GENERATOR INTERCONNECTION APPLICATION

For All Projects with Aggregate Generator Output
Less Than or Equal to 550 Kw
Also Serves as Application for Distributed Generation Program

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

CUSTOMER / ACCOUNT INFORMATION

Electric Utility Customer Information (As shown on utility bill)

Name or Entity on Electric Account	Customer Mailing Address (Street, City, State, and Zip Code)
Customer Phone Number ( )	Customer E-mail Address
Electric Service Account #	Electric Service Meter Number
Are you applying for the Distributed Generation Program? (**Note**: Level 3 Distributed Generation Program Only Available to Methane Digester Projects). Marking "no" means "interconnection only" ☐ Yes ☐ No	**What Level are you applying for?** ☐ 1 (≤ 20kW certified Inverter-based project) ☐ 2 (> 20kW and ≤ 150kW certified Inverter-based project) ☐ 3 (> 150kW and ≤ 550kW certified Inverter-based project OR ≤ 550 non-certified Inverter-based project)
Are you interested in selling Renewable Energy Credits? ☐ Yes ☐ No	**Do you have another Electric Supplier that is not Consumers Energy?** ☐ Yes ☐ No If Yes, Name _____
Does this project involve renovation to an existing structure or new construction? Y or N	**Rate Type: residential, commercial, or industrial**

Notes:
1. Account/meter not required for new construction where a permanent meter has not been installed.
2. You must apply to both the Distribution Utility and your Alternate Energy Provider (if applicable) for Distributed Generation
3. If you are applying for Distributed Generation, you may also apply online at https://consumersenergy.powerclerk.com

INSTALLATION INFORMATION

Project Single Point of Contact: (Electric Utility Customer, Installer or Other)

Name	Company (If Applicable)	Phone Number ( )
E-Mail Address		Requested In-Service Date
Installer (Name of Firm or Self)		
Installer Name (Last, First, MI)	Installer Phone #	Installer E-mail

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?) ☐ Yes ☐ No	What program is the existing generation enrolled in?
System Type (Solar, Wind, Anaerobic Digester, Diesel, Other etc.)	Other System Type:
Total Generator(s) Nameplate AC Rating _____ kW	

GENERATION SYSTEM SITE INFORMATION	
Physical Site Service Address (If Not Billing Address). Include City and Zip Code	
Physical Site Township and County	
Annual Site Requirements Without Generation in kWh _____ kWh/year	Peak Annual Site Demand in kW (only for Industrial customers billed on Demand Rates) _____ kW
Attached Site Plan Page # _____	Attached Electrical One-Line Drawing Page # _____
Level 1 and 2 do not need to show any proof of insurance. (Attach) Level 3 Applicant's Proof of General Liability Insurance for a minimum of $1,000,000. Per MSPC rule – Applicant must maintain a minimum of $1,000,000 General Liability Insurance for Level 3 ONLY.	
Level 1 and 2 proof of site control may be demonstrated by the site owner's signature and contact information on the application. Level 3 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 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.	
GENERATION SYSTEM MANUFACTURER INFORMATION	
System Type (Solar, Wind, 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) ☐ Yes ☐ No	Is the battery AC or DC coupled:
Battery manufacturer:	Battery Model Name:
Battery Model Number:	Battery Power Rating (kWh):
Battery Chemistry Type: Lead Acid, Lithium Ion, Lithium Iron Phosphate or Other:	Other Chemistry Type:
Battery Max Output Rating (kW):	Storage Capacity (kWh):
# of Batteries onsite:	Include Battery Spec Sheet(s)
METER SOCKET DETAIL INFORMATION (Level 2 and 3 only)	
Electrician's Name:	Electrician's phone number:
Electric phase: Single or Three:	How many wires (2 or 3) for the Single Phase configuration:
How many wires (3 or 4) for the Three Phase configuration:	What is the wire gauge leaving the panel going into the meter socket:
Single or Parallel conductor going in?	Wire size coming out of the meter socket (level 2 and 3 generator Meter info):
Is the service to the site Overhead (OH) or Underground (UG):	Single or Parallel conductor coming out?
Generator AC Operating Voltage (120/240, 240/480, 120/208 three phase or 480* (*with Consumers Energy approval only):	

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:

Notes:
1. **All applications require an attached Site Plan and Electrical One-Line Drawing**
2. See Page 7 for reference sample Site Plan
3. See Page 9 for reference sample Inverter Generator Electrical One-Line Drawing
4. See Page 11 for reference sample Synchronous Generator Electrical One-Line Drawing
5. See Page 13 for reference sample Induction Generator Electrical One-Line Drawing
6. For Levels 2 and 3, the One-Line Drawing must be signed and sealed by a licensed professional engineer, licensed in the State of Michigan or by an electrical contractor licensed by the State of Michigan with the electrical contractor's license number noted on the diagram.

INVERTER GENERATOR - BASED SYSTEMS

Manufacturer	Model (Name/Number)	Inverter Power Rating (kW) _____ kW
Number of Inverters _____	Total Generator(s) Nameplate AC Rating _____ kW	Is the Inverter tested to IEEE 1547.1? ☐ Yes ☐ No
Is this inverter(s) certified?		

SYNCHRONOUS AND INDUCTION GENERATOR - BASED SYSTEMS

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 and connected ratio**
- **Fuses – Normal operating status, rating (Amps) and type**
- **Generators – Capacity rating (kVA), location, type and method of grounding**
- **Grounding Resistors – Size (Ohms) and current (Amps)**
- **Isolating Transformers – Capacity rating (kVA), location, impedance, voltage ratings, primary and secondary connections, and method of grounding**
- **Potential Transformers – Ratio and connection**
- **Reactors – Ohms per phase**
- **Relays – Types, quantity, IEEE device numbers, and operator lines indicating the device initiated by the relays**
- **Switches – Location and normal operating status (open or closed), type, and rating**
- **Tagging Point – Location and identification**

CUSTOMER AND PROJECT DEVELOPER/CONTRACTOR SIGNATURES AND FEES

☐ **Non-Export Application Only**

☐ $100 + $1/kWac (certified) ☐ $100 +$2 / kWac (non-certified) OR

☐ **Combined Interconnection Application and Distributed Generation**

☐ $50 (Levels 1 - 3) OR

☐ **Interconnection Application Only (No Distributed Generation)**

☐ $100 + $1/kWac (certified) ☐ $100 +$2 / kWac (non-certified)

☐ Check #_____ ☐ Money Order # _____

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

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

This application is being submitted by ☐ Customer ☐ Developer/Installer

Signature: _____ Date _____

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

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

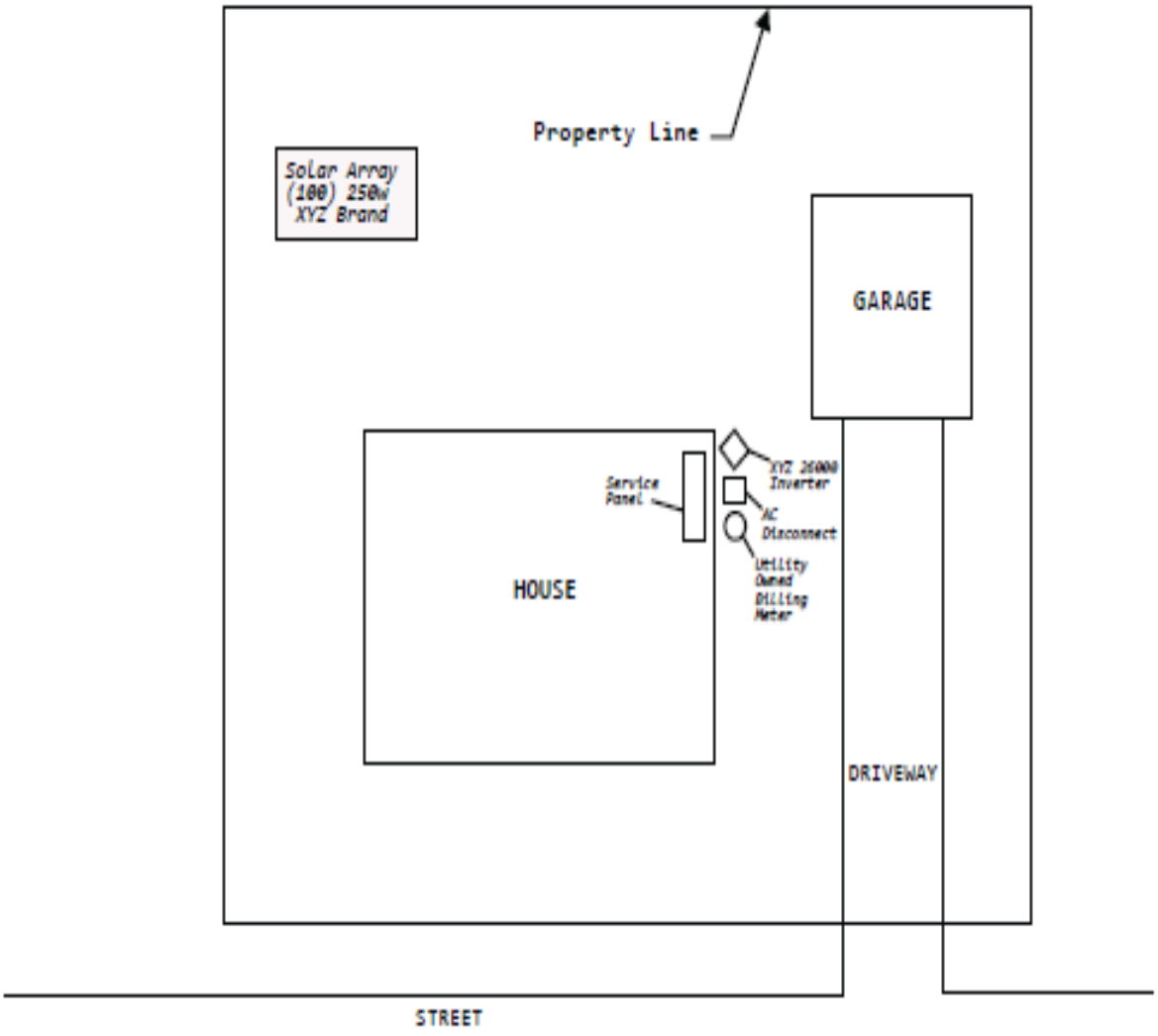
SYNCHRONOUS GENERATORS		
GENERATOR INFORMATION		
Generator Nameplate Voltage	Generator Nameplate Watts or Volt-Amperes	
Generator Nameplate Power Factor (pf)	RPM	
Manufacturer _____	Model Name _____	Model Number _____
TECHNICAL INFORMATION		
Minimum and Maximum Acceptable Terminal Voltage	Direct Axis Reactance (saturated) in ohms	
Direct Axis Reactance (unsaturated) in ohms	Quadrature Axis Reactance (unsaturated) in ohms	
Direct Axis Transient Reactance (saturated) in ohms	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	
Stator Resistance in ohms	Negative Sequence Reactance in ohms	
Zero Sequence Reactance in ohms	Neutral Grounding Resistor in ohms (If Applicable)	
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	Generator Nameplate Watts or Volt-Amperes	
Generator Nameplate Power Factor (pf)	RPM	
Manufacturer _____	Model Name _____	Model Number _____
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
Can be a separate document

Level 1 Site Plan

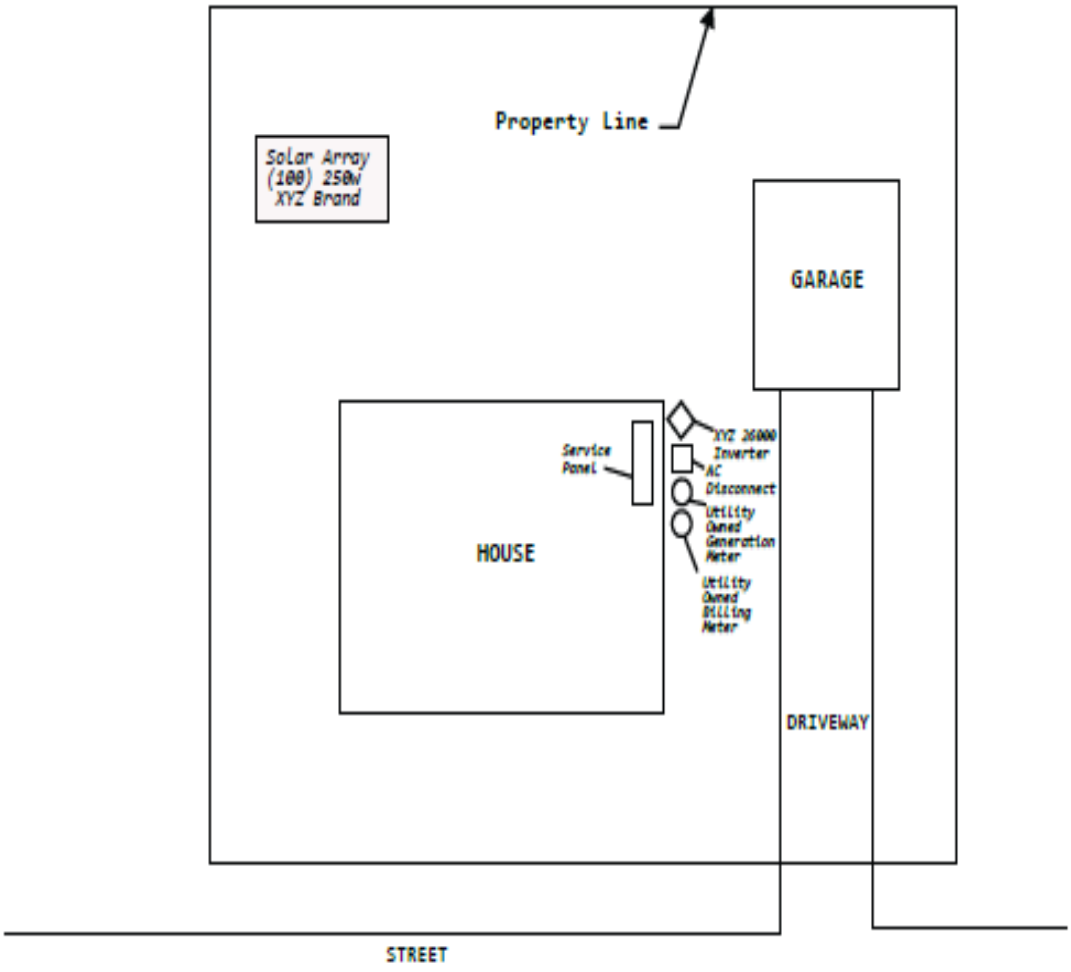
John Doe
4321 Apple Dr
Jackson, MI 48118



Level 2 & 3 Site Plan

John Doe
4321 Apple Dr
Jackson, MI 48118

Electrical Contractor
Bob Smith
License #: 123456
Bob Smith



Weblink to State of Michigan / Plats:

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

Note: Legible hand drawn site plans are acceptable. Level 3 should be not hand-drawn.

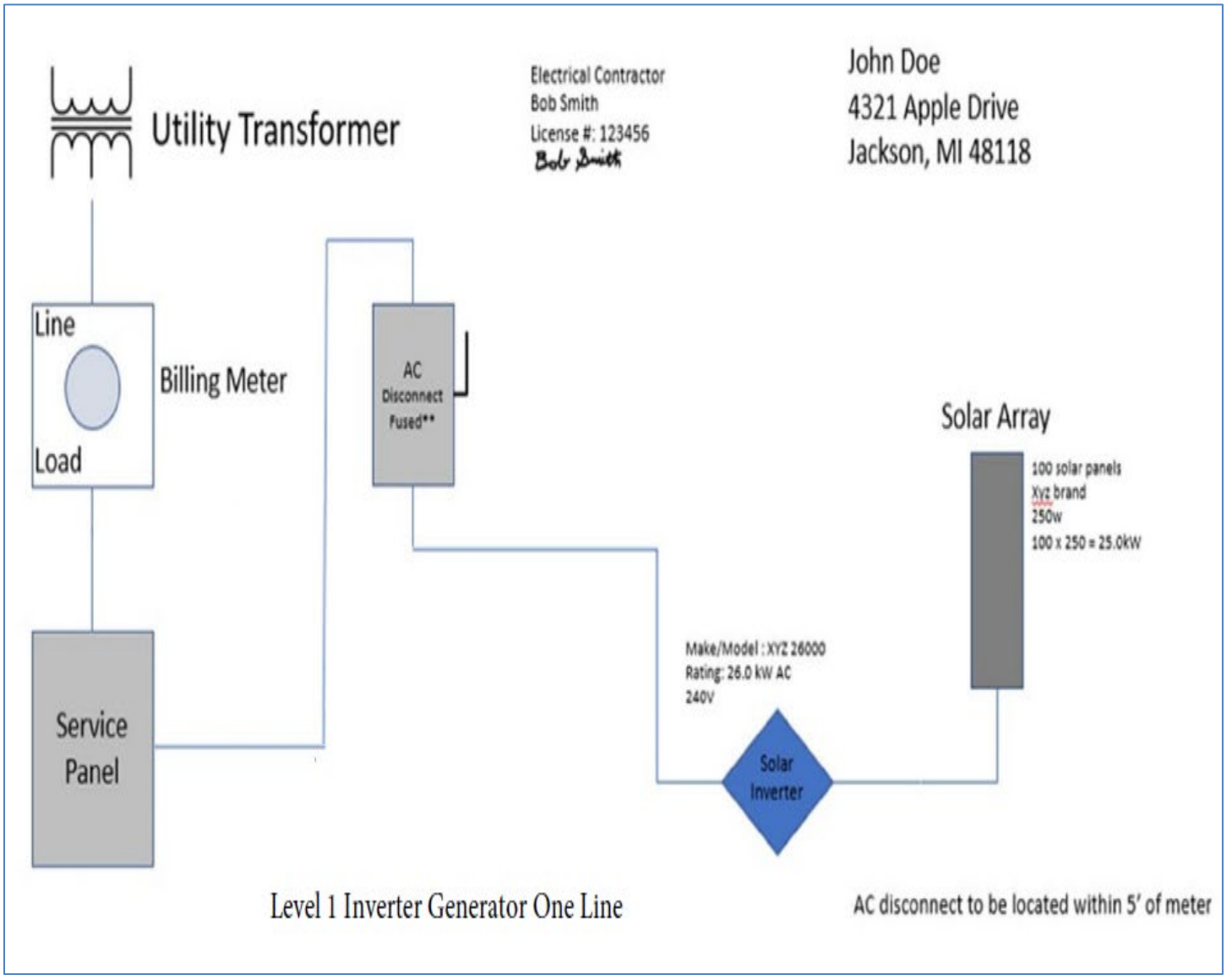
SAMPLE ELECTRICAL ONE-LINE DRAWING – PROVIDED FOR REFERENCE ONLY

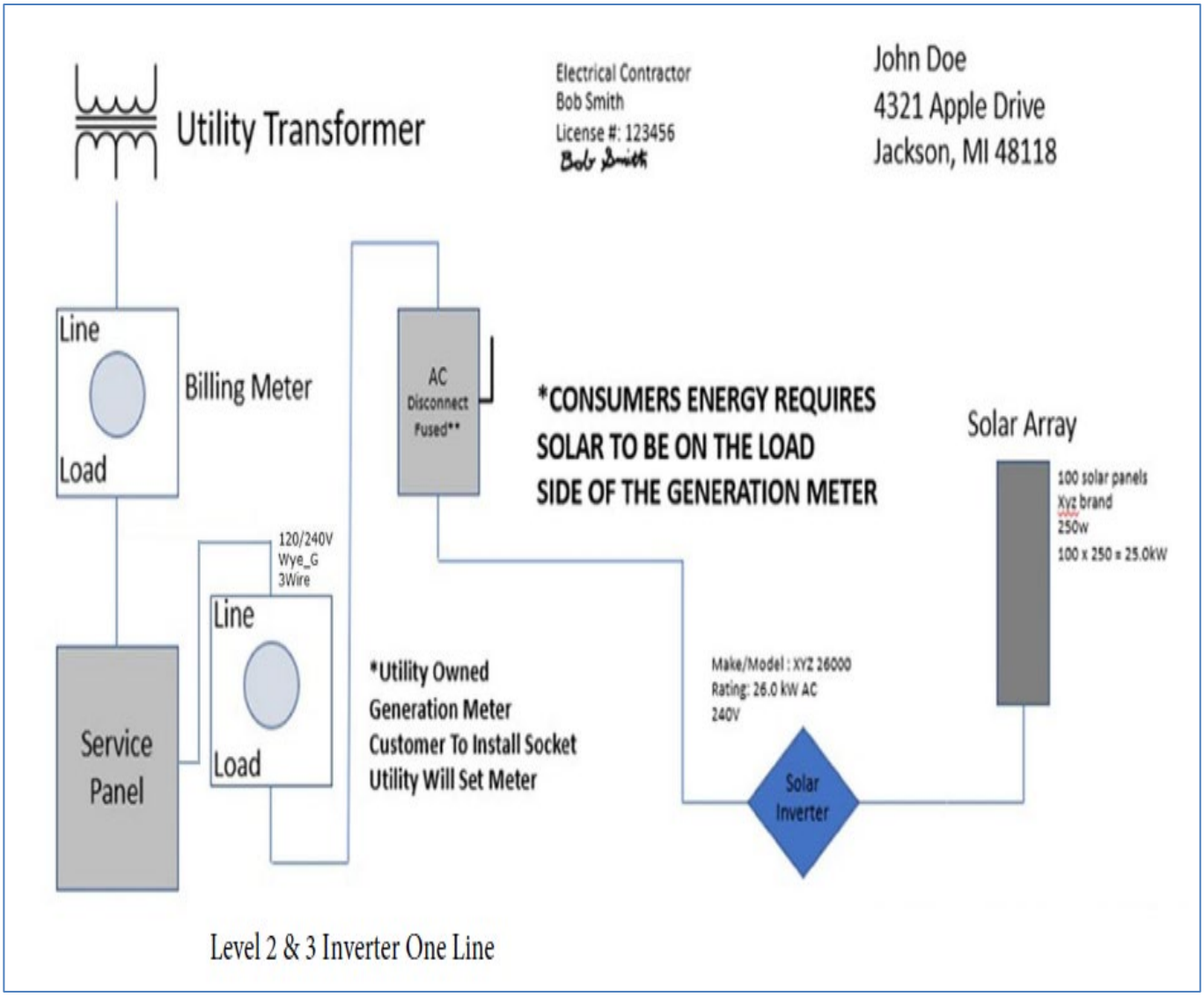
Can be separate document

INVERTER GENERATOR

PE Stamp required for levels 2 & 3

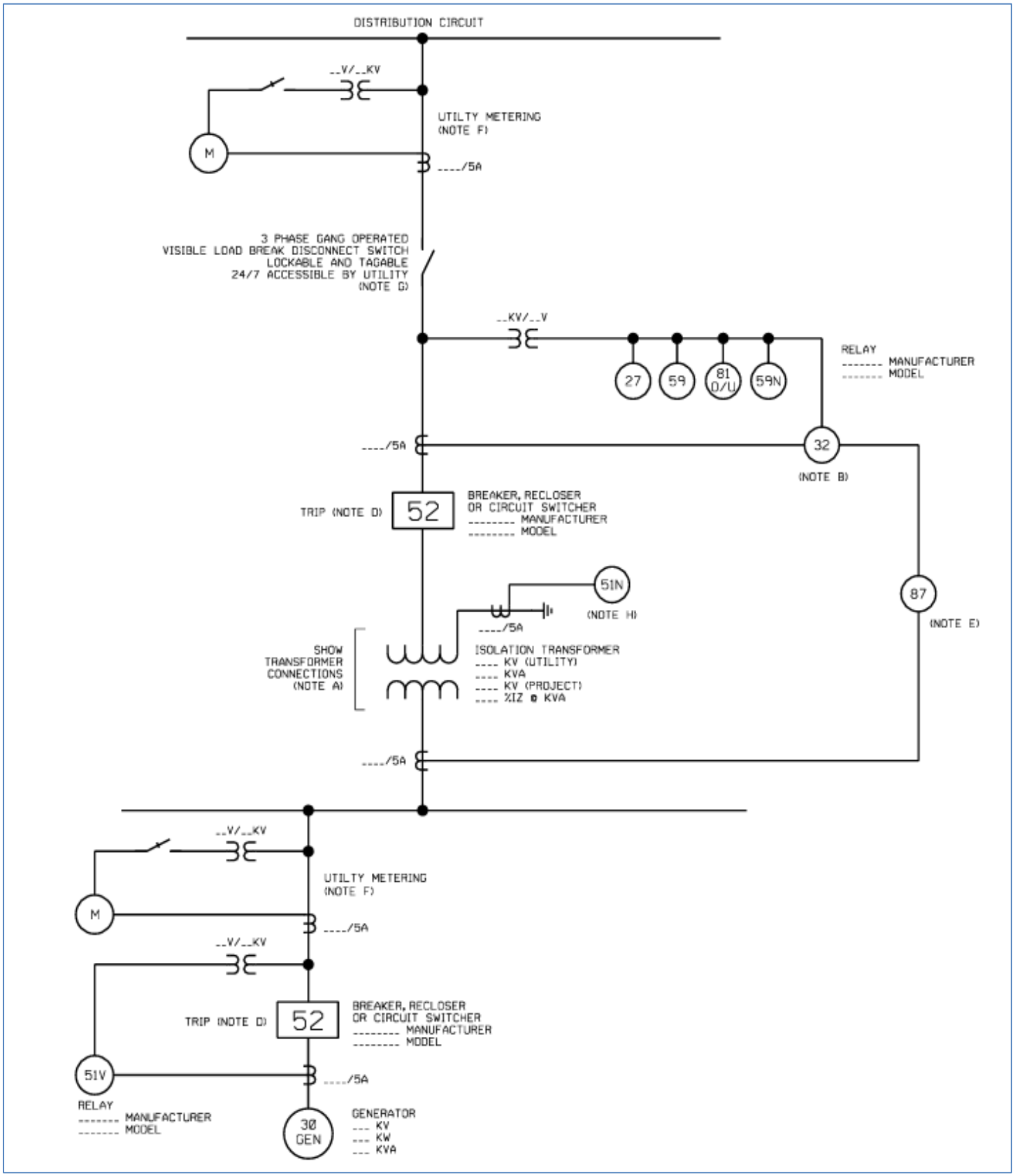
Level 2 can have a Licensed Contractor stamp instead of PE Stamp





Note: Legible Hand Drawn One-Line is Acceptable

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.

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.

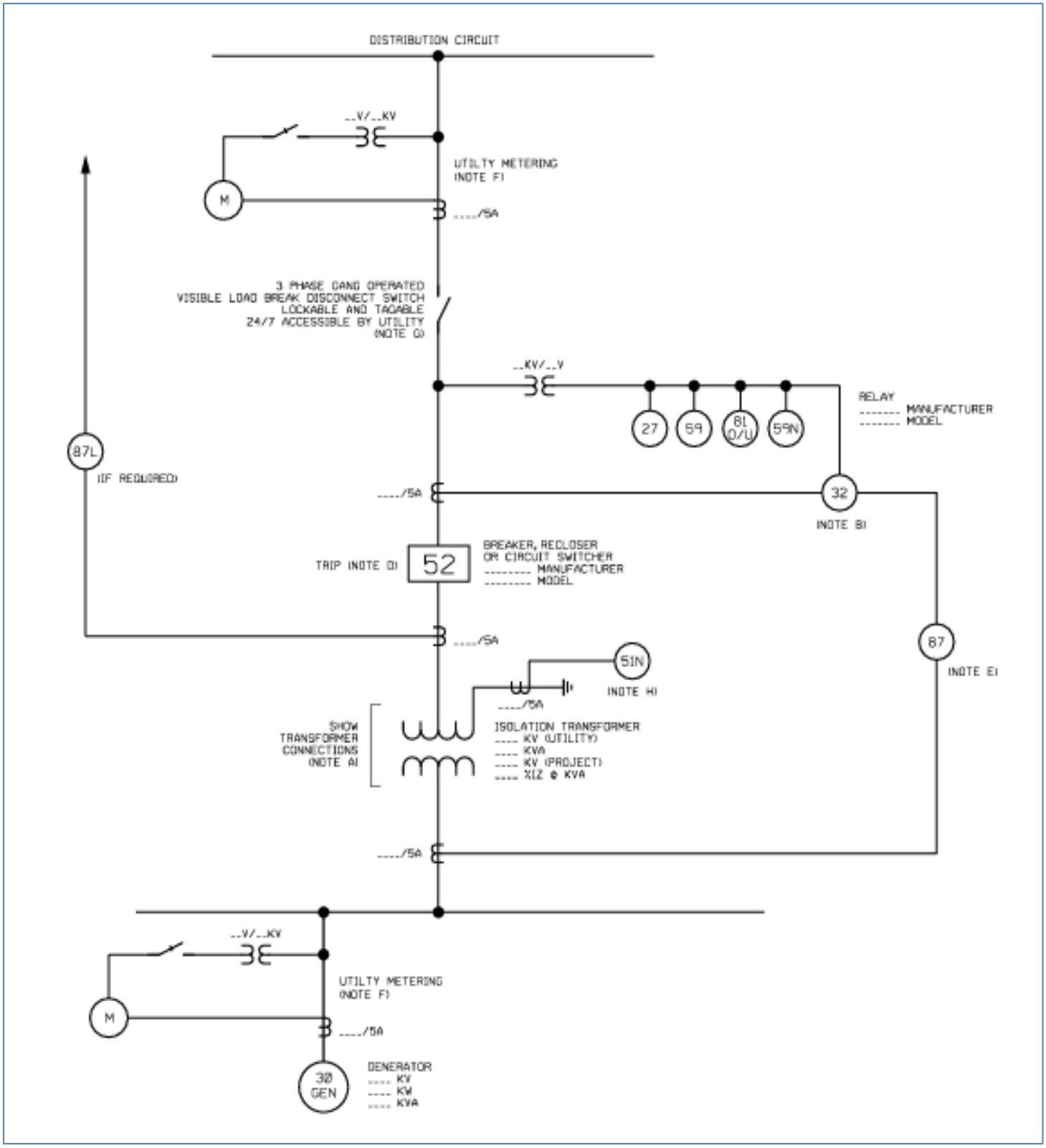
G) The isolation device is to be located on the utility side of the metering CTs and VTs when connected to the high voltage distribution system.

------- 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

PE Stamp required for levels 2 & 3
Level 2 can have a Licensed Contractor stamp instead of PE Stamp



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 connection configurations and protection. Transformer connections proposed shall be shown on the one-line drawing by the Applicant. Transformer connection and secondary 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.

------- 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.