



GENERATOR INTERCONNECTION PROJECT

Level 4 & 5

**For All Projects with Aggregate Generator Output of More Than 550 kW.
Level 4 is > 550 kWac to ≤ 1 MWac; Level 5 is > 1 MWac**

ELECTRIC UTILITY CONTACT INFORMATION		FOR OFFICE USE ONLY	
Consumers Energy Interconnection Coordinator 1945 West Parnall Road (Room P12-235) Jackson, MI 49201 517-788-1432 Interconnection E-mail: customer.generation@cmsenergy.com		Application Number	
		Date and Time Application Received	
APPLICANT / ACCOUNT INFORMATION			
Project Name		Rate Type (Commercial, Industrial)	
Applicant Name or Legal Entity name		Applicant Mailing Address (state and zip)	
Applicant Phone Number ()		Applicant E-mail Address (Optional)	
INSTALLATION INFORMATION Project Developer/Single Point of Contact			
Name		Phone Number ()	
Developer company or Point of Contact Company Name:			
Address			
E-Mail Address			
Project Site Address, must include city, township, county, state, zip code			
EXISTING GENERATION ON SITE			
Other than electrically isolated backup generation, are there any existing generators on site? (Are you modifying or adding capacity to an existing system?) <input type="checkbox"/> Yes <input type="checkbox"/> No		What program is the existing generation enrolled in?	
System Type (Solar, Wind, Anaerobic Digester, Diesel, etc.)		Total Generator(s) Nameplate AC Rating _____ kW	
GENERATION SYSTEM SITE INFORMATION			
Project Type (Base load, Peaking, Intermittent)		Energization Date for Project Interconnection Facilities	
First Parallel Operation Date for Testing		Project Commercial Operation Date	
Estimated Project Cost		Operation Mode	
Attached Applicant's Proof of General Liability Insurance for a minimum of \$2,000,000 for Level 4 and \$3,000,000 for Level 5			
Page # _____			
Attached Site Control may be demonstrated by providing documents (must be attached):			
- Ownership of, a leasehold interest in, or a right to develop a site for the purpose of constructing and operating a Distributed Energy Resource (DER).			

- An enforceable option to purchase or acquire a leasehold site.

A legally binding agreement transferring a present real property right to specified real property along with the right to construct and operate a DER on the specified real property for a period not less than 5 years.

Page # _____

GENERATION SYSTEM MANUFACTURER INFORMATION

System Type (Solar, Anaerobic Digester, Diesel, etc):	Generator Type (Inverter, Induction, Synchronous):
Total Generator(s) Nameplate AC Rating (kW):	Expected Annual Output in Kilowatt Hours (kWh/year):
Generator A.C. Operating Voltage:	Wiring Configuration (Single phase, Three phase):
Export Capacity (kW):	If power limited, list protective method (reverse power relay, min-import relay, UL PCS Certification, Load Offset):
If load offset, list the verifiable minimum load:	

BATTERY STORAGE INFORMATION

Will a stored energy system be onsite (Battery): <input type="checkbox"/> Yes <input type="checkbox"/> No	Is the battery AC or DC coupled: <input type="checkbox"/> AC <input type="checkbox"/> DC	
Battery manufacturer:	Battery Model Name:	
Battery Model Number:	Battery Power Rating (kWh):	Other Chemistry Type:
Battery Chemistry Type: Lead Acid, Lithium Ion, Lithium Iron Phosphate or Other: <input type="checkbox"/> Lead Acid <input type="checkbox"/> Lithium Ion <input type="checkbox"/> Lithium Iron <input type="checkbox"/> Phosphate <input type="checkbox"/> Other:		
Battery Max Output Rating (kW):	Storage Capacity (kWh):	
# of Batteries onsite:	Include Battery Spec Sheet(s):	

METER SOCKET DETAIL INFORMATION

Electrician's Name:	Electrician's phone number:
Electric phase: Single or Three: <input type="checkbox"/> Single <input type="checkbox"/> Three	How many wires (2 or 3) for the Single Phase configuration: <input type="checkbox"/> 2 <input type="checkbox"/> 3
How many wires (3 or 4) for the Three Phase configuration: <input type="checkbox"/> 3 <input type="checkbox"/> 4	What is the wire gauge leaving the panel going into the meter socket:
Single or Parallel conductor going in? <input type="checkbox"/> Single <input type="checkbox"/> Parallel	Wire size coming out of the meter socket (level 2 and 3 generator Meter info):
Is the service to the site: <input type="checkbox"/> Overhead (OH) <input type="checkbox"/> Underground (UG)	Single or Parallel conductor coming out? <input type="checkbox"/> Single <input type="checkbox"/> Parallel
Generator AC Operating Voltage (120/240, 240/480, 120/208 three phase or 480* (*with Consumers Energy approval only): <input type="checkbox"/> 120/240 <input type="checkbox"/> 240/480 <input type="checkbox"/> 120/208 three phase <input type="checkbox"/> 480*	

Meter socket pickup location is based on the nearest Consumers Energy Service Center to the project. Consideration may be taken if your requested pickup location is different than assignment.

METER SOCKET RETRIEVAL WILL NOT BE AVAILABLE UNTIL APPROVAL HAS BEEN GRANTED FOR CONSTRUCTION.

Meter Socket requested pick up location:	Meter socket requested pick up date:
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Attached Site Plan

Page # _____

Attached Electrical One-Line Drawing

Page # _____

(Per MPSC Rule – The One-Line Drawing must be signed and sealed by a licensed professional engineer, licensed in the State of Michigan.)

- See Page 8 for sample Site Plan
- See Page 10 for sample of Inverter Generator Electrical One-Line Drawing
- See Page 12 for sample of Synchronous Generator Electrical One-Line Drawing
- See Page 14 for sample of Induction Generator Electrical One-Line Drawing

Attached Specification for Equipment

Page # _____

ISOLATING TRANSFORMER(S) BETWEEN GENERATOR(S) AND UTILITY

Transformer Model Number	Transformer Manufacturer
Rated kV and connection (delta, wye, wye-gnd) of each winding	kVA of each winding (kVA)
BIL of each winding (kV)	Fixed taps available for each winding
Positive/Negative range for any Load Tap Changing (LTC) windings	%Z impedance on transformer self cooled rating
Percent Excitation current at rated kV	Load Loss Watts at full load or X/R ratio <input type="checkbox"/> Full Load <input type="checkbox"/> X/R ratio

**SYNCHRONOUS, INDUCTION AND INVERTER GENERATOR - BASED SYSTEMS
(Must complete Page 5, Page 6 or Page 7 and attach Electrical One-Line Drawing)**

The following information on these system components shall appear on the Electrical One-Line Drawing:

- Breakers – Rating, location and normal operating status (open or closed)
- Buses – Operating voltage
- Capacitors – Size of bank in Kvar
- Circuit Switchers – Rating, location and normal operating status (open or closed)
- Current Transformers – Overall ratio, connected ratio
- Fuses – Normal operating status, rating (Amps), type
- Generators – Capacity rating (kVA), location, type, method of grounding
- Grounding Resistors – Size (ohms), current (Amps)
- Isolating Transformers – Capacity rating (kVA), location, impedance, voltage ratings, primary and secondary connections and method of grounding
- Potential Transformers – Ratio, connection
- Reactors – Ohms/phase
- Relays – Types, quantity, IEEE device number, operator lines indicating the device initiated by the relays
- Switches – Location and normal operating status (open or closed), type, rating
- Tagging Point – Location, identification

Manufacturer	Model Name	Model Number
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CUSTOMER AND PROJECT DEVELOPER/CONTRACTOR SIGNATURES AND FEES

Non-export Interconnection Application Fee Certified (\$100 + \$1/kWac or Non-Certified (\$100 + \$2/kWac)

See MPSC Rule 460.942 to determine if applicable.

Fast Track Interconnection Application Fee Certified (\$100 + \$1/kWac or Non-Certified (\$100 + \$2/kWac)

See MPSC Rule 460.944 to determine if applicable.

Study Track Interconnection Application Fee: \$300

See MPSC Rule 460.952 to determine if applicable.

Check # _____

Money Order # _____

Request invoice to pay by ACH, Credit Card

Please send a check for the fee payable to **Consumers Energy** along with the signed and completed application to:

Consumers Energy
Interconnection Coordinator
1945 West Parnall Road (Room 12-235)
Jackson, MI 49201

Application Amount \$ _____

Sign and Return Completed Application with Application Fee to Electric Utility Contact

To the best of my knowledge, all the information provided in this application form is complete and correct.

Applicant Signature: _____ Date _____

Project Developer/Contractor Signature (if applicable): _____ Date _____

Note: Refer to the applicable "Consumers Energy Company Generator Interconnection Procedures" for a detailed explanation of the Interconnection Process, Fees, Timelines, and Technical Requirements.

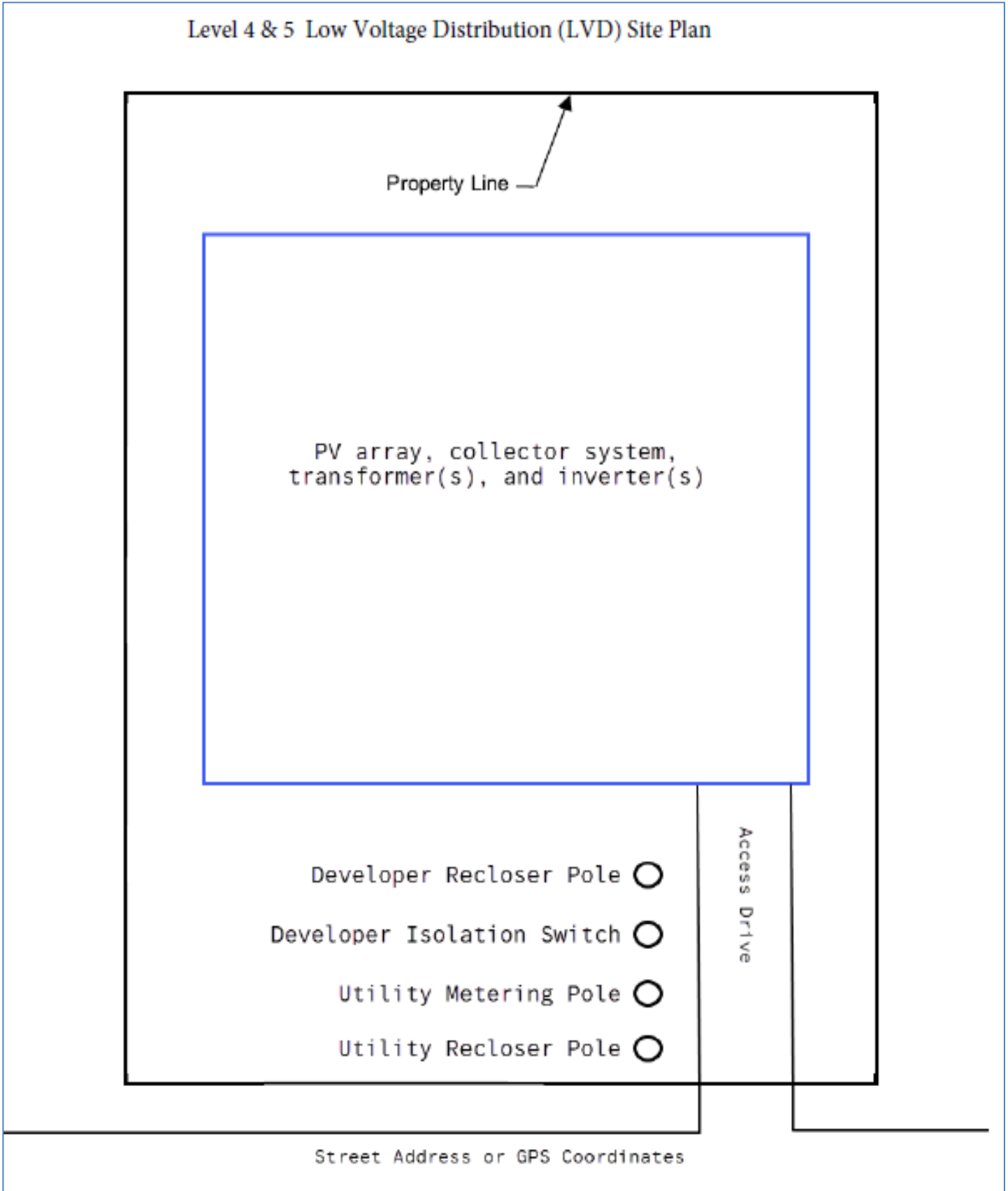
For this project, is there an interest in a Power Purchase Agreement (PPA) _____

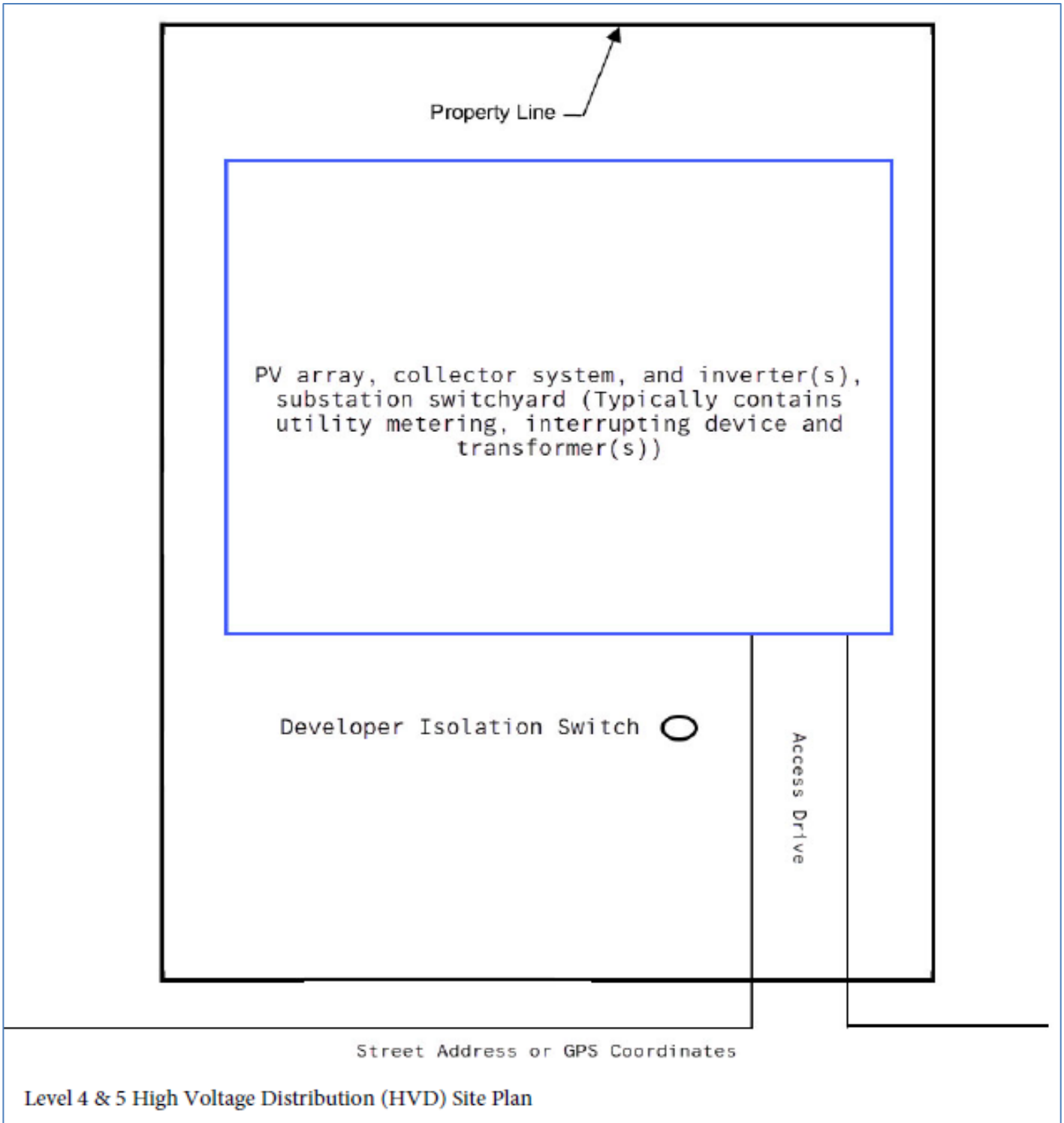
For this project, Is there an interest in participating in one of our company's IRP solicitations _____

INVERTER GENERATORS	
GENERATOR INFORMATION	
Energy Source (Solar, Battery, etc)	Total Generation Nameplate AC Rating (kW)
AC Operation Voltage	Manufacturer
Model (Name/Number)	Are the inverters certified? _____
SYNCHRONOUS GENERATORS	
GENERATOR INFORMATION	
Generator Nameplate Voltage	Total Generator Nameplate AC Rating (kW)
Generator Nameplate Power Factor (pf)	RPM
TECHNICAL INFORMATION	
Minimum and Maximum Acceptable Terminal Voltage	
Stator Resistance in ohms	
Negative Sequence Reactance in ohms	
Zero Sequence Reactance in ohms	
Neutral Grounding Resistor in ohms (If Applicable)	
Direct Axis Transient Reactance (unsaturated) in ohms	
Quadrature Axis Transient Reactance (unsaturated) in ohms	
Direct Axis Sub-Transient Reactance (saturated) in ohms	
Direct Axis Sub-Transient Reactance (unsaturated) in ohms	
Leakage Reactance	
Direct Axis Transient Open Circuit Time Constant	
Quadrature Axis Transient Open Circuit Time Constant	
Direct Axis Sub-Transient Open Circuit Time Constant	
Quadrature Axis Sub-Transient Open Circuit Time Constant	
Open Circuit Saturation Curve	
Reactive Capability Curve Showing Overexcited and Underexcited Limits (Reactive Information if Non-Synchronous)	
Excitation System Block Diagram with Values for Gains and Time Constants (Laplace Transforms)	
Short Circuit Current Contribution From Generator at the Point of Common Coupling	
Rotating Inertia of Overall Combination Generator, Prime Mover, Couplers and Gear Drives	
Station Power Load When Generator is Off-Line, Watts, pf	
Station Power Load During Start-Up, Watts, pf	

Station Power Load During Operation, Watts, pf	
INDUCTION GENERATORS	
GENERATOR INFORMATION	
Generator Nameplate Voltage	Total Generator Nameplate AC Rating (kW)
Generator Nameplate Power Factor (pf)	RPM
TECHNICAL INFORMATION	
Synchronous Rotational Speed	Rotation Speed at Rated Power
Slip at Rated Power	
Minimum and Maximum Acceptable Terminal Voltage	
Motoring Power (kW)	
Neutral Grounding Resistor in ohms (If Applicable)	
I2 2t or K (Heating Time Constant)	
Rotor Resistance in ohms	
Stator Resistance in ohms	
Stator Reactance in ohms	
Rotor Reactance in ohms	
Magnetizing Reactance	
Short Circuit Reactance	
Exciting Current	
Temperature Rise	
Frame Size	
Design Letter	
Reactive Power Required in Vars (No Load)	
Reactive Power Required in Vars (Full Load)	
Short Circuit Current Contribution from Generator at the Point of Common Coupling	
Rotating Inertia, H in Per Unit on kVA Base, of Overall Combination Generator, Prime Mover, Couplers and Gear Drives	
Station Power Load When Generator is Off-Line, Watts, pf	
Station Power Load During Start-Up, Watts, pf	
Station Power Load During Operation, Watts, pf	

SAMPLE SITE PLAN – PROVIDED FOR REFERENCE ONLY

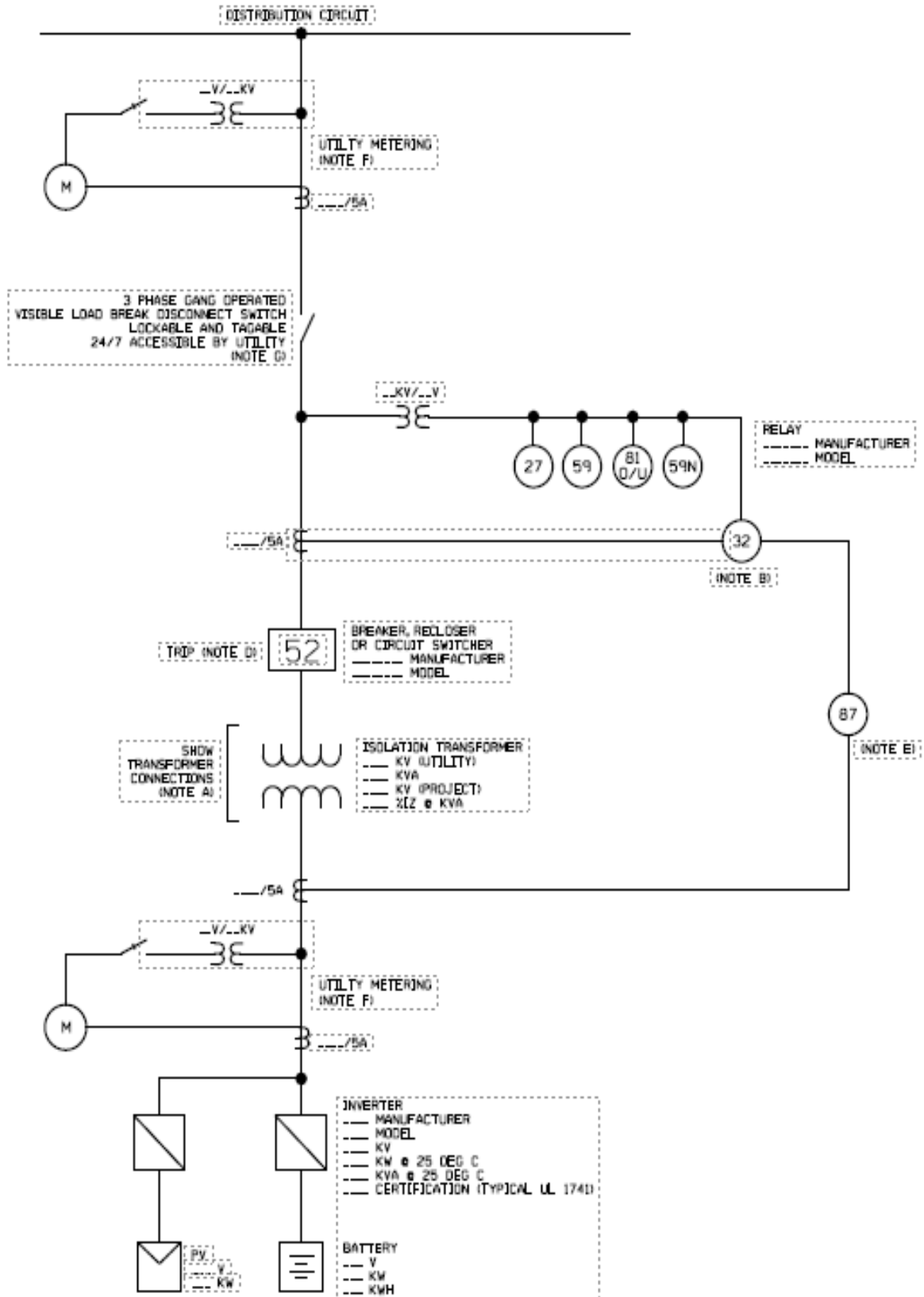




Weblink to State of Michigan / Plats:

http://www.cis.state.mi.us/platmaps/sr_subs.asp

SAMPLE ELECTRICAL ONE-LINE DRAWING – PROVIDED FOR REFERENCE ONLY
TYPICAL ISOLATION AND FAULT PROTECTION FOR INVERTER GENERATOR



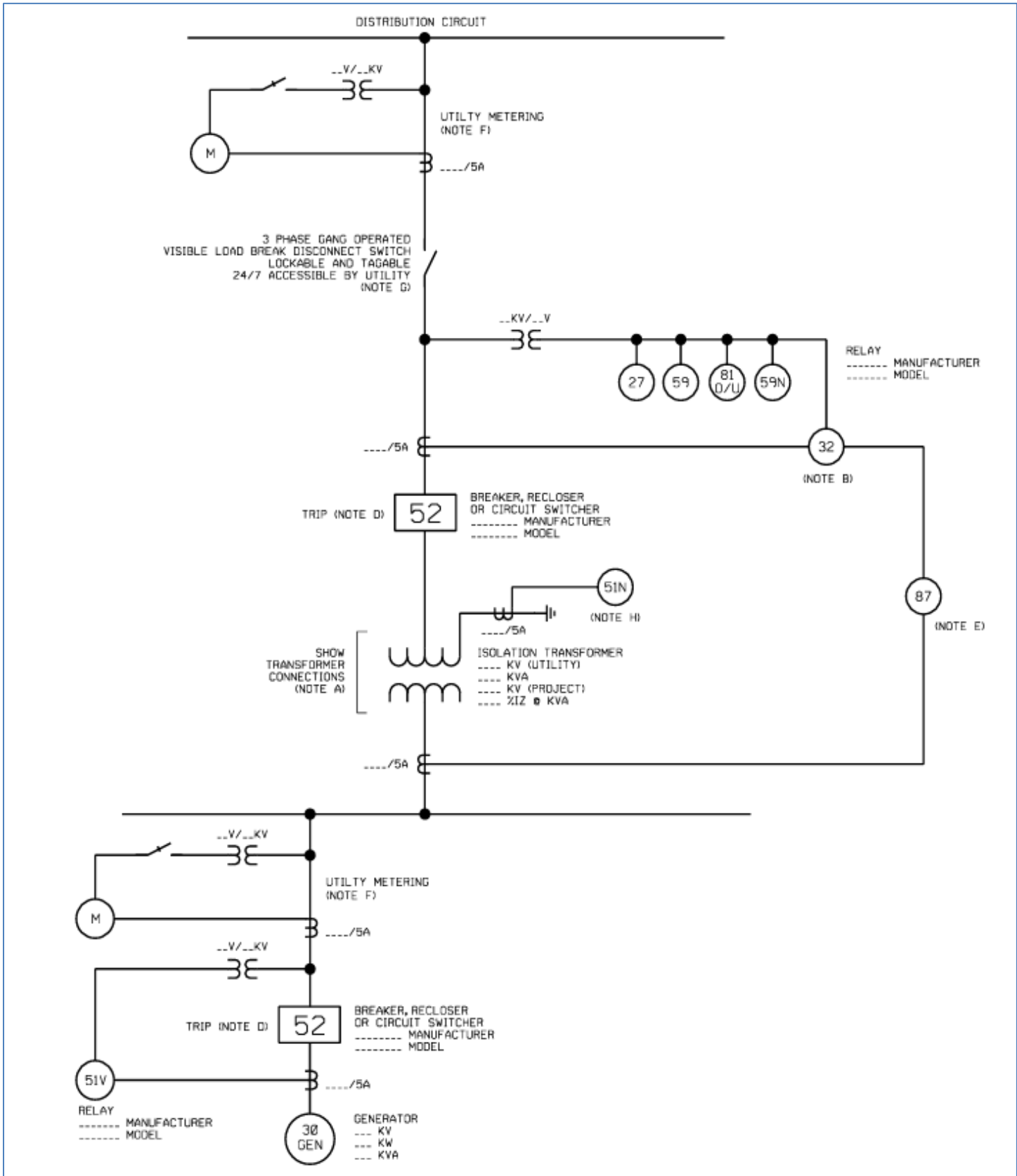
LEGEND

- 27 Undervoltage
- 32 Reverse Power (Not Required for Flow-Back)
- 51N Neutral overcurrent (required for grounded secondary)
- 59 Overvoltage
- 59N Zero sequence overvoltage (assuming ungrounded secondary on power transformer)
- 81o/u Over/Underfrequency

NOTES

- A) See technical requirements for permissible transformer connections. Transformer connections proposed shall be shown on the one-line diagram by the Applicant. Transformer connections and primary grounding to be approved by Utility.
- B) The 27, 59, 59N, and 81O/U relays shall be connected to VTs located at the point of common coupling, unless otherwise approved by Consumers Energy. VTs connected to the Project side of transformers without zero sequence continuity (e.g. ungrounded wye or delta winding connections) on a grounded distribution system is not allowed.
- C) Any additional equipment necessary to protect the Project is the sole responsibility of the Applicant to determine, design, and apply.
- D) Tripping of an approved interrupting device between the point of common coupling and distributed energy resource is acceptable, depending on if the Applicant wants to serve its own isolated load after loss of Utility service.
- E) Transformers 15 MVA (self-cooled rating) or larger shall be equipped with differential (87) relaying.
- F) Utility metering equipment will be supplied by the utility.
- G) The isolation device is to be located on the utility side of the metering CTs and VTs when connected to the high voltage distribution system.

SAMPLE ELECTRICAL ONE-LINE DRAWING – PROVIDED FOR REFERENCE ONLY
TYPICAL ISOLATION AND FAULT PROTECTION FOR SYNCHRONOUS GENERATOR



LEGEND

27	Undervoltage
32	Reverse Power (Not Required for Flow-Back)
51N	Neutral overcurrent (required for grounded secondary)
59	Overvoltage
59N	Zero sequence overvoltage (assuming ungrounded secondary on power transformer)
81o/u	Over/Underfrequency

NOTES

A) See technical requirements for permissible transformer connections. Transformer connections proposed shall be shown on the one-line diagram by the Applicant. Transformer connections and primary grounding to be approved by Utility.

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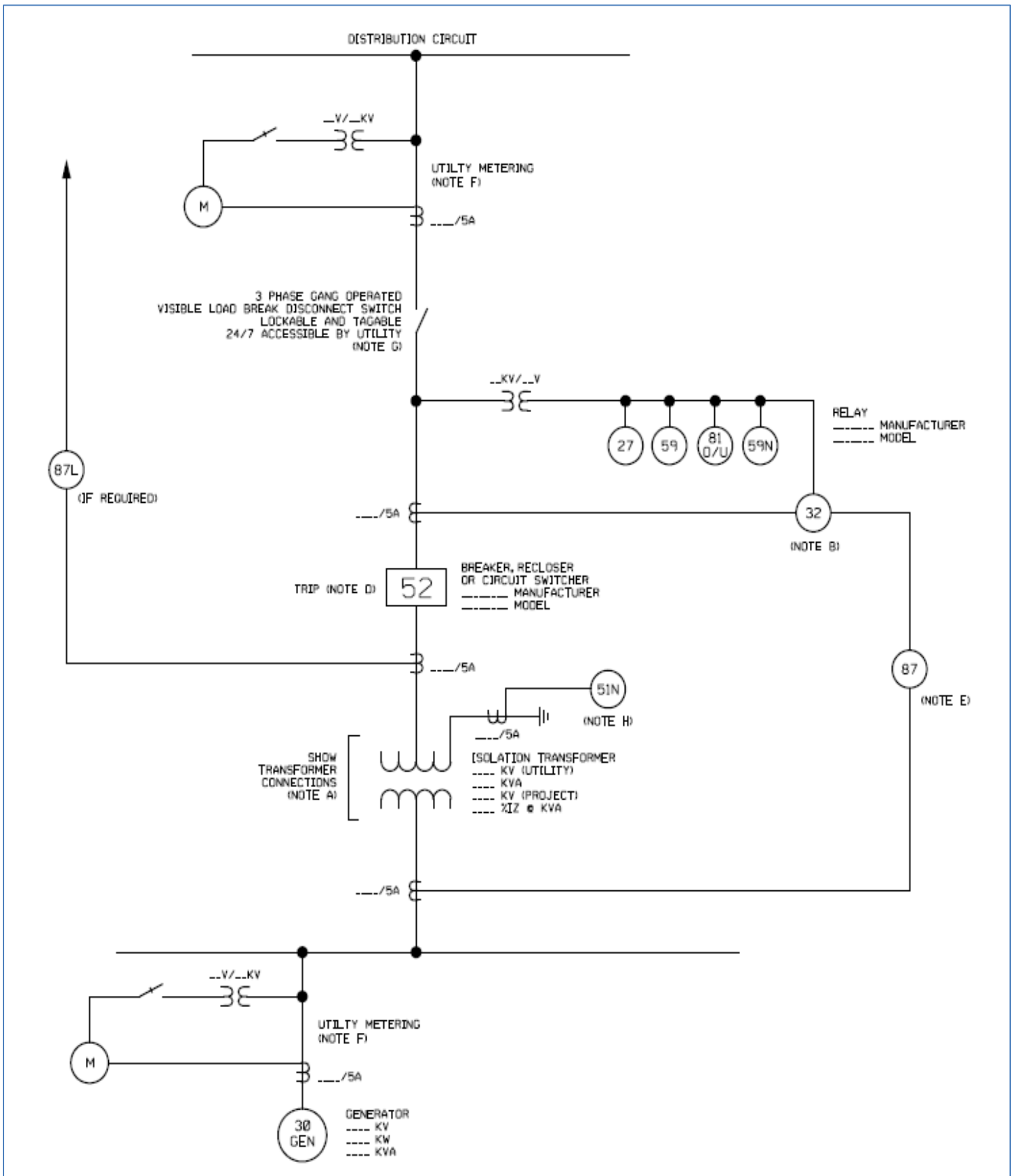
F) Utility metering equipment will be supplied by the utility.

G) The isolation device is to be located on the utility side of the metering CTs and VTs when connected to the high voltage distribution system.

----- Note H only applies to Synch Gens and Induction Generators -----

H) The 51N relay is required for isolation transformers with a Delta (Project) and Grounded Wye (Utility) winding connections. Refer to Note A for permissible transformer connections.

SAMPLE ELECTRICAL ONE-LINE DRAWING – PROVIDED FOR REFERENCE ONLY
TYPICAL ISOLATION AND FAULT PROTECTION FOR INDUCTION GENERATOR



LEGEND

27	Undervoltage
32	Reverse Power (Not Required for Flow-Back)
51N	Neutral overcurrent (required for grounded secondary)
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----- Note H only applies to Synch Gens and Induction Generators -----

H) The 51N relay is required for isolation transformers with a Delta (Project) and Grounded Wye (Utility) winding connections. Refer to Note A for permissible transformer connections.