

DRAFT MICHIGAN INTERCONNECTION APPLICATION FOR DERs

[UTILITY NAME]

ADDRESS1

ADDRESS2

CITY, STATE, ZIP CODE

PHONE

EMAIL ADDRESS

This Application is considered complete when it provides all applicable and correct information required below. Additional technical data may be necessary prior to the system impact study process. Applicant should refer to [UTILITY NAME] Interconnection Procedures for additional information.

The following additional information must be submitted with an application:

<input type="radio"/> Single Line Diagram	<input type="radio"/> Proof of Site Control and Site Diagram	<input type="radio"/> Expected Annual Generator Output (kWh)
<input type="radio"/> Applicable Fees Submitted with Application	<input type="radio"/> Pre-application Report (Levels 4 & 5 only)	

Application is for:

- New DER(s) Capacity addition or Material Modification to Existing DER

SECTION 1. CUSTOMER/INSTALLER INFORMATION

Interconnection Customer/Owner Information

Name:

Account Number: Meter Number:

Mailing Address:

Telephone: Email:

[If different,] Application Agent/Company:

Telephone: Email:

Interconnection Installer Information

Name:

Mailing Address:

Telephone: Email:

Project Site Address:

If capacity addition or Material Modification to existing facility, please describe:

SECTION 2. DER/GENERATOR INFORMATION

DER Level/Category

- Level 1 – 20 kWac or less
- Level 2 – More than 20 kWac and not more than 150 kWac
- Level 3 – More than 150 kWac and not more than 550 kWac
- Level 4 – More than 550 kWac and not more than 1 MWac
- Level 5 – More than 1 MWac

Distributed Energy Resource Information

Data applies only to the Distributed Energy Resource not the Interconnection Facilities.

Energy Source:

<input type="checkbox"/> Solar	<input type="checkbox"/> Wind	<input type="checkbox"/> Storage	<input type="checkbox"/> Cogeneration
<input type="checkbox"/> Solar w/Storage	<input type="checkbox"/> Other	<input type="checkbox"/>	<input type="checkbox"/>

Expected Annual kWh Output

Amount _____

Methodology (Check one):

- Publicly available model (ex. NREL’s PVWatts Calculator)
- Private model when model, assumptions, and data are provided to and approved by [UTILITY NAME]
- Applicant supplied estimated capacity factors

NOTE: [UTILITY NAME] reserves the right to reject any unverified annual generator output estimate.

Generator System Information

Generator Type (Inverter, Induction, Synchronous)	
Total Generator(s) Nameplate DC Rating (Solar Only) kW	Total Generator Nameplate AC Rating kW
Generator AC Operating Voltage	Wiring Configuration (Single Phase, Three Phase}
Certified Test Record No (Testing to Standard UL 1741 Scope 1.1a)	

Generator System Site Information

Project Type (Base load, Peaking, Intermediate)	Energization Date for Project Interconnection Facilities
First Parallel Operation Date for Testing	Project Commercial Operation Date
Estimated Project Cost	Operation Mode
Attached Customer's Proof of General Liability (See MI Rule 460.986) Insurance Proof - Page # [UTILITY NAME] Level 1 Insurance Required (Company specific) (If applicable) [UTILITY NAME] Level 2 Insurance Required (Company specific) (If applicable) [UTILITY NAME] Level 3 Insurance Required \$1,000,000 minimum [UTILITY NAME] Level 4 Insurance Required \$2,000,000 minimum [UTILITY NAME] Level 5 Insurance Required \$3,000,000 minimum	
Attached Site Plan Page # __	
Attached Electrical One-Line Drawing Page # _____ (MI Rule 460.936, levels 4 and 5 require the applicant to shall provide a 1-line diagram that is sealed by a professional engineer who is licensed in Michigan.) <input type="checkbox"/> See Page X for sample Site Plan <input type="checkbox"/> See Page X for sample of Synchronous Generator Electrical One-Line Drawing <input type="checkbox"/> See Page X for sample of Induction Generator Electrical One-Line Drawing	
Attached Specification for Equipment Page # __	

Isolating Transformer(s) Between Generator(s) and Utility (Levels 3, 4, and 5 ONLY)

Transformer Model Number	Transformer Manufacturer	
Rated kV and connection (delta, wye, wye-gnd) of each winding	kVA of each winding (kW)	
BIL of each winding	Fixed taps available for each winding (kW)	
Positive/Negative range for any LTC windings	% impedance on transformer self cooled rating (kW)	
Percent Excitation current at rated kV	Load Loss Watts at full load or X/R ratio (kW)	
<p>SYNCHRONOUS, INDUCTION AND INVERTER GENERATOR - BASED SYSTEMS (Must complete Page 3, Page 4 or Page 5 and attach Electrical One-Line Drawing)</p>		
<p>The following information on these system components shall appear on the Electrical One-Line Drawing:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Breakers – Rating, location and normal operating status (open or closed) <input type="checkbox"/> Buses – Operating voltage <input type="checkbox"/> Capacitors – Size of bank in Kvar <input type="checkbox"/> Circuit Switchers – Rating, location and normal operating status (open or closed) <input type="checkbox"/> Current Transformers – Overall ratio, connected ratio <input type="checkbox"/> Fuses – Normal operating status, rating (Amps), type <input type="checkbox"/> Generators – Capacity rating (kVA), location, type, method of grounding <input type="checkbox"/> Grounding Resistors – Size (ohms), current (Amps) <input type="checkbox"/> Isolating Transformers – Capacity rating (kVA), location, impedance, voltage ratings, primary and secondary connections and method of grounding <input type="checkbox"/> Potential Transformers – Ratio, connection <input type="checkbox"/> Reactors – Ohms/phase <input type="checkbox"/> Relays – Types, quantity, IEEE device number, operator lines indicating the device initiated by the relays <input type="checkbox"/> Switches – Location and normal operating status (open or closed), type, rating <input type="checkbox"/> Tagging Point – Location, identification 		
Manufacturer	Model Name	Model Number

Inverter Generators (If Applicable)

GENERATOR INFORMATION	
System Type (Solar, Wind, Biomass, Methane Digester, etc)	Generation Nameplate Rating (kW or MVA)
AC Operation Voltage	Manufacturer
Model (Name/Number)	Attached Grid Configuration
	Page # <u> </u>

Synchronous Generators (If Applicable)

GENERATOR INFORMATION	
Generator Nameplate Voltage	Generator Nameplate Watts or Volt-Amperes
Generator Nameplate Power Factor (pf)	RPM
TECHNICAL INFORMATION	
Minimum and Maximum Acceptable Terminal Voltage	
Direct Axis Reactance (saturated)	
Direct Axis Reactance (unsaturated)	
Quadrature Axis Reactance (unsaturated)	
Direct Axis Transient Reactance (saturated)	
Direct Axis Transient Reactance (unsaturated)	
Quadrature Axis Transient Reactance (unsaturated)	
Direct Axis Sub-Transient Reactance (saturated)	
Direct Axis Sub-Transient Reactance (unsaturated)	

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 (If Applicable)

GENERATOR INFORMATION	
Generator Nameplate Voltage	Generator Nameplate Watts or Volt-Amperes
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 (If Applicable)	
I ² 2t or K (Heating Time Constant)	
Rotor Resistance	
Stator Resistance	
Stator Reactance	
Rotor Reactance	
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

DRAFT

SECTION 3. REVIEW TRACK AND FEES

Track Review Requested (See Interconnection Procedures for more information):

<input type="checkbox"/> Non-Export Track Review	<input type="checkbox"/> Fast Track Review
<input type="checkbox"/> Study Track Review	

Fees

Non-Export Track Fee for Certified DERs	\$100 + \$1/kWac
Non-Export Track Fee for Non-Certified DERs	\$100 + \$2/kWac
Fast Track Initial Review for Certified DERs	\$100 + \$1/kWac
Fast Track Initial Review for Non-Certified DERs	\$100 + \$2/kWac
Scoping Meeting Fee	\$300
Fast Track Supplemental Review	Actual Cost up to \$5,000
Study Track Review and Scoping Meeting Fee	\$300
System Impact Study Fee	Actual Cost up to \$30,000
Facilities Study Fee	Actual Cost up to \$30,000

Enclosed Application Fees: _____

SECTION 4. PROOF OF SITE CONTROL AND SITE DIAGRAM

Applicant must demonstrate site control in one of the following ways pursuant to MI Rule 460.934 (Rule 34). Please select the appropriate method and attach the necessary documentation to demonstrate site control to the application:

Level 1 and 2 DERs

- Proof of site control may be demonstrated by the site owner's signature on the application

Level 3, 4 and 5 DERs

- Ownership of, a leasehold interest in, or a right to develop a site for the purpose of constructing and operating the DER.

- An enforceable option to purchase or acquire a leasehold site for this purpose.
- 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 of time not less than 5 years.

Please see Page 10 of this application for a sample Site Diagram.

SECTION 5. SINGLE LINE DIAGRAM

Applicant must submit a 1-line diagram per the DER Level per MI Rule 460.936. Depending on the Level of the project, there are certain requirements to be met:

- Level 1 – Submitted by applicant (no seal or signature required)
- Level 2 – Includes either a seal from a Michigan Licensed Professional Engineer or signed by an electrical contractor who is licensed in Michigan with the electrical contractor’s license number noted on the diagram.
- Level 3 – Includes either a seal from a Michigan Licensed Professional Engineer or signed by an electrical contractor who is licensed in Michigan with the electrical contractor’s license number noted on the diagram.
- Level 4 - Includes a seal from a Michigan Licensed Professional Engineer
- Level 5 - Includes a seal from a Michigan Licensed Professional Engineer

SECTION 6. CERTIFICATION AND SIGNATURE

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.

Customer Signature: _____ Date: _____

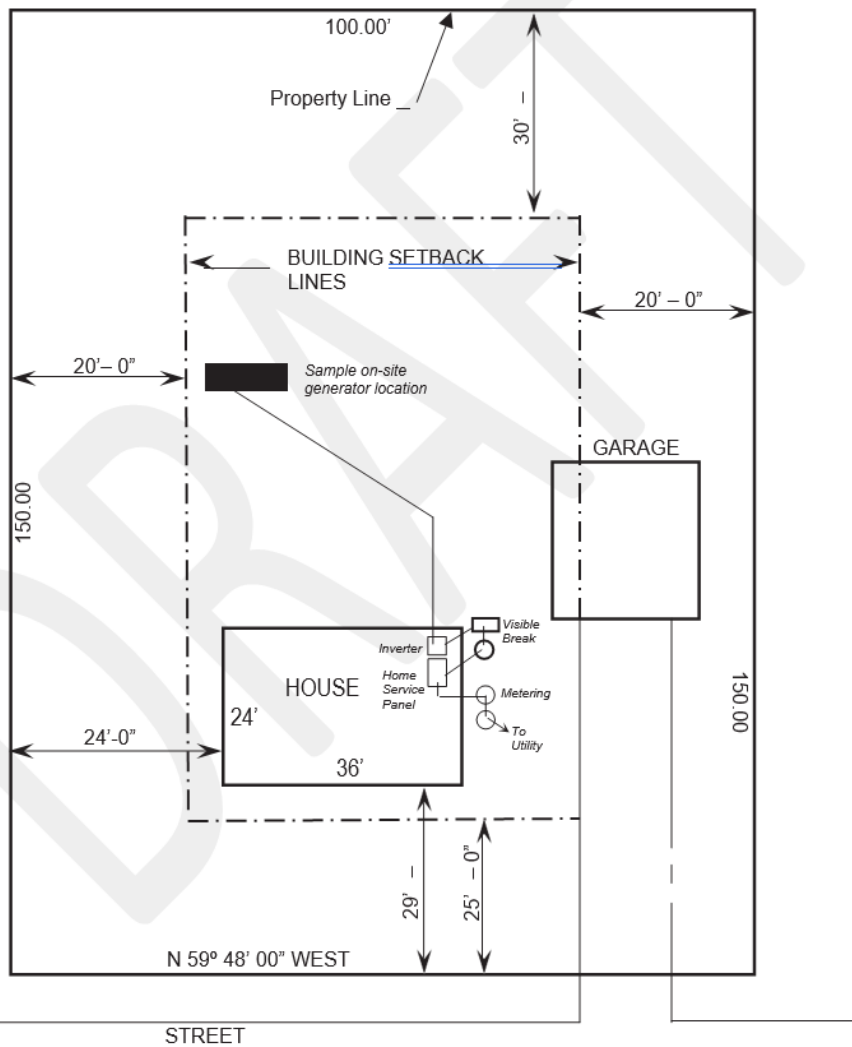
Project Developer/Contractor Signature (if applicable):
 _____ Date: _____

Note: Refer to the applicable “Michigan Electric Utility Interconnection Procedures” for a detailed explanation of the Interconnection Process, Fees, Timelines, and Technical Requirements.

SAMPLE SITE PLAN – PROVIDED FOR REFERENCE ONLY

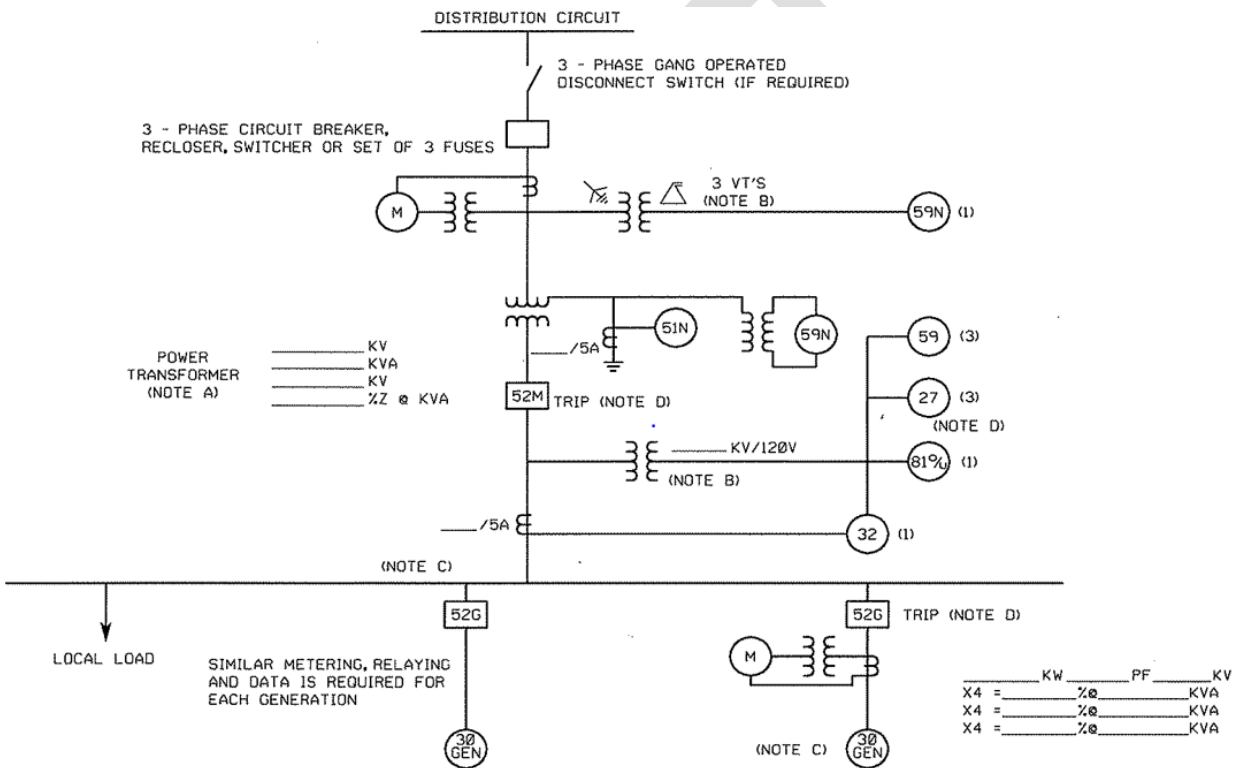
Weblink to State of Michigan / Plats: <https://aca-prod.accela.com/LARA/Default.aspx>
Legible hand drawn site plans are acceptable

SITE PLAN
Applicant
Address
City/Town
Signature



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

ONE-LINE DRAWING	
Licensed PE/Contractor	PE/Contractor License Number
PE/Contractor Address	PE/Contractor Signature



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 Project Developer. Transformer connection and secondary grounding to be approved by Utility.**
- B) Protection alternatives for the various acceptable transformer connections are shown. Only one protection alternative will ultimately be used, depending on the actual transformer winding connections. VT's for 59, 27, 81o/u and 32 are shown connected on the primary (Project side) of the power transformer, but may instead be connected on the secondary (Utility side). VT's are required on the secondary of the power transformer if**

a 59N is required for an ungrounded secondary connection. IEEE std 1547 requirements for voltage and frequency must be met at the PCC. IEEE Std. 1547 permits the VT's to be connected at the point of generator connection in certain cases.

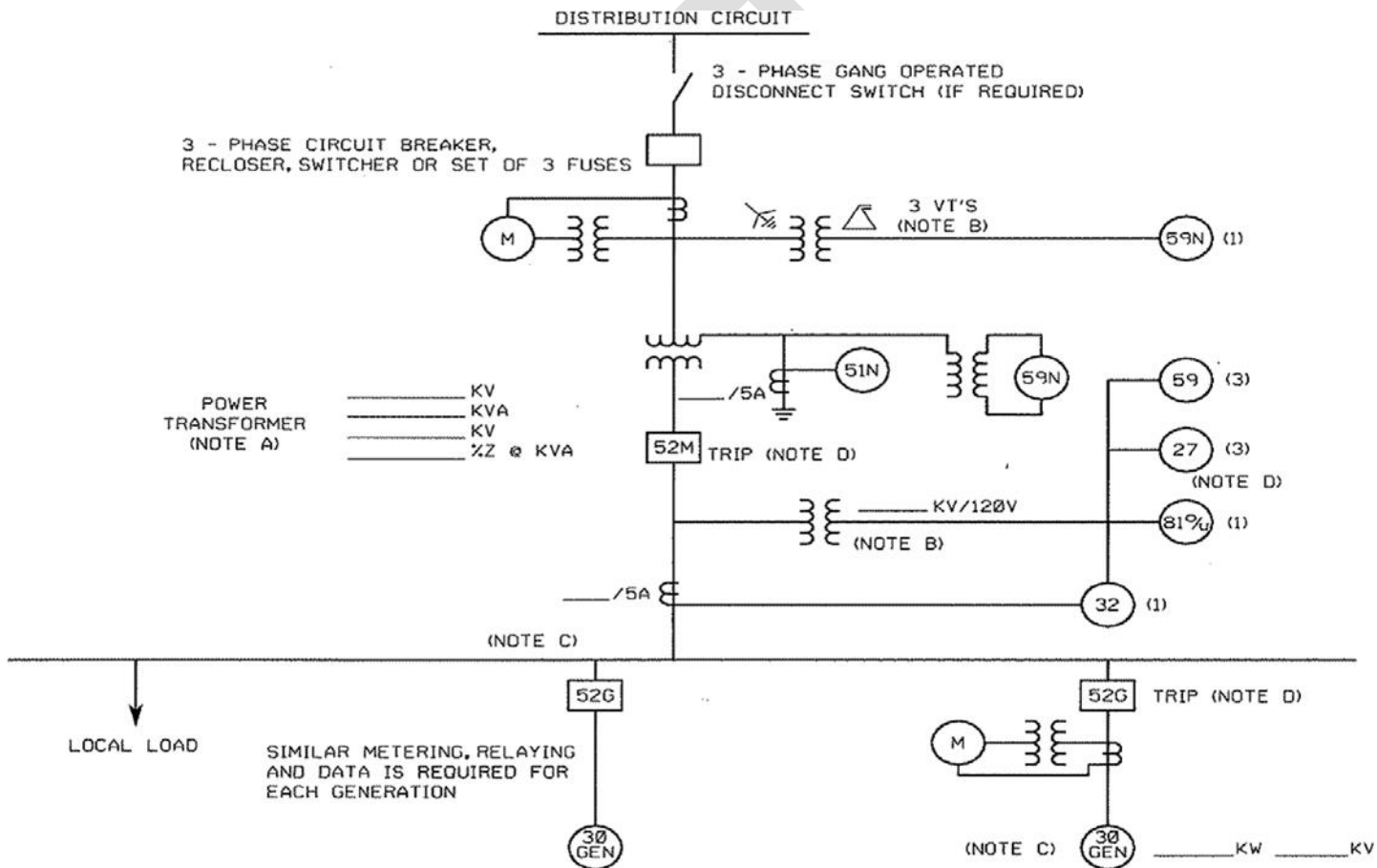
C) Main breaker protection, generator protection and synchronizing equipment are not shown.

D) Trip of all 52G breakers or the 52M breaker is acceptable, depending upon whether the Project Developer wants to serve its own isolated load after loss of Utility service.

DRAFT

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

ONE-LINE DRAWING	
Licensed PE/Contractor	PE/Contractor License Number
PE/Contractor Address	PE/Contractor Signature



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 Project Developer. Transformer connection and secondary grounding to be approved by Utility.

- B) Protection alternatives for the various acceptable transformer connections are shown. Only one protection alternative will ultimately be used, depending on the actual transformer winding connections. VT's for 59, 27, 81o/u and 32 are shown connected on the primary (Project side) of the power transformer, but may instead be connected on the secondary (Utility side). VT's are required on the secondary of the power transformer if a 59N is required for an ungrounded secondary connection. IEEE std 1547 requirements for voltage and frequency must be met at the PCC. IEEE Std. 1547 permits the VT's to be connected at the point of generator connection in certain cases.**
- C) Main breaker protection, generator protection and synchronizing equipment are not shown.**
- D) Trip of all 52G breakers or the 52M breaker is acceptable, depending upon whether the Project Developer wants to serve its own isolated load after loss of Utility service.**

DRAFT