# ENGINEERING DATA SUBMITTAL
For the Interconnection of Generation System

Nodak ELECTRIC COOPERATIVE
Your Touchstone Energy® Partner

**WHO SHOULD FILE THIS SUBMITTAL**: Anyone in the final stages of interconnecting a Generation System with Nodak Electric Cooperative, Inc. This submittal shall be completed and provided to Nodak Electric's Engineering Department during the design of the Generation System, as established in the "Nodak Electric's Interconnection Process for Distributed Generation Systems".

**INFORMATION:** This submittal is used to document the interconnected Generation System. The Applicant's Engineer (if applicable) should complete as much of the form as applicable and the Applicant shall sign and return the form to Nodak Electric. The Applicant will be contacted if additional information is required.

| **OWNER / APPLICANT** | | |
|---|---|---|
| Company / Applicant: | | |
| Representative: | Phone Number: | FAX Number: |
| Title: | | |
| Mailing Address: | | |
| Email Address: | | |

| **PROPOSED LOCATION OF GENERATION SYSTEM INTERCONNECTION** |
|---|
| Street Address, Legal Description or GPS coordinates: |

| **PROJECT DESIGN / ENGINEERING** (if applicable) | | |
|---|---|---|
| Company: | | |
| Representative: | Phone: | FAX Number: |
| Mailing Address: | | |
| Email Address: | | |

| **ELECTRICAL CONTRACTOR** (if applicable) | | |
|---|---|---|
| Company: | | |
| Representative: | Phone: | FAX Number: |
| Mailing Address: | | |
| Email Address: | | |

| **TYPE OF INTERCONNECTED OPERATION** |
|---|
| Interconnection / Transfer method:<br>□ Open □ Closed □ Soft Loading □ Extended Parallel □ Inverter |

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| | |
|---|---|
| Proposed use of generation: (Check all that may apply)<br>□ Peak Reduction □ Standby □ Energy Export Sales<br>□ Cover Load | Duration Parallel:<br>□ None □ Limited □ Continuous |
| **Transfer Switch Mfg.** _____ **Model** _____ | **Amps: Switchgear** _____ **Transfer Switch** _____ |

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| **ESTIMATED LOAD** | | |
|---|---|---|
| The following information will be used to help properly design the interconnection. This Information is not intended as a commitment or contract for billing purposes. | | |
| Minimum anticipated load (generation not operating): | kW: | kVA: |
| Maximum anticipated load (generation not operating): | kW: | kVA: |

| **GENERATION SYSTEM OPERATING INFORMATION** | |
|---|---|
| Fuel Capacity (gals): | Full Fuel Run-time (hrs): |
| Engine Cool Down Duration (Minutes): | Start time Delay on Load Shed signal: |
| Start Time Delay on Outage (Seconds): | |

| **GENERATION SYSTEM OPERATION / MAINTENANCE CONTACT INFORMATION** | | |
|---|---|---|
| Maintenance Provider: | Phone #: | Pager #: |
| Operator Name: | Phone #: | Pager #: |
| Person to Contact before remote starting of units | | |
| Contact Name: | Phone #: | Pager #: |
| | 24hr Phone #: | |

| **REQUESTED CONSTRUCTION START/COMPLETION DATES** | |
|---|---|
| Design Completion: | |
| Construction Start Date: | |
| Footings in place: | |
| Primary Wiring Completion: | |
| Control Wiring Completion: | |
| Start Acceptance Testing: | |
| Generation operational (In-service): | |

| **TRANSFER SWITCH** (If applicable) | |
|---|---|
| **Number of Transfer Switches planned** _____ | **Amperage of Switchgear & Transfer Switches** |
| **1. Transfer Switch Mfg.** _____ **Model** _____ | **Switchgear** _____ **Transfer Switch** _____ |
| **2. Transfer Switch Mfg.** _____ **Model** _____ | **Switchgear** _____ **Transfer Switch** _____ |
| **3. Transfer Switch Mfg.** _____ **Model** _____ | **Switchgear** _____ **Transfer Switch** _____ |
| **4. Transfer Switch Mfg.** _____ **Model** _____ | **Switchgear** _____ **Transfer Switch** _____ |
| **5. Transfer Switch Mfg.** _____ **Model** _____ | **Switchgear** _____ **Transfer Switch** _____ |

| **Relay Information :** Please Include pickup setting and time delay for each protective element | | | |
|---|---|---|---|
| **Relay Type** | | **Relay Model No.** | |
| **CT Ratio** | | **VT Ratio** | |
| Under-voltage (27) | | Reverse Power (32R) | |
| Over-current (50/51) | | Lockout Relay (86) trips… | |
| Over-voltage (59) | | Synch Check Relay (25) | |
| Under-frequency (81U) | | Parallel Limit Timer (62PL) | |
| Over-frequency (81O) | | | |

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| **PRIME MOVER** (Complete all applicable items) | | | |
|---|---|---|---|
| Unit Number: | Type: | | |
| Manufacturer: | | | |
| Serial Number: | | Date of Manufacture: | |
| H.P. Rated: | H.P. Max: | Inertia Constant: | lb.-ft.$^2$ |
| Energy Source (hydro, steam, wind, wind etc.): | | | |

| **SYNCHRONOUS GENERATOR** (if applicable) | | | |
|---|---|---|---|
| Unit Number: | Total number of units with listed specifications on site: | | |
| Manufacturer: | Type: | Phases: 1 or 3 | |
| Serial Number (each) | Date of manufacture: | Speed (RPM): | Freq. (Hz); |
| Rated Output (each unit) kW Standby: | kW Prime: | kVA: | |
| Rated Power Factor (%): | Rated Voltage(Volts): | Rated Current (Amperes): | |
| Field Voltage (Volts): | Field Current (Amperes): | Motoring Power (kW): | |
| Synchronous Reactance ($X_d$): | % on | kVA base | |
| Transient Reactance ($X'_d$): | % on | kVA base | |
| Subtransient Reactance ($X''_d$): | % on | kVA base | |
| Negative Sequence Reactance ($X_2$): | % on | kVA base | |
| Zero Sequence Reactance ($X_o$): | % on | kVA base | |
| Neutral Grounding Resistor (if applicable): | | | |
| $I^2t$ or K (heating time constant): | | | |
| Exciter data: | | | |
| Governor data:<br>Additional Information: | | | |

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| **INDUCTION GENERATOR** (if applicable) | | | |
|---|---|---|---|
| Rotor Resistance ($R_r$): | Ohms | Stator Resistance ($R_s$): | Ohms |
| Rotor Reactance ($X_r$): | Ohms | Stator Reactance ($X_s$): | Ohms |
| Magnetizing Reactance ($X_m$): | Ohms | Short Circuit Reactance ($X_d$"): | Ohms |
| Design Letter: | | Frame Size: | |
| Exciting Current: | | Temp Rise (deg C°): | |
| Rated Output (kW): | | | |
| Reactive Power Required: | | k Vars (no Load) | kVars (full load) |
| If this is a wound-rotor machine, describe any external equipment to be connected (resistor, rheostat, power converter, etc.) to rotor circuit, and circuit configuration. Describe ability, if any, to adjust generator reactive output to provide power system voltage regulation. | | | |
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| Additional Information: | | | |

| **INTERCONNECTION (STEP-UP) TRANSFORMER** (If applicable) | | | |
|---|---|---|---|
| Manufacturer: | | kVA: | |
| Date of Manufacture: | Serial Number: | | |
| High Voltage: kV | Connection: delta wye | Neutral solidly grounded? | |
| Low Voltage: kV | Connection: delta wye | Neutral solidly grounded? | |
| Transformer Impedance (Z): | % on | kVA base | |
| Transformer Resistance (R): | % on | kVA base | |
| Transformer Reactance (X): | % on | kVA base | |
| Neutral Grounding Resistor (if applicable) | | | |

| **INVERTER** (If applicable) | | |
|---|---|---|
| Manufacturer: | Model: | |
| Rated Power Factor (%): | Rated Voltage (Volts): | Rated Current (Amperes): |
| Inverter Type (ferroresonant, step, pulse-width modulation, etc.): | | |
| Type of Commutation: forced line | Minimum Short Circuit Ratio required: | |
| Minimum voltage for successful commutation: | | |
| Current Harmonic Distortion | Maximum Individual Harmonic (%): | |
| | Maximum Total Harmonic Distortion (%): | |
| Voltage Harmonic Distortion | Maximum Individual Harmonic (%): | |
| | Maximum Total Harmonic Distortion (%): | |
| Describe capability, if any, to adjust reactive output to provide voltage regulation: | | |
| **NOTE:** *Attach all available calculations, test reports, and oscillographic prints showing inverter output voltage and current waveforms.* | | |

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| **POWER CIRCUIT BREAKER** (if applicable) | |
|---|---|
| Manufacturer: | Model: |
| Rated Voltage (kilovolts): | Rated Ampacity (Amperes): |
| Interrupting Rating (Amperes): | BIL Rating: |
| Interrupting Medium (vacuum, oil, gas, etc.) | Insulating Medium (vacuum, oil, gas, etc.) |
| Control Voltage (Closing): (Volts) AC DC | |
| Control Voltage (Tripping): (Volts) AC DC Battery Charged Capacitor | |
| Close Energy (circle one): Spring Motor Hydraulic Pneumatic Other | |
| Trip Energy (circle one): Spring Motor Hydraulic Pneumatic Other | |
| Bushing Current Transformers (Max. ratio): | Relay Accuracy Class: |
| CT'S Multi Ratio? (circle one); No / Yes: (Available taps): | |

| **MISCELLANEOUS** (Use this area and any additional sheets for applicable notes and comments) |
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## SIGN OFF AREA

**This Engineering Data Submittal documents the equipment and design of the Generation System. We agree to supply Nodak Electric with an updated Engineering Data Submittal any time significant changes are made in the equipment used or the design of the proposed Generation System. The Applicant agrees the Generation System will be designed, operated and maintained within the requirements set forth by Nodak Electric.**

_____ _____

**Applicant Name (printed)** **Representing/Company or Business**

_____ _____

**Applicant Signature** **Date**