposals and misfire, knock, catalyst-temperature, and ignition-system information for natural gas-fueled proposals.

- General arrangements, dimensions, weights, clearances, and preliminary foundation loads.
- Preliminary one-line diagram, control architecture, battery limits, and communications architecture.
- Noise data and preliminary cumulative acoustic prediction.
- Certified emissions and air-permit support data.
- Maintenance schedule, overhaul intervals, lube-oil consumption, consumables, and estimated maintenance costs.
- Factory test plan, field test plan, training plan, warranty, availability data, and delivery schedule.
- Separate prices for all RFP options and all exceptions.
- For diesel-fueled proposals, provide diesel consumption in gallons per hour, required usable storage volumes, tank arrangement, water-management provisions, and fuel-quality maintenance recommendations.
- For natural gas-fueled proposals, provide fuel consumption in MMBtu/hr and standard cubic feet per hour, minimum and maximum pressure requirements, gas-quality limits, gas-train requirements, gas heating or compression requirements, utility-interface assumptions, and expected annual maintenance costs based on approximately 2,000 operating hours per year.
- For natural gas-fueled proposals offering propane backup, provide propane consumption, required usable storage volume, fuel-switching methodology, expected full-load runtime, output derating, emissions impacts, and maintenance implications.

14. Engineering Submittals After Award

- Certified general arrangement and foundation-load drawings.
- P&IDs for fuel, cooling, lubrication, exhaust, drains, and aftertreatment.
- Electrical one-lines, elementary diagrams, interconnection diagrams, terminal plans, cable requirements, and auxiliary-load schedule.
- Controls narrative, cause-and-effect matrix, permissives, interlocks, I/O list, SCADA point map, and network diagram.
- OEM machine data required for short-circuit, coordination, arc-flash, grounding, motor-starting, and protection studies.
- Heat balance, ventilation demand, fuel consumption, emissions, acoustic, and exhaust-backpressure calculations.
- Bills of material, equipment data sheets, installation instructions, storage requirements, and preservation procedures.
- Draft and final O&M manuals, spare-parts lists, software backups, licenses, and as-built documents.

15. Factory Testing, Field Testing, and Commissioning

Field demonstration of guaranteed output and performance is subject to the availability of sufficient load, fuel, utility authorization, and completed Contractor- and KYMEA-furnished systems. If site conditions prevent a complete field demonstration, the parties shall use an agreed combination of factory-test data, corrected field-test data, and temporary load-bank testing to verify the applicable guarantees.

- Complete OEM factory production test of each engine-generator set with certified report.
- Factory functional testing of switchgear, generator controls, master plant controls, alarms, communications, and simulated operating sequences.
- Provide at least four weeks' advance notice of witness tests unless otherwise agreed.
- OEM-supervised installation review, pre-start inspection, initial startup, paralleling, and tuning.
- Demonstrate grid-parallel operation, no-export control, load following, island operation, load sharing, black start, dead-bus energization, load shedding, and resynchronization.
- Demonstrate 100 percent net dependable output, fuel consumption, cooling performance, emissions-system operation, and acoustic compliance.
- Test meter-loss and communications-loss responses and representative intrahour load changes.
- Provide an optional temporary resistive/reactive load bank if Olive Hill load cannot support required test conditions.
- Complete an agreed reliability run and submit signed final test reports and deficiency closure records.

16. Delivery, Installation Support, Training, and Warranty

- FOB delivery to the Olive Hill site, including packing, preservation, cargo insurance, permits, route review, and advance shipping documentation.
- Ship equipment as completely assembled as transportation constraints allow. Identify all loose-shipped items and installation by others.
- Provide installation manuals, checklists, tolerances, hold points, and sufficient OEM field-service support.
- Provide project-specific operator, maintenance, electrical, controls, cybersecurity, and safety training separate from startup activities.
- Provide specialty tools and commissioning spares. Separately price two-year operating spares and capital spares as identified in RFP Form 3.
- Provide coordinated equipment and performance warranties covering all Supplier-furnished components, guarantees, software, and third-party package equipment.
- Separately price the extended warranty and LTSA options identified in RFP Form 3. The LTSA proposal shall describe and price, as applicable, preventive maintenance, major-maintenance support, emergency field-service response, long-term parts support, exclusions, escalation provisions, and other available service coverage.

Appendix A. Required Proposal Data Schedule

Required Data	Proposer Response
Manufacturer and model	
Number of Base Proposal units	2
Optional identical third unit	Yes / No
Gross kW per unit	
Generator kVA and rated power factor	
Net dependable Base Proposal MW at POI	
Net dependable expanded MW at POI	
Minimum stable kW per unit	
Recommended minimum continuous load (%)	
Start to synchronization time (minutes)	
Ramp rate (kW/minute)	
Proposed primary fuel	
Engine combustion type	
Diesel fuel use at 25%, 50%, 75%, 90%, 100%, gal/hr	Attach curve
Natural gas fuel use at 25%, 50%, 75%, 90%, 100%, MMBtu/hr and scfh	Attach curve
Natural gas minimum required pressure, psig	
Natural gas maximum allowable pressure, psig	
Maximum two-unit natural gas demand, MMBtu/hr and scfh	
Maximum three-unit natural gas demand, MMBtu/hr and scfh	
Gas compression required	Yes / No
Gas heating required	Yes / No
Natural gas heating-value and methane-number requirements	
Propane backup available	Yes / No
Propane output derating, if any	
Twelve-hour propane usable storage volume	
Twenty-four-hour propane usable storage volume	
Expected annual maintenance cost at applicable operating profile	
Major maintenance interval in operating hours and starts	
Twelve-hour diesel usable storage volume, if applicable	
Twenty-four-hour diesel usable storage volume, if applicable	
Maximum guaranteed ambient at full output	
Guaranteed facility noise at receptor	
EPA/non-emergency compliance basis	
Guaranteed delivery date	