aes Indiana

Distribution Interconnection Policy

Technical Requirements

1 Introduction

The AES Indiana distribution interconnection technical requirements are intended to facilitate distributed energy resource (DER) installations while ensuring the delivery of safe and reliable power to all customers. This document contains information on the application process, technical requirements, and testing and commissioning requirements for distributed energy resources. The target audience for this public facing document are customers, DER developers, owners, and installers. The following information is in alignment with and supplements the related Interconnection Tariff on file with the Indiana Utility Regulatory Committee.

Please note that this document is a guide, and the Company reserves the right to change its policies, procedures and standards when deemed necessary to maintain the reliability of the AES Indiana Electric Power System (EPS) and the safety of the Company's customers, workforce and the general public.

In Indiana, the interconnection of DER to the distribution system is governed by Indiana Administrative Code. Cogeneration and Small Power Production Facilities are governed by Indiana Administrative Code Article 4, Rule 4.1. Net Metering is governed by Indiana Administration Code Article 4, Rule 4.2. Customer-Generator Interconnection Standards are governed by Indiana Administrative Code Article 4, Rule 4.3.

2 Scope

This policy applies to distributed energy resources that are designed to operate in parallel with the AES Indiana distribution system and export electric power for more than 100 milliseconds. The policy does not apply to customer owned emergency or standby generators that do not operate in parallel with or create momentary parallel operation with the AES Indiana distribution system for no more than 100 milliseconds. This document also does not apply to DERs connected directly to an AES Indiana distribution substation, the AES Indiana transmission system at 138kV or 345kV, or any resource under the jurisdiction and requirements of FERC due to their wholesale market sales of electricity. The AES Indiana Transmission Interconnection Requirements may be accessed by a formal request to AES Indiana.

3 Definitions

Abnormal Operating Condition – A situation in which the Company is operating the Distribution System in other than normal configuration, or under conditions that do not normally exist.
Application – *See* Interconnection Request Application below.
Basic Impulse Level (BIL) – A measure of the ability of a piece of equipment to withstand abnormal voltage and surge voltages.
Company – AES Indiana
Customer – An entity that receives electric service from Company.
Distributed Energy Resource (DER) – A source of electric power that is directly connected to Company's Distribution System. DER sources include energy storage systems, fuel cells, solar photovoltaic (PV), biomass, natural gas, wind, etc. DER conversion technology includes inverters, induction generators, and synchronous generators, including reciprocating or turbine-driven generators.
DER Owner – The entity that is the counterparty to the Company in the DER Interconnection Agreement.
Direct Transfer Trip (DTT) – High speed relaying function and communication channel between two or more devices that provides for a remote operation of a circuit breaker or recloser.
Distribution System – Company's wires, equipment, and facilities that operate at a nominal operating alternating current (AC) voltage of 34.5 kV or below.
Effectively Grounded – A system in which a low impedance path to ground exists to limit overvoltage during fault conditions.
Energy Storage System – A system that captures energy produced at one time, stores that energy for a period of time, and delivers that energy as electricity at a future time.
FERC – Federal Energy Regulatory Commission
Interconnection – The physical connection of a DER to Company's Distribution System.
Interconnection Agreement – The contract between Company and DER Owner that stipulates terms and conditions for DER Interconnection and Parallel Operation.
Interconnection Equipment – Company-owned facilities that are required for DER interconnection service.
Interconnection Request Application ("Application") – Formal application to connect a DER to Company's Distribution System and for DER interconnection service, using Company's standard form.

Interconnection Study – A technical analysis to determine whether adverse effects to the operation or reliability of the Distribution system would be created as a result of the DER under study operating in parallel with the system at the proposed POI.
Island – According to IEEE 1547-2018, a condition in which a portion of Company's Distribution System is energized solely by a DER while that portion is electrically separated from the rest of Company's electric system on all phases to which the DER is connected. IEEE defines both intentional and unintentional islands. Intentional islands may be desirable in some cases, such as in a microgrid that is planned to operate independently during a weather event or unforeseen outage. An unintentional island is not planned and is considered undesirable because line worker practices, protective equipment, and grid control systems are not designed for those conditions.
Letter of Credit – A standby letter of credit that is: (i) substantially in Company's standard form; (ii) issued by a U.S. commercial bank or a U.S. branch of a foreign bank with total assets of at least $10 billion, having a general long-term senior unsecured debt rating of A minus or higher as rated by S&P, or A3 or higher as rated by Moody's, or A minus or higher as rated by Fitch; and (iii) otherwise acceptable to Company in Company's sole discretion.
Meter – A device or sensor that measures the amount of electricity consumed or generated by a DER. It may also be used to monitor the voltage, current, or other electrical characteristics of the electricity generated by a DER.
Parallel Operation – Operation of a DER connected to Company's Distribution System.
Point of Interconnection (POI) – The point of connection of the DER to Company's Distribution System; this term is synonymous with point of common coupling (PCC) as used in IEEE 1547.
Power Delivered – Electricity supplied by Company to the DER .
Power Received – Electricity supplied by the DER to Company's Distribution System.
Ramp Rate – The linear rate at which a DER increases its real power output over time upon entering service or operating in parallel with the utility source.
Secondary Network – A Distribution System in which the secondary of multiple distribution transformers are connected to a common network for supplying electric power to customers.
Spot Network – Type of electric distribution system that uses two or more inter-tied transformers to supply an electric network circuit.
Telemetering – Communications equipment used to obtain information from the DER or to control the DER, including a transmitter, antenna, pole for the antenna, telephone, etc.
Term – Time period during which terms and conditions of an Interconnection Agreement are binding.
Witness Testing – Live testing of the DER while operating in parallel with Company's Distribution System.

4 Application Requirements

For an application to be deemed complete it must include payment for all applicable fees, be factually correct in information, contain all required documentation, and meet all applicable standards listed within this document and set forth in the Indiana Administrative code. AES Indiana reserves the right to review, approve, and request modifications to all interconnection applications to ensure the safety and reliability of the distribution system. If at any stage the application is deemed to require corrections or clarification the review time will revert to the applicable stage of review upon receipt of those documents.

4.1 Indiana Interconnection Incentives

All current and active AES Indiana interconnection incentives can be found here. The Indiana Administrative Code Rule 4.1, 4.2 and 4.3 which provides current rules for cogeneration and alternative energy production facilities, net metering and customer-generation interconnection standards can be found here. There is no guarantee of acceptance or availability of such incentives.

4.2 Applying for Interconnection

All interconnection application forms can be found here at the AES Indiana Interconnection website. Additionally, all applications can be submitted electronically via PowerClerk, AES Indiana's application portal. Interconnections in Indiana are broken into different levels depending on the size of the proposed DER system. The application levels and fees are defined in the Indiana Administrative Code Article 4 Rule 4.3 and are summarized in Table 1 for reference. There is no fee for the installation of a meter with bidirectional reading capabilities.

Application Level	System Requirements	Fees
Level 1	Inverter based customer-generator facility that has a nameplate capacity of ten (10) kilowatts or less; and meet the certification requirements of the Indiana Administrative Code Article 4 Rule 4.3-5.	No Fee
Level 2	Inverter based customer-generator facility that has a nameplate capacity of two (2) megawatts or less; and meet the certification requirements of the Indiana Administrative Code Article 4 Rule 4.3-5.	$50 + $1 per kW of nominal nameplate capacity
Level 3	Request to connect customer-generator facilities that do not qualify for either level 1 or level 2 interconnection review procedures.	$100 + $2 per kW of nominal nameplate capacity

4.3 Interconnection Process Overview

The interconnection process begins when a customer or developer submits an interconnection application. The application must include information about the DER facility including the fuel source, nominal nameplate capacity, equipment being used, site plan, and electrical diagram (one-line). Further clarification on the site plan and one-line diagrams is summarized below. Applications are reviewed based on the processes and procedures defined in Indiana Administrative Code Article 4 to ensure the delivery of safe and reliable power to all customers and AES Indiana's workers. If an interconnection study identifies system modifications to the AES Indiana electrical power supply are required for interconnection to proceed, the applicant will be provided with the estimated cost of the system modifications. AES Indiana will then generate an Interconnection Agreement (IA) that includes any necessary system modifications and DER customer charges. When any charges are paid and both parties sign the IA, the project moves forward, and the interconnection queue progresses accordingly. After the DER customer and AES Indiana construct any required facilities and install any required bidirectional metering capabilities, permission to operate (PTO) is granted to the DER customer.

Site Plan

Customer's site plan must clearly indicate where all equipment will be installed on property. The site plan must show, all PV information, all batteries or inverters, AC disconnect, utility meter, any reclosers or step-up transformers. DER Customers utilizing photovoltaic based resources shall provide tilt and azimuth for all panels related with the interconnection request.

One Line

Interconnection Service Customer must provide the Company with a one-line diagram showing the configuration of the proposed DER system, including the protection and controls, disconnection devices, nameplate rating of each device, power factor rating, transformer connections, and all grounding information. One Line diagrams for all applications >50kW must be stamped by a Licensed PE in the state where the installation will occur.

Proof of Insurance

Any DER to be interconnected with the AES Indiana Distribution system must show proof of insurance or other suitable financial instrument sufficient to meet applicable rates, applicable riders, construction, operating, and liability responsibilities.

Inspection

Proof of inspection is required from local county, city, or an otherwise licensed inspector. AES Indiana may at its discretion request an inspection of the DER and Interconnection in accordance with the Indiana Administrative Code.

4.4 Interconnection Queue Process

DER interconnection applications are studied following a queue process to ensure fairness and consistency when considering system impacts, balancing a holistic view of the electric distribution system with expedience. All applications are queued based on the time the application is submitted and the circuit that will serve the proposed interconnection. Larger projects requiring engineering studies will be studied on a first-come, first-served basis based upon their proposed POI. Queue position is not guaranteed if an applicant fails to complete any milestone/requirement without prior notice.

5 General Requirements

Any DER Owner seeking a new or modified interconnection of a DER with the AES Indiana distribution system must meet the requirements and specifications provided in this document, the interconnection agreement, and any other requirements set forth by the Company.

5.1 Equipment Standards

The DER Owner is responsible for ensuring that the DER design and installation meet the technical requirements described in this document. The DER Owner must also be in compliance with, as it applies, the most current version of standards in the National Electric Code (NEC), the National Electrical Safety Code (NESC), Institute of Electrical and Electronic Engineers (IEEE), National Electrical Manufacturers Association (NEMA), American National Standards Institute (ANSI), National Fire Protection Association (NFPA), Underwriters Laboratories (UL), Federal Communications Commission (FCC), local codes, and any jurisdictional requirements pertaining to electrical facility design, construction, and safety.

AES Indiana reserves the right to field verify the DER owned and operated equipment against the equipment specified in the interconnection application.

5.2 Safe Operation and Maintenance

The DER Owner shall operate and maintain the DER in accordance with the applicable manufacturer's recommended maintenance schedule, and in compliance with all aspects of the Company's interconnection tariff and agreements, as applicable. The DER Owner must keep maintenance records that the Company may request for review. The DER Owner shall continue to comply with all applicable laws and requirements after an interconnection has occurred. In the event the Company has reason to believe that the DER installation may be the source of problems on the Company EPS, the Company has the right to install monitoring equipment at a mutually agreed upon location to determine the source of the problems. If the DER is determined to be the source of the problems, the Company may require disconnection as applicable.

5.3 Facility Isolation and Curtailment

AES Indiana reserves the right to temporarily disconnect the DER from the Company's distribution system on a non-discriminatory basis. AES Indiana may disconnect the DER for the following reasons:

- During an emergency with the potential to endanger life or property.
- The DER is adversely affecting the Company's distribution system equipment or its safe and reliable operation.
- During planned or emergency maintenance, repair, modification, or replacement of AES owned system assets impacting the normal circuit hosting the DER. To include manual or automatic system reconfiguration of the distribution system which results in the DER being connected in parallel with the AES Indiana distribution system under conditions that were not studied for parallel operation with the DER.
- Under normal operation of protection and control devices.
- Failure of Company owned equipment which is necessary for parallel operation of the DER.
- Noncompliant DER operation or output.
- Modification of the DER operating characteristics, output, or interconnection point without the approval of the Company.
- DER Owner's failure to comply with the conditions of the interconnection agreement.

AES Indiana will reconnect the DER to the Company owned distribution system as soon as practicable once the event or condition which caused the temporary disconnection is resolved. The Company will communicate and coordinate with the DER Owner to the extent possible. For planned work or maintenance, the Company will provide at minimum a seven-day notice.

The Company may require curtailment if it is determined that the continued operation of the DER at the current output level will impact the Company's ability to operate the Company's distribution system safely and reliably.

5.4 Utility Access

The DER Owner and/or operator on which the Company's facilities reside shall allow duly authorized agents of the Company the right and privilege to enter the Customer's premises at all reasonable times for the purpose of reading meters, installing, testing, inspecting, repairing and removing any or all of the Company's equipment used in connection with the supply of electric service.

5.5 Utility Accessible Disconnect Switch

AES Indiana requires a utility accessible disconnecting device that provides for a visible break at the point of interconnection, or another mutually agreed upon location. The disconnecting device must be accessible to the Company at all times. The Company reserves the right to operate the disconnecting device in accordance with the Company's interconnection agreement. The disconnecting device must provide a visible break and be capable of being locked open by the Company.

5.6 Connection types

AES Indiana permits line and load side taps given such connection is made past any AES Indiana owned metering assemblies or equipment. AES Indiana does not allow direct connections into the meter socket.

5.7 Future System Changes and Responsibilities

The EPS is dynamic and must be able to accommodate future load growth and system changes. Therefore, the Company may, at its discretion and cost, make upgrades to the EPS. Such upgrades may have an impact on existing DER facilities. In order to ensure continued safe operations in compliance with any Interconnection Agreements, the DER facilities, including any DER interconnection facilities, may need to be upgraded in accordance with the upgraded EPS. The DER Owner and the Company will work together cooperatively to implement the appropriate changes, upgrades, etc. to attain the common goal of continued safe and reliable operation of the interconnection of the DER to the EPS.

AES Indiana must be contacted prior to any operating or design modifications made to existing DER facilities. The Company must approve of any proposed changes to an existing interconnected DER. Failure to notify AES Indiana and seek approval of operating or design changes prior to implementation may result in the disconnection of the DER.

6. DER Design and Operating Requirements

The information and requirements provided in this section are intended to ensure interconnection to the AES Indiana distribution system will be made in a safe and reliable manner for both the Company and the DER Owner. The interconnection of a DER onto the Company's distribution system must not negatively affect the safety or the service reliability of other customers.

6.1 Thermal Loading Limits

DER interconnections must not cause AES Indiana's conductors or devices to exceed 90% of their thermal ratings. Specific to Company owned transformation this 90% limit is in relation to the transformer's top nameplate rating.

6.2 Transformer Reverse Power Capability

Any proposed DER facility that has the potential to cause reverse power flow through an AES Indiana substation transformer will require additional analysis during the interconnection study. The interconnection study will specifically address the ability of the transformer to accommodate reverse power flow. Based upon the transformer specifications and the insulation aging impact in accordance with IEEE Std. C57.91 it will be determined if reverse power will significantly add to a loss of life for the substation transformer. If it is found that loss of transformer life is not a concern a maximum of reverse power flow up to 90% of the substation transformer's top nameplate rating may be permitted.

The DER Owner will be responsible for the cost to upgrade or replace any load tap changer (LTC) control or voltage regulator control that is found to be incompatible with a reverse flow of real power. The LTC and/or regulator controls must be capable of properly regulating the voltage when the real power is observed to be in either the forward or reverse direction to ensure adequate voltage is being supplied to all customers on the EPS.

6.3 Interconnection Transformer Winding and Grounding Requirements

The DER Owner shall own, maintain, and operate the step-up transformation for any DER that will be connected at primary voltage to the AES Indiana distribution system. The interconnection transformer(s) shall be grounded-wye on the Company side and grounded-wye on the DER side. The rated voltage, kVA, and impedance of the interconnection transformer must be included in the system single line provided to AES Indiana by the DER Owner.

During its active operation, a customer-owned DER System must serve as an effectively-grounded source within the AES Indiana system. This measure is vital to safeguard against over-voltages stemming from neutral shifts during ground faults. Conversely, when the Interconnection Customer's DER System is not in operation, it must not act as a grounding source within the AES Indiana system. This is required to avoid the desensitization of AES Indiana's ground fault protection. During a phase to ground fault on the AES Indiana distribution system, the Interconnection Customer's equipment shall not cause over voltages greater than 135% of nominal phase to ground

voltage on the unfaulted phases. During an open phase condition on the AES Indiana distribution system, the Interconnection Customer's equipment shall not energize (i.e., backfeed) the open phase.

A DER System may meet effective grounding requirements through its transformer configuration or by use of a grounding transformer, each with or without a neutral reactor.

A grounded wye - grounded wye interconnection transformer with a grounded wye generator may satisfy the requirement of being an effectively grounded source, as it will pass zero-sequence current from the Interconnection Customer source only when the DER is generating. A three-legged core type grounded wye – grounded wye transformer should not be used; a four-legged or five-legged core type transformer or three single-phase transformers are required to prevent overheating due to zero sequence current circulating through the transformer tank.

For DER technologies that do not supply zero-sequence current (for example, inverter-based DERs), a grounded wye - grounded wye interconnection transformer alone may not satisfy the effective grounding requirement. Per IEEE 142 a system is considered effectively grounded when the ratio of zero-sequence reactance to positive-sequence reactance is less than or equal to three and the zero-sequence resistance to positive-sequence reactance is not greater than one. AES Indiana will review the proposed DER System and, depending on the results, an additional grounding transformer may be required in parallel with the DER equipment to provide zero sequence current during a ground fault on the AES Indiana system. This grounding transformer shall be appropriately sized to maintain IEEE 142 effective grounding criteria while producing ground current no greater than 10% of the existing ground fault current at the PCC. If the grounding transformer cannot be sized in such a way, the Interconnection Customer shall include provisions to disconnect the grounding transformer at either the high side or the neutral when the DER is not generating. Additional protection, such as open-phase detection settings, may be required with the inclusion of a grounding transformer. Upon request, AES Indiana will supply the Interconnection Customer with source impedance and fault current levels at the PCC and might assist in the development of open-phase detection settings.

Conventional generators (i.e., rotating machinery) are classified as constant voltage sources. By contrast, inverters are considered voltage-controlled current sources. Because of this distinction, an inverter-based DER will respond differently to fault conditions than a non-inverter-based DER. Therefore, it is necessary to adjust certain effective grounding criteria for inverter-based DER Systems only. Many inverters are constructed with a neutral wire that is meant for sensing only and is not rated to carry fault current. This prevents the inverter from being an effectively grounded source to the AES Indiana system. An interconnection transformer that is a zero-sequence current source or an additional grounding transformer may be required for these inverters to meet the effective grounding requirement. For inverter-based DER Systems with nameplate ratings greater than 50 kW, AES Indiana will evaluate each proposal on a case-by-case basis to determine if a ground source is needed on the Interconnection Customer's system. The Interconnection Customer shall provide AES Indiana with the inverter's positive, negative, and zero sequence impedances if they are available from the manufacturer. If AES Indiana determines that a grounding transformer is required, the Interconnection Customer shall revise their design to include a grounding transformer and resubmit it to AES Indiana for review.

6.4 Fault Current Contribution

AES Indiana will simulate the fault current with the DER interconnection to ensure that the distribution equipment, which includes but is not limited to feeder breakers, reclosers, regulators, switches, and fuses, does not exceed their specified withstand ratings. This analysis is conducted to ensure that all DERs, both currently installed and proposed, within the feeders originating from the same substation, as well as any DERs connected to affected systems of other utilities, can be seamlessly integrated into and disconnected from the system in a synchronized manner. AES Indiana will evaluate fault currents at various equipment locations, extending up to and including the corresponding feeder breaker, as well as at the Point of Interconnection (POI) or Point of Common Coupling (PCC). The available fault current at the PCC must not increase by more than 10% due to the addition of a DER.

6.5 Interconnection Requirements for Secondary Networks

Any proposed DER to be interconnected on an AES Indiana secondary network must be inverter based. To prevent unwanted operation of network protectors due to reverse power flow under no circumstances should the

DER export power onto the secondary network. Any DER interconnecting on a secondary network shall install minimum import protection (37P) that will trip the DER Owner's dedicated DER breaker when the power being imported by the DER Owner drops below 5% of the DERs nameplate rating. The maximum aggregated generation on a spot network must not exceed the smaller of five percent of the spot network's maximum load or 50kW.

6.6 Insulation and Insulation Coordination

It is the responsibility of the DER Owner to ensure equipment owned and operated by the DER Owner is able to withstand normal and abnormal transient voltages that can be experienced in grid parallel mode. Abnormal voltages can be experienced during switching activities, lightning strikes, system faults, etc.

6.7 Power Quality Requirements

The requirements below are intended to ensure AES Indiana continues to deliver safe and reliable service to all customers while allowing for the interconnection of DERs. The criteria below are used to determine if system modifications to the AES Indiana system and/or the proposed DER will be necessary during the interconnection study process.

6.7.1 Steady State Voltage Requirements

The steady state voltage of the AES Indiana distribution system must remain within ANSI C84.1 range A. DERs interconnecting with AES Indiana shall not cause voltage at any point along the EPS to deviate from +5% / -2.5% of the nominal service voltage.

6.7.2 Rapid Voltage Change Limits

Rapid voltage change as defined by IEC 61000-4-30:2015 is a quick transition in rms voltage accruing between two steady-state conditions. In accordance with IEEE1547 the maximum voltage change at any point on the EPS due to a DER tripping offline or coming online must be less than 3% of the nominal voltage. Additionally, AES Indiana requires the maximum voltage change due to a DER tripping offline or coming online be at or below 2% of the nominal voltage at any regulating device to prevent excessive operations of the device.

6.7.3 Voltage Variation Limits

Section 6.7.2 addresses the worst-case voltage fluctuation. However, it does not address the frequent voltage fluctuations that may occur due to the intermittency of solar and wind based DERs. The voltage change related to the DER output dropping from 100% to 50% should not exceed 1.5% at any AES Indiana voltage regulating device.

6.7.4 Ramp Rate

When a DER enters service or reconnects to operate in parallel with the grid source a defined ramp rate may be necessary to assist in being compliant with the rapid voltage change limits and voltage variation limits in the above sections. AES Indiana may specify a maximum ramp rate for the generation not to exceed a linear ramp of 300 seconds (20% per minute). The Company will communicate the need for a specific ramp rate with the DER Owner if applicable.

6.7.5 Harmonic Limits

The maximum harmonic limits for electrical equipment shall be in accordance with the most current version of IEEE 519. The objective of IEEE 519 is to limit the maximum individual frequency voltage harmonic to 3% of the fundamental frequency and the voltage Total Harmonic Distortion (THD) to 5% on the AES Indiana side of the PCC. In addition, DER Systems shall also meet harmonic current distortion limits as described in the most recent version of IEEE 1547.

6.7.6 DC Current Injection

AES Indiana limits the level of DC current injection into the grid as it may lead to transformer saturation and other equipment failure. The Interconnection Customer's DER System including all interconnection equipment shall not inject DC current greater than 0.5% of the full rated output current at the point of connection of the DER System.

6.8 Voltage Regulation

AES Indiana regulates the voltage of the EPS through load tap changes (LTCs), voltage regulators, capacitor banks, and other devices. DERs interconnected with AES Indiana must not interfere with the capability to regulate voltage of the EPS. DERs should not actively regulate the voltage of the EPS unless agreed upon or required by the Company.

6.8.1 Reactive Power Control Capability

DERs that are interconnected with the AES Indiana distribution system must have the following reactive power control capabilities. The control mode required by the Company will be identified during the interconnection study. The Company will specify set points for the control mode or control modes that are agreed upon to operate under. The DER must not operate in a control mode not approved by the Company.

Constant Power Factor – In this control mode the DER will operate with a constant leading or lagging power factor to limit the voltage fluctuation scene on the EPS. The power factor will be determined by the Company following an interconnection study.

Volt – VAr control mode – In this control mode the DER controls its reactive power output as a function of the voltage at the point of interconnection. Figure 1 below shows an example of the volt-var curve for a DER. The specific set points will be determined during the interconnection study.

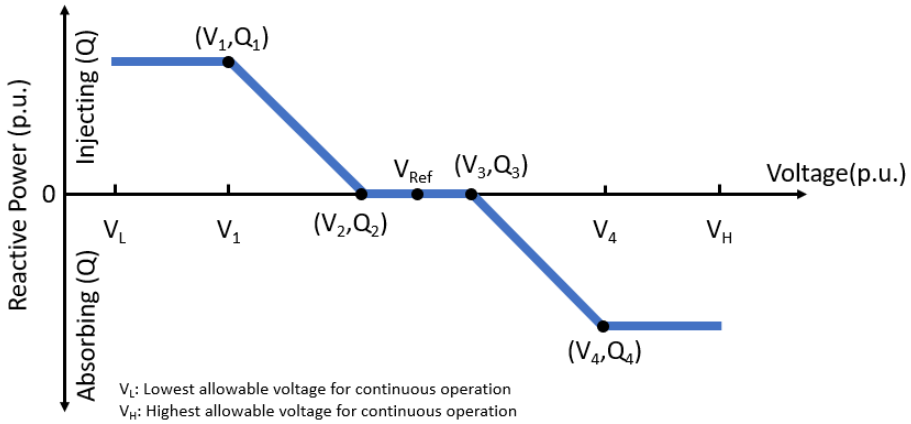


Figure 1

6.8.2 Power Factor Requirements

The DER must be capable of operating with a leading or lagging power factor up to 90%. Should a constant power factor other than unity be required it will be identified and agreed upon following an interconnection study. The DER shall only operate in a control mode or at a power factor agreed upon by the Company.

6.9 Ride-Through Capability

All DERs seeking interconnection with the AES Indiana distribution grid shall be capable of riding through momentary system abnormalities as specified in IEEE 1547-2018. The clearing times of inverter-based DER will generally follow those of a category II DER as specified in IEEE 1547-2018 and rotating machine-based DER will

follow that of a category I DER as specified in IEEE 1547-2018. The Company will make final determination of the ride through settings as part of the interconnection study.

DERs that will not operate in parallel with the AES Indiana distribution system and operate only as back-up or emergency generation and do not to energize the area EPS are exempt from the ride-through requirements.

6.9.1 Voltage Ride-Through

Inverter based DER shall follow the default Category II abnormal operating performance settings as specified in IEEE 1547-2018 section 6.4.1. Machine based generation shall follow the default Category I abnormal operating performance settings as specified in IEEE 1547-2018 section 6.4.1. The Company reserves the right to request custom voltage ride-through settings within the range of allowable settings to ensure safe and reliable operation of the distribution grid.

6.9.2 Frequency Ride-Through

Inverter based and machine based generation shall follow the default abnormal operating performance settings for frequency as specified in IEEE 1547-2018 section 6.5.1. The Company reserves the right to request custom frequency ride-through settings within the range of allowable settings to ensure safe and reliable operation of the distribution grid.

6.10 Transient Overvoltage

Transient overvoltage is a concern with inverter-based DER when a large step change in load occurs. This is known as load rejection overvoltage and can cause damage to both the DER Owner's and Company's equipment if not limited. All inverter-based DER installations greater than or equal to 500kW must incorporate inverters that are compliant with IEEE 1547-2018 clause 7.4.2 to limit the potential for transient overvoltage. The DER shall not cause overvoltage on any part of the EPS that exceeds the magnitude and duration specified in IEEE 1547-2018 section 7.4.2.

6.11 Inverter Design Requirements

All inverter based DERs shall incorporate inverters with the following features and capabilities:

- UL listed and meet UL Standard 1741
- Operate in grid following mode when operating in parallel with the AES Indiana distribution grid.
- Grid forming mode is allowable when isolated from the AES Indiana distribution grid upon written approval and agreement by the Company.
- Meet the ride through requirements in section 6.9
- Be capable of operating in the reactive power modes listed in section 6.8.1
- Meet the transient overvoltage requirements in section 6.10
- Be capable of detecting and tripping for faults on the Company owned equipment on the Company side of the point of interconnection

6.12 Single Phase DER Connection Limits

AES Indiana limits imbalance on a single phase 120/240 V service. These limits are designed to maintain system phase balancing while allowing smaller applications, which often do not have three-phase equipment available, to proceed with interconnection. Installations behind a three-phase meter should be balanced three-phase generators whenever possible to preserve phase balancing. In all cases, single phase DER interconnections are limited to 100kW to prevent phase imbalance. Additional limits around single phase DER interconnections may apply depending on the existing service voltage for behind the meter DER installations.

7. Protection and Control Requirements

The protection and control requirements below contain requirements for AES Indiana owned and operated equipment as well as the requirements for the DER owned equipment. These requirements are intended to ensure the distribution system can continue to operate in a safe and reliable manner.

The requirements below are intended to protect the AES Indiana transmission and distribution system only. AES Indiana nor the DER Owner should rely on the other party for detection of abnormal conditions, such as faults, or protection of their respective equipment. The DER Owner is required to detect faults and isolate the DER equipment with DER owned and maintained equipment and protective devices.

As a part of the interconnection study process, projects will be reviewed on a case-by-case basis to determine if additional relays or other protective devices will be required. The DER Owner is responsible for the costs of any AES Indiana owned protective equipment that is deemed necessary to allow for the DER to interconnect with the AES Indiana distribution system. The need for protective equipment will vary with the type of generation, DER output (kW), and location of the facility on a Company's distribution system.

7.1 Interconnection Classification

The sections below will specify the protection requirements for DERs interconnecting with the AES Indiana distribution system. The DERs will fall into three classifications: Primary Connected, Behind the Meter (Exporting), and Behind the Meter (Non-Exporting). This classification in addition to the size of the proposed DER and the generation type will determine the required protection.

7.1.1 Primary Connected

A DER that is stepped up to primary voltage through DER owned transformation and whose point of interconnection / change in ownership is at primary voltage is considered a primary connected DER. These DERs will normally be a stand-alone DER whose primary purpose is to provide power to the area EPS with little to no customer load onsite. Depending on the size of the installation a Company owned protective device, such as an electronic recloser may be required along with a DER owned disconnecting device as described in section 5.5.

The Company owned disconnecting device may be operated when conditions listed in section 5.3 are present due to the absence of customer load behind the point of interconnection.

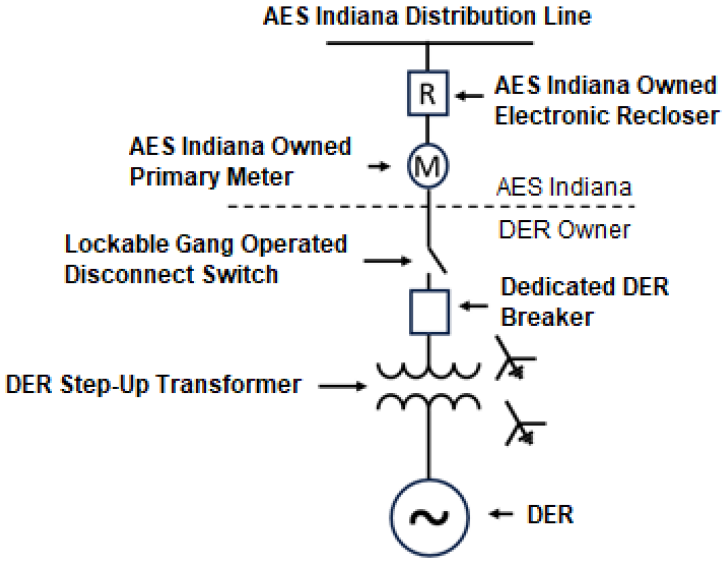


Figure 2 – Simplified Primary Connected DER Single Line Diagram

7.1.2 Behind the Meter (Exporting)

This classification may be connected to the area EPS through a company owned transformation with metering on secondary equipment or customer owned transformation with metering on primary equipment. A DER of this classification will provide power to the Company EPS, but also contains customer load behind the meter.

A DER owned disconnecting device as described in section 5.5 will be required. For behind the meter three phase installations the Company may require an additional DER owned protective device and the ability to control

the protective device in order to isolate the DER from the EPS in accordance with section 5.3. Large three phase installations behind the meter installations equal to or greater than 1000 kW may require a Company owned electronic recloser. See section 7.2.3.

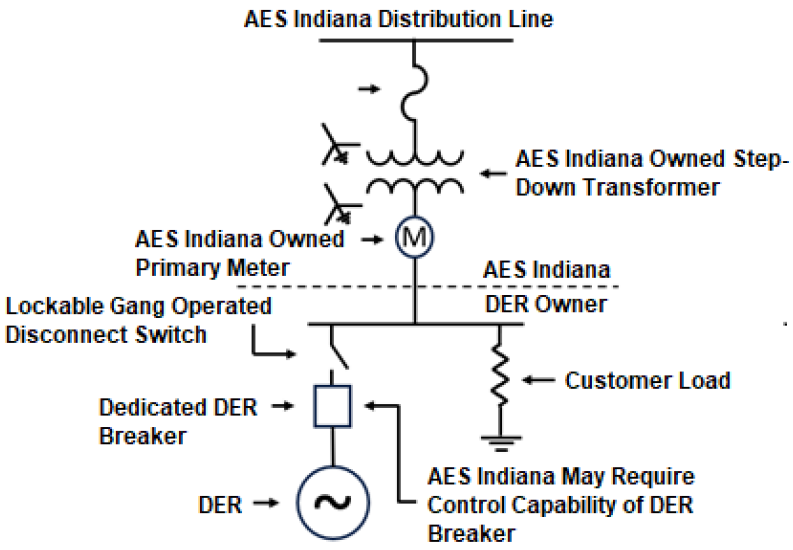


Figure 3 – Simplified Behind the Meter (Exporting) DER Single Line Diagram for Three Phase Industrial and Commercial Customer

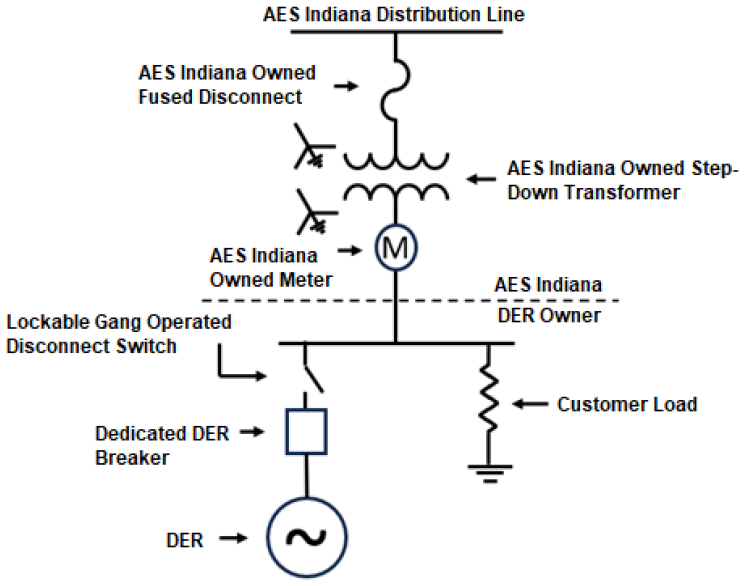


Figure 4 – Simplified Behind the Meter (Exporting) DER Single Line Diagram for Residential or Single Phase Commercial Customer

7.1.3 Behind the Meter (Non-Exporting)

A DER that is only intended to supplement customer load, operate in parallel with the area EPS, and not to export power back to the area EPS will require standard anti-islanding protection unless installed on a secondary network. Interconnection onto a secondary network will additionally require a minimum power relay and dedicated breaker to ensure that the DER cannot back feed onto the secondary network and risk the tripping of network protectors.

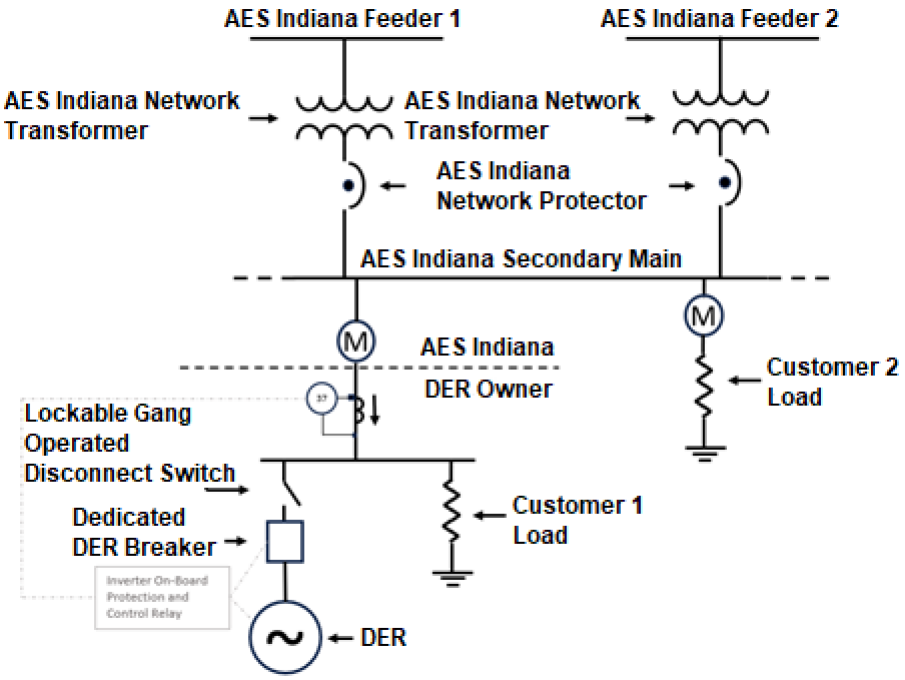


Figure 5 – Simplified Behind the Meter (Non-Exporting) DER Single Line Diagram on Secondary Network

7.2 Protection and Relay Requirements

The minimum protection the DER Owner shall incorporate for all DER to detect and clear faults on the EPS is as follows.

- Under and over voltage (27/59) and under and over frequency (81U / 81O) – see section 6.8 for the default AES Indiana settings. The Company will determine if special settings need to be applied on a case-by-case basis.
- Directional time and instantaneous phase overcurrent protection (67)
- Directional time and instantaneous ground overcurrent protection (67N)

This relaying will be owned, operated, and maintained by the DER Owner and at the DER Owner's expense. The protective functions above will trip the DER owned and operated interconnection breaker or inverter directly. If it is found the DER is unable to detect faults on the EPS with the functions above the Company will require direct transfer trip to a Company owned device at the point of interconnection (see section 7.3) at the customer's expense.

7.2.1 Detection of DER System Faults

Detection and clearing of DER system faults beyond the point of interconnection is the responsibility of the DER Owner. The DER Owner will determine the protection necessary to detect and clear DER system faults. The DER Owner and the Company will mutually agree upon the overcurrent protection settings so that coordination can be achieved to the maximum extent possible between the Company's protective equipment and the DER owned, operated, and maintained protection equipment.

7.2.2 Tie Line Protection for Inverter Based DER Less than 1000 kW

For primary connected inverter-based DER with an aggregate nameplate capacity less than 1000 kW a Company owned fused disconnect at minimum is required. The interconnection study may identify the need for additional protection depending on the aggregate amount of DER present, location on the circuit, and other specific design details of the proposed DER.

7.2.3 Tie Line Protection for Inverter Based DER 1000kW and Greater

For primary connected inverter-based DER with an aggregate nameplate capacity of 1000 kW or greater a Company owned electronic recloser is required on the Company's side of the point of interconnection. The recloser will be owned, operated, and maintained by the Company. The DER Owner will be responsible for the cost of the electronic recloser.

Direct transfer trip may also be required and will be determined during the interconnection study. See section 7.3 for details on direct transfer trip.

7.2.4 Tie Line Protection for Synchronous / Asynchronous Generation

For primary connected DER which utilize synchronous or asynchronous generation a Company owned electronic recloser is required on the Company side of the point of interconnection regardless of the aggregate nameplate capacity. The recloser will be owned, operated, and maintained by the Company. The DER Owner will be responsible for the cost of the recloser.

Direct transfer trip is required and at the expense of the DER Owner. See section 7.3 for details on direct transfer trip.

7.3 Direct Transfer Trip

Direct Transfer Trip (DTT) may be required and the need for DTT will be determined on a case-by-case basis. At AES Indiana Direct Transfer Trip (DTT) is used to send a high-speed signal between protective devices upstream from the DER location to the AES owned DER recloser at the point of interconnection. The Company requires a fiber optic connection between devices as the communication medium.

A DTT scheme may be required if any of the criteria below are met pending the outcome of the interconnection study.

- The DER is capable of back feeding onto the transmission system.
- It is determined the DER is unable to detect and trip for faults on the Company's EPS.
- The DER is any one of the following types:
    - Synchronous or asynchronous machine
    - Non-certified inverter
    - Self-excited induction generator
- The nameplate output of the DER is equal to or greater than 1000 kW.
- The minimum load on the line segment following the operation of any Company owned sectionalizing device is not greater than three times the aggregate DER capacity.

If the Company determines DTT is required the company shall install, own, and maintain the fiber optic communications line and the associated equipment enabling a DTT scheme. The cost associated with the installation of the DTT scheme, including the fiber optic communications line, will be the responsibility of the DER Owner.

7.4 Intentional and Unintentional Islanding

Intentional Islanding

An intentional island, such as a microgrid, is planned to operate independent of the utility source upon an unforeseen utility outage and energize some portion of the area EPS. AES Indiana will work collaboratively with the DER Owner when intentional islanding is desired. Permission to operate in grid forming mode must be granted in writing by the company before intentional islanding is permitted.

A DER Owner may wish to use a DER as backup or emergency generation following a loss of the utility source to energize the DER Owners equipment and load. This is supported by the Company with the requirement that the

DER ceases to energize Company owned facilities and the area EPS within 2 seconds following a loss of the utility source.

Unintentional Islanding

An unintentional island is an unplanned island that has energized or re-energized a portion of the area EPS following the loss of the utility source. Unintentional islands may result in unsafe conditions for the public, customers, and Company employees and can result in equipment damage. In the absence of a written agreement with the Company to form an intentional island or microgrid the DER must cease to energize the area EPS within 2 seconds following the loss of the utility source. Inverter based generation must be configured to operate in grid following mode. Inverter based generation shall not operate in grid forming mode or with anti-islanding function disabled without consultation with and written permission by the Company.

7.5 Automatic Reclosing of Company Equipment

AES Indiana normally uses automatic reclosing to re-energize the downstream EPS following a fault clearing trip. If the fault is momentary this action will automatically restore the impacted customers. The automatic reclosing scheme does not normally check for the absence of voltage or synchronization prior to operating. It is the DER Owner's responsibility to ensure the DER has disconnected from the EPS prior to the automatic reclose. The Company is not responsible for damage to the DER owned and operated equipment due to out-of-phase reclosing.

7.6 DER Synchronization

The synchronization device shall be owned and operated by the DER Owner. Company facilities will not be used to provide synchronization between the DER owned equipment and the company owned EPS. The synchronization device must not be used to energize any portion of the EPS. The DER owned synchronization device must be capable of interrupting the current associated with an out of phase condition.

All machine-based generation must be operating at the proper speed prior to paralleling with the area EPS to reduce the voltage drop associated with the current needed to accelerate the device during the synchronization process. DER Synchronization shall comply with IEEE 15457-2018 section 4.10.4.

7.7 DER Reconnection to the Area EPS

The DER must not re-energize the area EPS in any circumstance unless approved by and agreed upon with the Company. Following an outage on the EPS or a trip of the DER due to a fault or other abnormal condition on the area EPS the DER may synchronize and reconnect to the energized EPS after stable voltage and frequency is observed for a minimum of five minutes.

Should the area EPS be re-energized under abnormal conditions the Company may require the DER to remain disconnected from the area EPS until the system is returned to normal. This will be achieved by a Company owned electronic recloser operating to an open state such that the point of interconnection with the DER remains de-energized or by the Company sending a block signal to the DER to prevent it from reconnecting to the area EPS.

8 Telemetry Requirements

AES Indiana will require a Company owned electronic recloser with SCADA communications for monitoring and control of primary connected DER with an aggregated nameplate capacity at or above 1000 kW. Additional communication and control capability may be required and will be determined as part of the interconnection study.

The Company may require SCADA communication to behind the meter installations of 1000 kW and above where the installation of an electronic recloser is not desired due to the impact to the customer load behind the meter

should the DER need to be disconnected from the EPS. The need for SCADA communication and control capability will be determined during the interconnection study.

The DER should be capable of supporting the information exchange requirements specified in IEEE 1547-2018 section 10. The local DER communications interface must support IEEE Std 1815 (DNP3), IEEE Std 2030.5 (SEP2), and SunSpec Modbus.

Backup and emergency generation that does not run in parallel with the EPS is exempt from this requirement.

9 Metering Requirements

AES Indiana will install and provide the appropriate metering equipment. This equipment includes a meter, meter socket, instrument transformers, conduit, and secondary wiring. The metering location will be outside on an AES owned pole or padmount housing depending on the feed type. Metering equipment will not be installed in customer switchgear or equipment.

The DER meter will record real and reactive interconnection power flows between the DER and the EPS. The meter will display real power, reactive power will only be recorded. Meter will be a two-way communicating AMI meter that records intervals. The customer can request to monitor their usage with their own equipment using KYZ. If necessary, a separate metering of station power may be required to meter facility load when the DER is offline.

10 Testing and Commissioning

The DER Owner is responsible for conducting commissioning and verification testing to confirm that the DER as designed, installed, and operating meets the interconnection and interoperability requirements of this document and IEEE Std 1547-2018.

10.1 Witness Testing

AES Indiana requires DER inspection of completed installations and witness testing prior to granting permission to operate for any DER with an aggregate nameplate capacity of 1000 kW or greater. The DER Owner and the Company will jointly determine a date and time of the inspection and witness testing once the DER has successfully completed initial synchronization and the control parameters are in their final configuration.

Witness testing at minimum will require confirmation and testing of the following:

- Confirmation of reactive power mode and/or constant power factor as agreed upon by the Company.
- Confirmation of aggregate nameplate capacity.
- Confirmation of interconnection transformer winding configuration (if applicable).
- Confirmation of utility accessible disconnect switch.
- Witness test that the DER disconnects following a loss of a single phase.
- Witness test that the DER disconnects following a three-phase loss of utility source.
- Witness test DER reconnection delay upon the return of the utility source.
- Witness test the DER ramp rate upon reconnection and parallel operation with the utility source.

The Company reserves the right to require witness testing of additional commissioning activities if deemed necessary by the Company.

10.2 Permission to Operate

For DERs that require witness testing a Permission to Operate (PTO) will be issued following a successful witness test within 48 hours. If the DER fails any portion of the inspection and witness test another witness test will be scheduled within 30 days to allow the DER Owner to resolve any problems. The DER Owner may seek an extension of this 30 days upon mutual agreement between the Company and the DER Owner. For DERs that require any additional metering equipment, Permission to Operate will be given once all required metering equipment has been installed.

11 Appendix

11.1 Level 1 Application

Application for Interconnection
Level 1 - Certified* Inverter-Based Generation Equipment**
10kW or Smaller

Application Date:

Applicant Information
Customer (Applicant) Name:
Applicant Address:
City/State/Zip Code:
Home/Business Phone: Daytime Phone:
Email Address:
Meter Number:
Name of Contractor/Installer:
Contractor Address:
Contractor Phone: Email Address:

Interconnection Information
Total Generating Capacity Output of Customer Facility (AC Power and Voltage):
Power Source: ☐ Solar Photovoltaic ☐ Wind Turbine ☐ Other (Specify)
Inverter AC Power and Voltage Rating:
Number and Type of Solar Panels (if applicable):
Generating Facility is: Customer Owned ☐ Customer Leased ☐
Inverter Manufacturer and Model Number:
Attach documentation confirming that a nationally recognized testing and certification laboratory has listed the equipment.
☐ Battery (If Used) Model: Size (kWh):
How is the battery being operated? ☐ Backup mode or ☐ Peak shaving

Indicate the intended use of power generated from the proposed facility, subject to all applicable regulatory approvals.

☐ Rider 9 Net Metering
☐ Rider 16 Rate EDG
☐ Internal Use Only
☐ Other – Explain

Attach a single line diagram or sketch one below that includes all electrical equipment from the point where service is taken from AES Indiana to the inverter which includes the main panel, sub-panels, breaker sizes, fuse sizes, transformers, and disconnect switches (which may need to be located outside and accessible by utility personnel). AES Indiana does not require the disconnect switches for Level 1 applications.

Fees
Level 1 – There is no cost to the Applicant for a Level 1 Interconnection review.

Insurance Requirements
The Applicant shall provide evidence of homeowners, commercial or other insurance that provides coverage in the amount of at least $100,000 for Comprehensive General Liability and Contractual Liability.

* Certified as defined in 170 Indiana administrative Code 4-4.3-5.
** Level 1 as defined as 170 Indiana Administrative Code 4-4.4-4(a).

01-01-2025

☐ Evidence of Insurance coverage provided with Application.

Submittal of Fees, Application and Documentation

Fees – Payment for the Initial Review shall be sent to AES Indiana Interconnections, T&D Planning Attn: Room 208, 1230 W Morris St., Indianapolis, IN 46221. Please make checks payable to AES Indiana and include the customer's name and address on the check.

Application and Documentation – Please send the application and all documentation electronically to ipl.interconnection@aes.com. All papers copies of documentation should be scanned electronically prior to submittal to AES Indiana.

* Certified as defined in 170 Indiana administrative Code 4-4.3-5.
** Level 1 as defined as 170 Indiana Administrative Code 4-4.4-4(a).

11.2 Level 2 Application

Application for Interconnection

Level 2 - Certified* Inverter-Based Generation Equipment**
2MW or Less

Application Date:

Applicant Information
Customer (Applicant) Name:
Applicant Address:
City/State/Zip Code:
Contact Person:
Phone: Email Address:

Generation Site Information
Service (Site) Address:
City/State/Zip Code:
Phone Number:
Meter Number:

Developer Information
Project Developer Name:
Project Development Address:
Phone: Email Address:
Please provide names and contact information for other Contractor and Engineering firms involved in the design and installation of the general facilities:

Interconnection Information
Total Generating Capacity Output of Customer Facility (AC Power and Voltage):
Inverter AC Power and Voltage Rating:
Quantity:
Number and Type of Solar Panels (if applicable):

Type of Generator: ☐ Inverter-Based ☐ Synchronous ☐ Induction

Power Source:	☐ Solar	☐ Wind	☐ Diesel-fueled Reciprocating Engine
	☐ Gas Turbine	☐ Microturbine	☐ Gas-fueled Reciprocating Engine
	☐ Other (specify)		

☐ Battery (If Used) Model: Size: (kWh):

Generating Facility is: ☐ Customer Owned ☐ Customer Leased
If the Equipment "Certified"* as defined by the 10 Administrative Code ("IAC") 4-4.3-5
☐ Yes ☐ No

* Certified as defined in 170 Indiana administrative Code 4-4.3-5.
** Level 2 as defined as 170 Indiana Administrative Code 4-4.4-4(a).

01-01-2025

Indicate the intended operating mode for this generator facility:
{data: Intended Operating Mode}

Indicate the intended use of power generated from the proposed facility, subject to all applicable regulatory approvals.

{data: Intended Use of Power}

Level of Interconnection Review Requested:

☐ Level 2** for nameplate rating 2MW or less

For this application to be considered complete, adequate documentation and information must be submitted that will allow AES Indiana to determine the impact of the generation facilities on AES Indiana's electric system and to confirm compliance by Customer with the provisions of and AES Indiana's requirements. Typically, this should include the following for Level 2 applications:

1. Single-line diagram of the customer's system showing all electrical equipment from the generator to the point of interconnection with AES Indiana distribution system, including generators, transformers, switchgear, switches, breakers, fuses, voltage transformers, and current transformers.
2. Control drawings for relays and breakers.
3. Site Plans showing the physical location of major equipment.
4. Relevant ratings of equipment. Transformer information should include capacity ratings, voltage ratings, winding arrangements, and impedance.
5. If protective relays are used, settings applicable to the interconnection protection. If programmable relays are used, a description of how the relay is programmed to operate as application to interconnection protection.
6. For Certified* equipment, documentation confirming that a nationally recognized testing and certification laboratory has listed the equipment.
7. A description of how the generator system will be operated including all modes of operation.
8. For inverters, the manufacturer name, model, and AC power rating. Operating manual or link to manufacturer's website containing such manual.
9. For synchronous generators, manufacturer and model number, nameplate ratings, and impedance data (Xd, X'd, & X"d).
10. For induction generators, manufacturer and model number, nameplate ratings, and locked rotor current.

This application is subject to further consideration and study by AES Indiana and the possible need for additional documentation and information from the Customer.

Fees

Level 2 – Initial Review	$50 plus, $1/kW of nameplate capacity.
Additional Review[1]	Non-binding, good faith cost estimate provided to customer.

[1]Additional Review may be elected by the customer for the case where the facility failed to meet one or more of the applicable requirements and the Initial Review indicated that additional review may enable the Company to approve the application with minor modifications. The applicant cost to conduct the Additional Review is in addition to the initial Review Fee. Actual costs will be billed or credited to the applicant following the completion of the Additional review and minor modifications.

Insurance Requirements

* Certified as defined in 170 Indiana administrative Code 4-4.3-5.
** Level 2 as defined as 170 Indiana Administrative Code 4-4.4-4(a).

The Applicant shall provide evidence of homeowners, commercial or other insurance that provides coverage in the amount of at least $100,000 for Comprehensive General Liability and Contractual Liability.

☒ Evidence of Insurance coverage provided with Application.

Reference Documents
170 IAC Customer generator interconnection standards are located at:
http://www.in.gov/legislative/iac/T01700/A00040.PDF

Submittal of Fees, Application and Documentation
Fees – Payment for the Initial Review shall be sent to AES Indiana Interconnections, T&D Planning Attn: Room 208, 1230 W Morris St., Indianapolis, IN 46221. Please make checks payable to AES Indiana and include the customer's name and address on the check.

Application and Documentation – Please send the application and all documentation electronically to ipl.interconnection@aes.com. All papers copies of documentation should be scanned electronically prior to submittal to AES Indiana.

* Certified as defined in 170 Indiana administrative Code 4-4.3-5.
** Level 2 as defined as 170 Indiana Administrative Code 4-4.4-4(a).

11.3 Level 3 Application

Application for Interconnection
Level 3 - All Other Facilities**

Application Date:

Applicant Information
Customer (Applicant) Name:
Applicant Address:
City/State/Zip Code:
Contact Person:
Phone: Email Address:

Generation Site Information
Service (Site) Address:
City/State/Zip Code:
Phone Number:
Meter Number:

Developer Information
Project Developer Name:
Project Development Address:
Phone: Email Address:
Please provide names and contact information for other Contractor and Engineering firms involved in the design and installation of the general facilities:

Interconnection Information
Total Generating Capacity Output of Customer Facility (AC Power and Voltage):
Inverter AC Power and Voltage Rating:
Quantity:
Number and Type of Solar Panels (if applicable):

Type of Generator: ☐ Inverter-Based ☐ Synchronous ☐ Induction

Power Source:	☐ Solar	☐ Wind	☐ Diesel-fueled Reciprocating Engine
	☐ Gas Turbine	☐ Microturbine	☐ Gas-fueled Reciprocating Engine
	☐ Other (specify)		

☐ Battery (If Used) Model: Size (kWh):
Generating Facility is: ☐ Customer Owned ☐ Customer Leased
If the Equipment "Certified"* as defined by the 10 Administrative Code ("IAC") 4-4.3-5
☐ Yes ☐ No

* Certified as defined in 170 Indiana administrative Code 4-4.3-5.
** Level 3 as defined as 170 Indiana Administrative Code 4-4.3-4(a).

01-01-2025

Indicate the intended operating mode for this generator facility:
{data: Intended Operating Mode}

Indicate the intended use of power generated from the proposed facility, subject to all applicable regulatory approvals.

{data: Intended Use of Power}

Level of Interconnection Review Requested:

☐ Level 3** for all other facilities.

For this application to be considered complete, adequate documentation and information must be submitted that will allow AES Indiana ("IPL") to determine the impact of the generation facilities on AES Indiana's ("IPL") electric system and to confirm compliance by the Customer with the provisions of 170 IAC 4-4.3 and AES Indiana's ("IPL") requirements. The Applicant must submit the specific interconnection requirements contained in Attachment A for a Level 3 request. This application is subject to further consideration and study by AES Indiana ("IPL") and the possible need for additional documentation and information from the Applicant.

Fees

Level 3 – Initial Review	$100 plus, $2/kW of nameplate capacity.
Impact Study	Non-binding, good faith cost estimate provided to customer.
Facility Study	Non-binding, good faith cost estimate provided to customer.

Additional Review may be elected by the customer for the case where the facility failed to meet one or more of the applicable requirements and the Initial Review indicated that additional review may enable the Company to approve the application with minor modifications. The applicant cost to conduct the Additional Review is in addition to the initial Review Fee. Actual costs will be billed or credited to the applicant following the completion of the Additional review and minor modifications.

* Certified as defined in 170 Indiana administrative Code 4-4.3-5.
** Level 3 as defined as 170 Indiana Administrative Code 4-4.3-4(a).

Insurance Requirements
The Applicant shall provide evidence of homeowners, commercial or other insurance that provides coverage in the amount of at least 5$ million for Comprehensive General Liability and Contractual Liability.

☒ Evidence of Insurance coverage provided with Application.

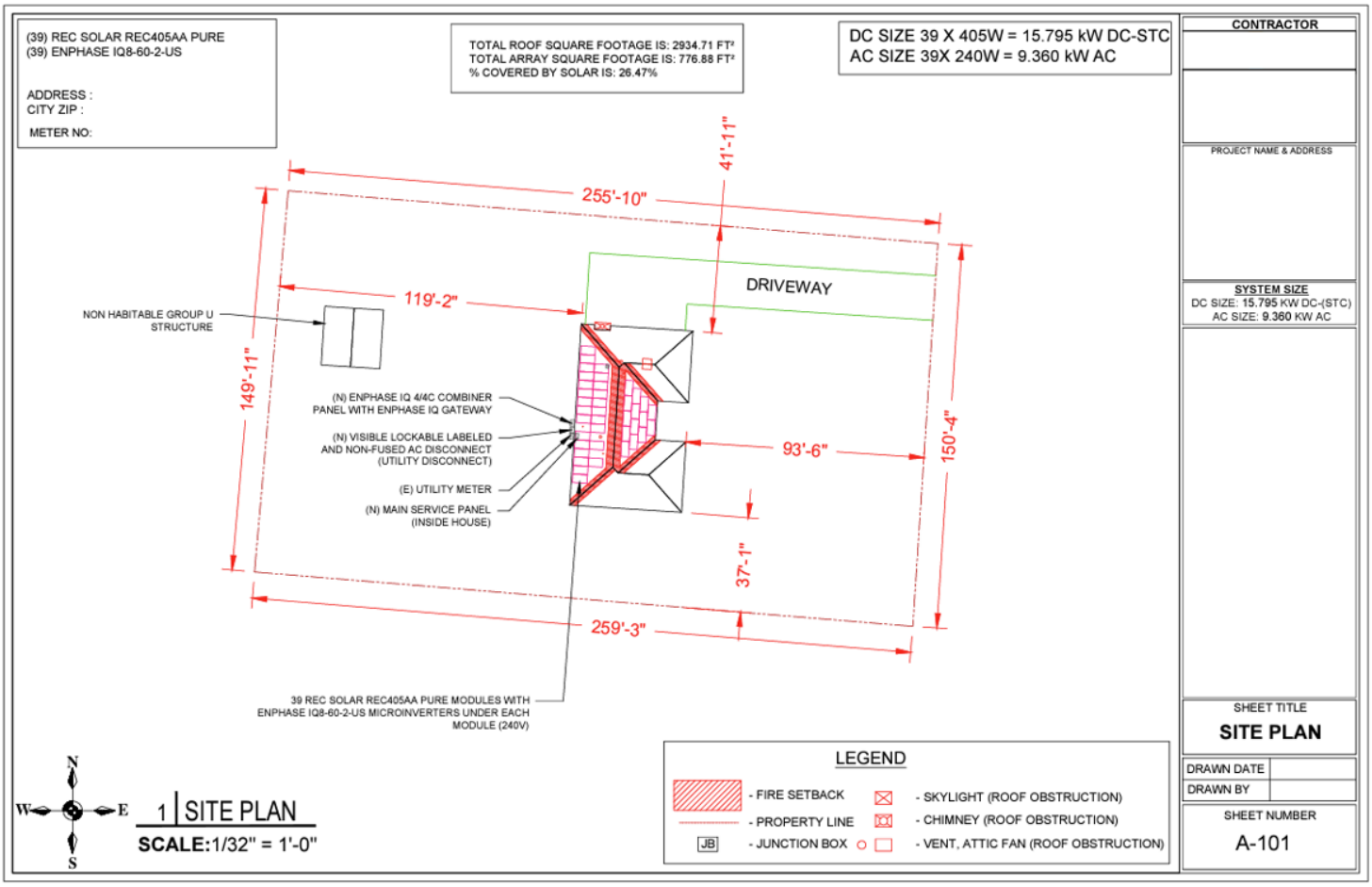
Reference Documents
170 IAC Customer generator interconnection standards are located at:
http://www.in.gov/legislative/iac/T01700/A00040.PDF

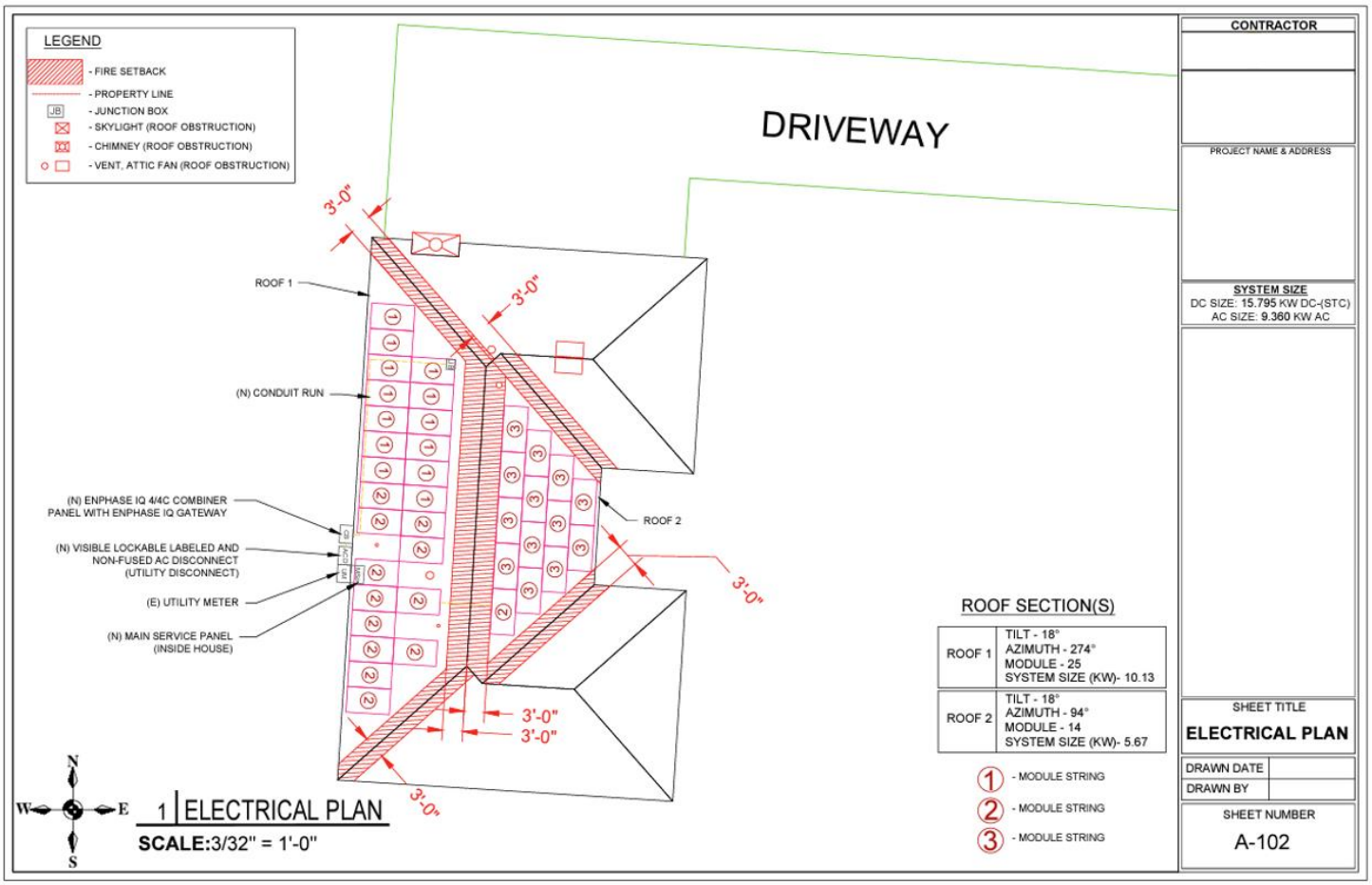
Submittal of Fees, Application and Documentation
Fees – Payment for the Initial Review shall be sent to AES Indiana Interconnections, T&D Planning Attn: Room 208, 1230 W Morris St., Indianapolis, IN 46221. Please make checks payable to AES Indiana and include the customer's name and address on the check.

Application and Documentation – Please send the application and all documentation electronically to ipl.interconnection@aes.com. All papers copies of documentation should be scanned electronically prior to submittal to AES Indiana.

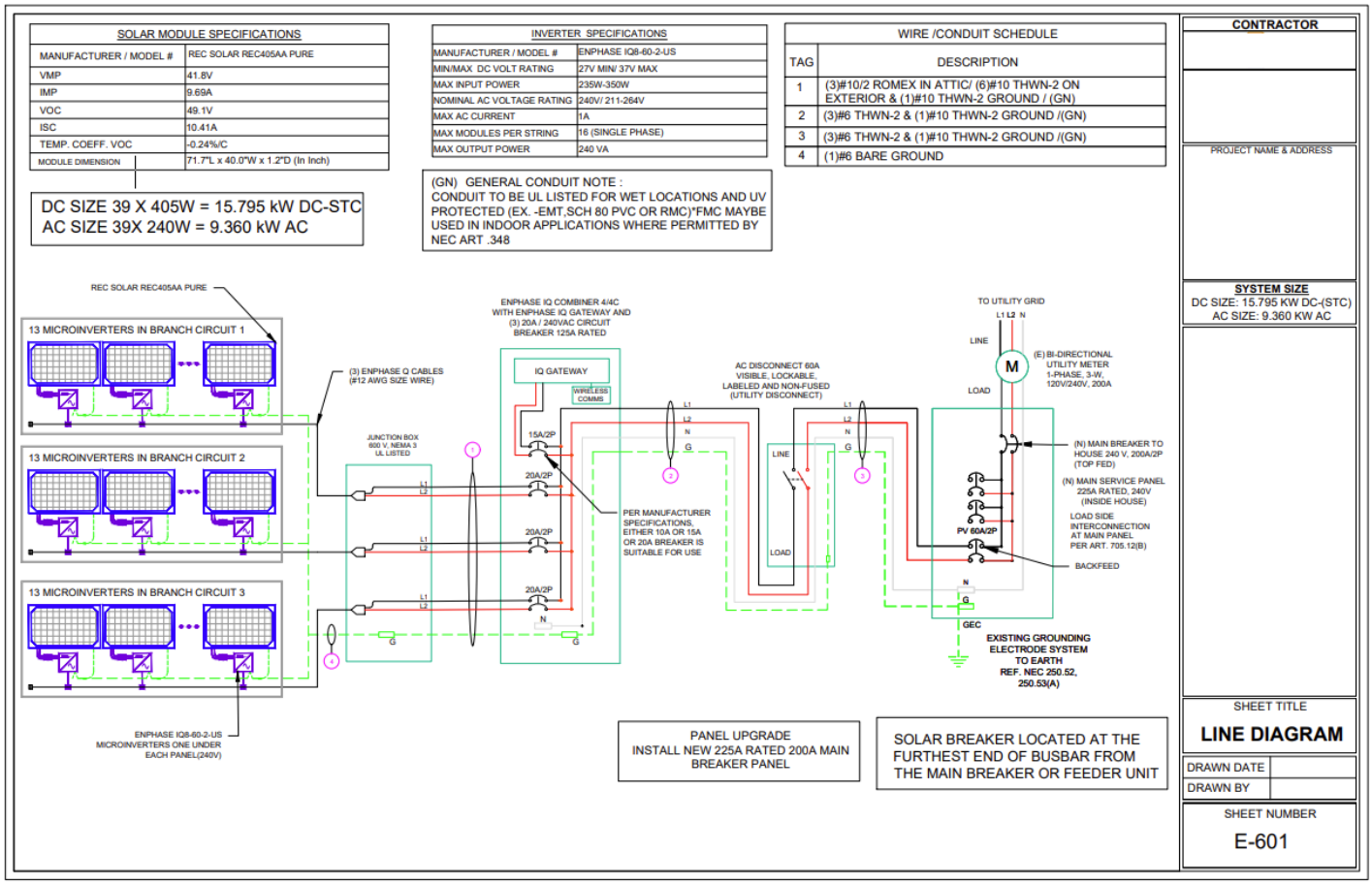
* Certified as defined in 170 Indiana administrative Code 4-4.3-5.
** Level 3 as defined as 170 Indiana Administrative Code 4-4.3-4(a).

11.4 Example Site Plan



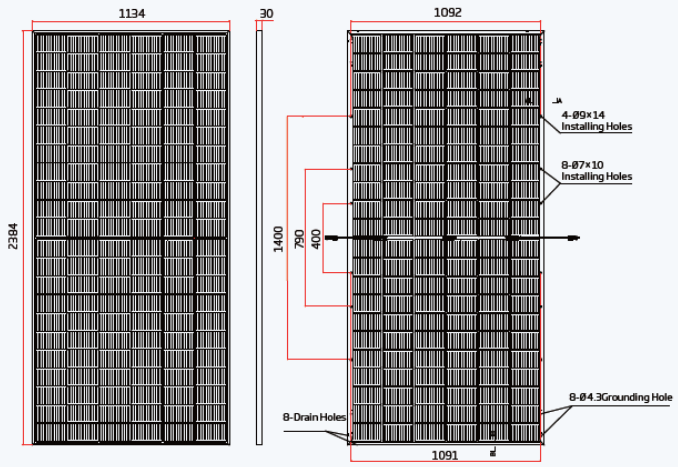

LEGEND
- FIRE SETBACK
- PROPERTY LINE
JB - JUNCTION BOX
- SKYLIGHT (ROOF OBSTRUCTION)
- CHIMNEY (ROOF OBSTRUCTION)
- VENT, ATTIC FAN (ROOF OBSTRUCTION)
DRIVEWAY
3'-0"
ROOF 1
(N) CONDUIT RUN
(N) ENPHASE IQ 4/4C COMBINER PANEL WITH ENPHASE IQ GATEWAY
(N) VISIBLE LOCKABLE LABELED AND NON-FUSED AC DISCONNECT (UTILITY DISCONNECT)
(E) UTILITY METER
(N) MAIN SERVICE PANEL (INSIDE HOUSE)
ROOF 2
3'-0"
3'-0"
3'-0"
3'-0"
N
W
E
S
1 ELECTRICAL PLAN
SCALE:3/32" = 1'-0"
ROOF SECTION(S)
ROOF 1
TILT - 18°
AZIMUTH - 274°
MODULE - 25
SYSTEM SIZE (KW)- 10.13
ROOF 2
TILT - 18°
AZIMUTH - 94°
MODULE - 14
SYSTEM SIZE (KW)- 5.67
1 - MODULE STRING
2 - MODULE STRING
3 - MODULE STRING
CONTRACTOR
PROJECT NAME & ADDRESS
SYSTEM SIZE
DC SIZE: 15.795 KW DC-(STC)
AC SIZE: 9.360 KW AC
SHEET TITLE
ELECTRICAL PLAN
DRAWN DATE
DRAWN BY
SHEET NUMBER
A-102

11.5 Example Single Line

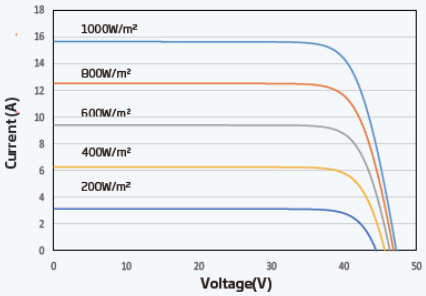


11.6 Example Generator Data Sheet

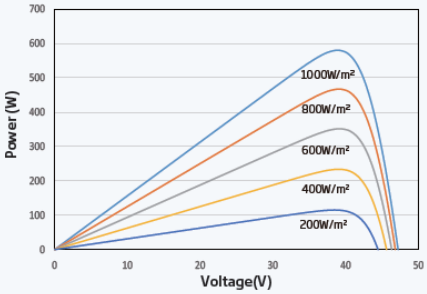
DIMENSIONS OF PV MODULE (mm)



I-V CURVES OF PV MODULE (580W)



P-V CURVES OF PV MODULE (580W)



ELECTRICAL DATA (STC)

Peak Power Watts-PMAX (Wp)*	570	575	580	585	590
Power Tolerance-PMAX (W)			0 ~ +5		
Maximum Power Voltage-VMPP (V)	38.6	38.9	39.2	39.5	39.7
Maximum Power Current-IMPP (A)	14.75	14.78	14.79	14.82	14.86
Open Circuit Voltage-Voc (V)	46.6	46.9	47.2	47.5	47.8
Short Circuit Current-Isc (A)	15.61	15.63	15.65	15.68	15.72
Module Efficiency η m (%)	21.1	21.3	21.5	21.6	21.8

STC: Irradiance 1000W/m2, Cell Temperature 25°C, Air Mass AM1.5. *Measuring tolerance: ±3%.

ELECTRICAL CHARACTERISTICS with BIFACIAL GAINS (10% Irradiance Ratio)

Total Equivalent power -PMAX (Wp)	616	621	626	632	637
Maximum Power Voltage-VMPP (V)	38.6	38.9	39.2	39.5	39.7
Maximum Power Current-IMPP (A)	15.93	15.96	15.97	16.01	16.05
Open Circuit Voltage-Voc (V)	46.6	46.9	47.2	47.5	47.8
Short Circuit Current-Isc (A)	16.86	16.88	16.90	16.93	16.98
Irradiance ratio (rear/front)			10%		

Power Bifaciality:80±5%.

ELECTRICAL DATA (NOCT)

Maximum Power-PMAX (Wp)	434	438	442	446	450
Maximum Power Voltage-VMPP (V)	36.3	36.5	36.8	37.1	37.3
Maximum Power Current-IMPP (A)	11.97	11.99	12.00	12.02	12.05
Open Circuit Voltage-Voc (V)	44.2	44.5	44.7	45.0	45.3
Short Circuit Current-Isc (A)	12.58	12.59	12.61	12.64	12.67

NOCT: Irradiance at 800W/m², Ambient Temperature 20°C, Wind Speed 1m/s.

MECHANICAL DATA

Solar Cells	Monocrystalline ⩾10Rmm N-type
No. of cells	132 cells
Module Dimensions	2384×1134×30 mm (93.86×44.65×1.18 in)
Weight	33.1kg (72.97lb)
Front Glass	2.0 mm (0.08 in), High Transmission, AR Coated Heat Strengthened Glass
Encapsulant material	EVA/POE
Back Glass	2.0 mm (0.08 in), Heat Strengthened Glass (White Grid Glass)
Frame	30mm (1.18 in) Anodized Aluminium Alloy
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm² (0.006 in²) Portrait: 350/280 mm (13.78/11.02 in)* Landscape: 1400 mm (55.12 in)*
Connector	MC4 EVO2 or TS4

*Lengths can be customized

TEMPERATURE RATINGS

NOCT (Nominal Operating Cell Temperature)	43°C (±2°C)
Temperature Coefficient of PMAX	- 0.30%/°C
Temperature Coefficient of Voc	- 0.24%/°C
Temperature Coefficient of Isc	0.04%/°C

*Recommended

MAXIMUM RATINGS

Operational Temperature	-40~+85°C
Maximum System Voltage	1500V DC (IEC)
	1500V DC (UL)
Max Series Fuse Rating	30A*

WARRANTY

12 year Product Workmanship Warranty
30 year Power Warranty
1% first year degradation
0.40% Annual Power Attenuation

(Please refer to product warranty for details)

PACKAGING CONFIGURATION

Modules per box: 36 pieces
Modules per 40' container: 504 pieces
Pallets per 40' container: 14

11.7 Example Inverter Data Sheet

INPUT DATA (DC)							
Commonly used module pairings[2]	W	235 – 350	235 – 440	260 – 460	295 – 500	320 – 540+	295 – 500+
Module compatibility		60-cell/120 half-cell	60-cell/120 half-cell, 66-cell/132 half-cell and 72-cell/144 half-cell				
MPPT voltage range	V	27 – 37	29 – 45	33 – 45	36 – 45	38 – 45	38 – 45
Operating range	V	25 – 48	25 – 58				
Min/max start voltage	V	30 / 48	30 / 58				
Max input DC voltage	V	50	60				
Max DC current[3] [module Isc]	A	15					
Overvoltage class DC port		II					
DC port backfeed current	mA	0					
PV array configuration		1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit					
OUTPUT DATA (AC)							**IQ8H-208-72-2-US[1]**
Peak output power	VA	245	300	330	366	384	366
Max continuous output power	VA	240	290	325	349	380	360
Nominal (L-L) voltage/range[4]	V	240 / 211 – 264					208 / 183 – 250
Max continuous output current	A	1.0	1.21	1.35	1.45	1.58	1.73
Nominal frequency	Hz	60					
Extended frequency range	Hz	50 – 68					
AC short circuit fault current over 3 cycles	Arms	2					4.4
Max units per 20 A (L-L) branch circuit[5]		16	13	11	11	10	9
Total harmonic distortion		<5%					
Overvoltage class AC port		III					
AC port backfeed current	mA	30					
Power factor setting		1.0					
Grid-tied power factor (adjustable)		0.85 leading – 0.85 lagging					
Peak efficiency	%	97.5	97.6	97.6	97.6	97.6	97.4
CEC weighted efficiency	%	97	97	97	97.5	97	97
Night-time power consumption	mW	60					
MECHANICAL DATA							
Ambient temperature range		-40°C to +60°C (-40°F to +140°F)					
Relative humidity range		4% to 100% (condensing)					
DC Connector type		MC4					
Dimensions (HxWxD)		212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")					
Weight		1.08 kg (2.38 lbs)					
Cooling		Natural convection – no fans					
Approved for wet locations		Yes					
Pollution degree		PD3					
Enclosure		Class II double-insulated, corrosion resistant polymeric enclosure					
Environ. category / UV exposure rating		NEMA Type 6 / outdoor					
COMPLIANCE							
Certifications		CA Rule 21 (UL 1741-SA), UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.					

11.8 Sample Interconnection Agreement 10kW or Smaller

INTERCONNECTION AGREEMENT
FOR INTERCONNECTION AND PARALLEL OPERATION
OF CERTIFIED INVERTER-BASED EQUIPMENT 10 kW OR SMALLER

THIS INTERCONNECTION AGREEMENT ("Agreement") is made and entered into this day , by and between Indianapolis Power & Light Company d/b/a AES Indiana ("IPL"), and ("Customer").

Customer is installing, or has installed, inverter-based Customer-generator facilities and associated equipment ("Generation Facilities") to interconnect and operate in parallel with IPL's electric distribution system, which Generation Facilities are more fully described as follows:

Location:
Type of facility: ☐ Solar Photovoltaic ☐ Wind Turbine ☐ Other

Inverter Power Rating: ☐ (Must have individual inverter name plate capacity of 10kW or less.)

Inverter Manufacturer and Model Number:

Description of electrical installation of the Generation Facilities, including any field adjustable voltage and frequency settings:

☐ As shown on a single line diagram attached hereto as "Exhibit A" and incorporated herein by this reference; or

☐ Described as follows:

Customer represents and agrees that the Generation Facilities are, or will be prior to operation, certified as complying with:

(i) The requirements of the Institute of Electrical and Electronics Engineers ("IEEE") Standard 1547-2003, "Standard for Interconnecting Distributed Resources with Electric Power Systems", as amended and supplemented as of the date of this Agreement, which standard is incorporated herein by this reference ("IEEE Standard 1547-2003"); or

(ii) The requirements of the Underwriters Laboratories ("UL") Standard 1741 concerning Inverters, Converters and Controllers for Use in Independent Power Systems, as amended and supplemented as of the date of this Agreement, which standard is incorporated herein by this reference.

Customer further represents and agrees that:

(i) The Generation Facilities are, or will be prior to operation, designed and installed to meet all applicable requirements of IEEE Standard 1547-2003, the National Electrical Code and local building codes, all as in effect on the date of this Agreement;

(ii) The voltage and frequency settings for the Generation Facilities are fixed or, if field adjustable, are as stated above; and

(iii) If requested by IPL, Customer will install and maintain, at Customer's expense, a disconnect switch located outside and accessible by IPL personnel.

Customer agrees to maintain reasonable amounts of insurance coverage against risks related to the Generation Facilities for which there is a reasonable likelihood of occurrence, as required by the provisions

of 170 Indiana Administrative Code ("IAC") 4-4.3-10, as the same may be revised from time to time by the

Indiana Utility Regulatory Commission ("Commission"). Customer agrees to provide IPL from time to time with proof of such insurance upon IPL's request.

With respect to the Generation Facilities and their interconnection to IPL's electric system, IPL and Customer, whichever is applicable, (the "Indemnifying Party") shall indemnify and hold the other harmless from and against all claims, liability, damages and expenses, including attorney's fees, based on any injury to any person, including the loss of life, or damage to any property, including the loss of use thereof, arising out of, resulting from, or connected with, or that may be alleged to have arisen out of, resulted from, or connected with, an act or omission by the Indemnifying Party, its employees, agents, representatives, successors or assigns in the construction, ownership, operation or maintenance of the Indemnifying Party's facilities, as required by the provisions 170 IAC 4-4.3-10(b)(2), as the same may be revised from time to time by the Commission.

IPL agrees to allow Customer to interconnect and operate the Generation Facilities in parallel with IPL's electric system in accordance with the provisions of 170 IAC 4-4.3, as the same may be revised from time to time by the Commission, which provisions are incorporated herein by this reference.

In the event that Customer and IPL are unable to agree on matters relating to this Agreement, either Customer or IPL may submit a complaint to the Commission in accordance with the Commission's applicable rules.

For purposes of this Agreement, the term "certify" (including variations of that term) has the meaning set forth in 170 IAC 4-4.3-5, as the same may be revised from time to time by the Commission, which provision is incorporated herein by this reference.

Customer's use of the Generation Facilities is subject to the rules and regulations of IPL, including IPL's General Terms and Conditions for Electric Service, as contained in IPL's Retail Electric Tariff, as the same may be revised from time to time with the approval of the Commission. Both IPL and this Agreement are subject to the jurisdiction of the Commission. To the extent that Commission approval of this Agreement may be required now or in the future, this Agreement and IPL's commitments hereunder are subject to such approval.

IN WITNESS WHEREOF, Customer and IPL have executed this Agreement, effective as of the date first above written.

INDIANAPOLIS POWER & LIGHT COMPANY	**CUSTOMER**
By: _____	By: _____
Printer Name: _____	Printed Name: _____
Title: _____	Date: _____

Generation Facilities Description

The generation facility is for property owner located at . This level 1 solar distributed generation facility will have a nameplate output rating of . Finalizing the interconnection agreement and qualification for is dependent upon the Customer.

The site consists of generating equipment connected with inverters. This accumulates for a total inverter output generator capacity of as listed on the attached application. The inverter data sheet lists the UL 1741 and IEEE 1547 certificates and approvals.

Attachments

Interconnection Application

Single Line Drawing

Site Plan

Inverter Specifications

Certificate of Insurance

Other Electrical Specifications

11.9 Sample Interconnection Agreement Greater Than 10kW

INTERCONNECTION AGREEMENT
FOR LEVEL 2 - 2MW OR LESS OR LEVEL 3 - ALL OTHER FACILITIES

THIS INTERCONNECTION AGREEMENT ("Agreement") is made and entered into this day of _____, by and between **Indianapolis Power & Light Company** ("Buyer") and **Customer,** ("Seller"). Buyer and Seller are hereinafter sometimes referred to individually as "Party" or collectively as "Parties".

WITNESSETH:

WHEREAS, Seller is installing, or has installed, generation equipment, controls, and protective relays and equipment ("Generation Facilities") on Customer's property used to interconnect and operate in parallel with Buyer's electric system, which Generation Facilities are more fully described in Exhibit A, attached hereto and incorporated herein by this Agreement, and as follows:

Location:

Generator Size and Type:

NOW, THEREFORE, in consideration thereof, Seller and Buyer agree as follows:

1. Application. It is understood and agreed that this Agreement applies only to the operation of the Generation Facilities described above and on Exhibit A.

2. Interconnection. Buyer agrees to allow Seller to interconnect and operate the Generation Facilities in parallel with Buyer's electric system in accordance with any operating procedures or other conditions specified in Exhibit A. By this Agreement, or by inspection, if any, or by non-rejection, or by approval, or in any other way, Buyer does not give any warranty, express or implied, as to the adequacy, safety, compliance with applicable codes or requirements, or as to any other characteristics, of the Generation Facilities. The Generation Facilities installed shall comply with, and Seller represents and warrants their compliance with: (a) the National Electrical Code and the National Electrical Safety Code, as each may be revised from time to time; (b) Buyer's rules and regulations, including Buyer's General Terms and Conditions for Electric Service as contained in Buyer's Retail Electric Tariff and as each may be revised from time to time with the approval of the Indiana Utility Regulatory Commission ("Commission"); and (c) all other applicable local, state, and federal codes and laws, as the same may be in effect from time to time.

Seller shall install, operate, and maintain, at Seller's sole cost and expense, the Generation Facilities in accordance with the manufacturer's suggested practices for safe, efficient and reliable operation of the Generation Facilities in parallel with Buyer's electric system. Customer and Seller shall bear full responsibility for the installation, maintenance and safe operation of the Generation Facilities. Customer and Seller shall be responsible for protecting, at Seller's sole cost and expense, the Generation Facilities from any condition or disturbance on Buyer's electric system, including, but not limited to, voltage sags or swells, system faults, outages, loss of a single phase of supply, equipment failures, and lightning or switching surges.

Seller agree that, without the prior written permission from Buyer, no changes shall be made to the configuration of the Generation Facilities, as that configuration is described in Exhibit A, and no relay or other control or protection settings specified in Exhibit A shall be set, reset, adjusted or tampered with, except to the extent necessary to verify that the Generation Facilities comply with Buyer approved settings.

3. Operation by Seller. Seller shall not operate the Generation Facilities in such a manner as to cause undue fluctuations in voltage, intermittent load characteristics or otherwise interfere with the operation of Buyer's electric system. At all times when the Generation Facilities are being operated in parallel with Buyer's electric system, Seller shall so operate the Generation Facilities in such a manner that no disturbance will be produced thereby to the service rendered by Buyer to any of Buyer's other customers or to any electric system interconnected with Buyer's electric system. Seller understands and agrees that the interconnection and operation of the Generation Facilities pursuant to this Agreement is secondary to, and shall not interfere with, Buyer's ability to meet its primary responsibility of furnishing reasonably adequate service to its customers.

The control equipment for the Generation Facilities shall immediately, completely, and automatically disconnect and isolate the Generation Facilities from Buyer's electric system in the event of a fault on Buyer's electric system, a fault on the Generating Facilities' electric system, or loss of a source or sources on Buyer's electric system. The automatic disconnecting device included in such control equipment shall not be capable of reclosing until after service is restored on Buyer's electric system. Seller represents and warrants to Buyer that the control equipment complies with the foregoing requirements. Additionally, if the fault is on the Generating Facilities' electric system, such automatic disconnecting device shall not be reclosed until after the fault is isolated from the Generating Facilities' electric system. Upon Buyer's request, Seller shall promptly notify Buyer whenever such automatic disconnecting devices operate.

4. Access by Buyer. Upon reasonable advance notice to Seller, Buyer shall have access at reasonable times to the Generation Facilities whether before, during or after the time the Generation Facilities first produce energy, to perform reasonable on-site inspections to verify that the installation and operation of the Generation Facilities comply with the requirements of this Agreement and to verify the proper installation and continuing safe operation of the Generation Facilities. Buyer shall also have, at all times, immediate access to breakers or any other equipment that will isolate the Generation Facilities from Buyer's electric system. The cost of such inspection(s) shall be at Buyer's expense; however, Buyer shall not be responsible for any other cost Seller may incur as a result of such inspection(s). Buyer shall have the right and authority to temporarily disconnect the Generation Facilities at Buyer's sole discretion if Buyer believes that: (a) for scheduled outages upon reasonable notice; (b) for unscheduled outages or emergency conditions; (c) if Buyer determines that continued operation of the Generation Facilities is a safety hazard to Buyer's personnel or to the general public; (d) continued interconnection and parallel operation of the Generation Facilities with Buyer's electric system creates or contributes (or will create or contribute) to a system emergency on either Buyer's or Customer's electric system; (e) the Generation Facilities are not in compliance with the requirements of this Agreement, and the non-compliance adversely affects the safety, reliability or power quality of Buyer's electric system; (f) in the event the interconnection equipment used by the Generation Facilities is de-listed by the nationally recognized testing laboratory that provided the listing at the time the interconnection was approved and the Buyer determines that the continued operation has the potential to cause a safety, reliability or power quality problem or (g) the Generation Facilities interfere with the operation of Buyer's electric system. In non-emergency situations, Buyer shall give Seller reasonable notice prior to isolating the Generating Facilities.

5. Rates and Other Charges. This Agreement does not constitute an agreement by Buyer to purchase or wheel power produced by the Generation Facilities, or to furnish any backup, supplemental or other power or services associated with the Generation Facilities, and this Agreement does not address any charges for excess facilities that may be installed by Buyer in connection with interconnection of the Generation Facilities. It is understood that if Seller desires an agreement whereby Buyer wheels power, or purchases energy and/or capacity, produced by the Generation Facilities, or furnishes any backup, supplemental or other power or services

associated with the Generation Facilities, then Buyer may enter into another mutually acceptable separate agreement with Customer or Seller detailing the charges, terms and conditions of such purchase or wheeling, or such backup, supplemental or other power or services. It is also understood that if any such excess facilities are required, including any additional metering equipment as determined by Buyer, in order for the Generation Facilities to interconnect with and operate in parallel with Buyer's electric system, then Seller shall enter into an Excess Facilities Agreement with Buyer in accordance with Buyer's Standard Contract Rider No. 4 contained in Buyer's Retail Electric Tariff, which rider details the charges and terms of such excess facilities, as the same may be revised from time to time with the approval of the Commission.

6. **Insurance.** The Seller shall procure and keep in force during all periods of parallel operation of the Generation Facilities with Buyer's electric system, the following insurance to protect the interests of Buyer under this Agreement, with insurance carriers acceptable to Buyer, and in amounts not less than the following:

Coverage	Limits
Comprehensive General Liability	**$100,000.00**
Contractual Liability	**$100,000.00**
Bodily Injury	**$100,000.00**
Property Damage	**$100,000.00**

Seller shall deliver a CERTIFICATE OF INSURANCE verifying the required coverage to:

Attention: Insurance Administrator
Address One Monument Circle, Indianapolis IN, 46204

at least fifteen (15) days prior to any interconnection of the Generation Facilities with Buyer's electric system, and thereafter as requested by Buyer.

If the Seller is sufficiently creditworthy, as determined by Buyer, then, in lieu of obtaining all or part of the above-specified required insurance coverage from insurance carriers acceptable to Buyer, Seller may self insure all or part of such required insurance coverage provided that Seller agrees to defend Buyer and to provide on a self insurance basis insurance benefits to Buyer, all to the same extent as would have been provided under this Agreement pursuant to the above insurance provisions of this Section 6. By utilizing self insurance to provide all or part of the above-specified required insurance, Seller shall be deemed to have agreed to the provisions of the previous sentence of this Section 6.

7. **Commission Rules.** Each Party agrees that the interconnection of the Generating Facilities is exempt from the requirements of 170 IAC 4-4.3-1, *et seq.* to the fullest extent permitted by 170 IAC 4-4.3-3(b).

8. **Indemnification.** Each Party (the "Indemnifying Party") shall indemnify and hold harmless the other Party from and against all claims, liability, damages and expenses, including attorney's fees, based on any injury to any person, including the loss of life, or damage to any property, including the loss of use thereof, arising out of, resulting from, or connected with, or that may be alleged to have arisen out of, resulted from, or connected with, an act or omission by the Indemnifying Party, its employees, agents, representatives, successors or assigns in the construction, ownership, operation or maintenance of the Indemnifying Party's facilities used in connection with this Agreement. In addition, no Party is the agent or representative of any other Party under this Agreement. Upon written request of the Party seeking relief under this Section 8, the Indemnifying Party shall defend any suit asserting a claim covered by this Section 8. If a

Party is required to bring an action to enforce its rights under this Section 8, either as a separate action or in connection with another action, and said rights are upheld, the Indemnifying Party shall reimburse such Party for all reasonable expenses, including attorney's fees, incurred in connection with such action.

9. Term. This Agreement shall become effective when executed by all Parties and shall continue in effect for a period of thirty (30) years (the "Initial Term"). After the Initial Term, this Agreement shall renew for one (1) year periods unless a Party serves notice on all other Parties giving notice of its intent not to renew at least sixty (60) days prior to the expiration of the then current term.

10. Termination.

a. Seller Defaults. The following events shall be defaults with respect to Seller (each a "Seller Default"):

i Seller fails to generate energy from the Generation Facilities in parallel with Buyer's electric system within twelve (12) months after completion of the interconnection provided for by this Agreement;

ii Seller fails to pay when due any amounts owing to Buyer or Host Facility under the Agreement or fails to indemnify another party;

iii Seller fails, within sixty (60) days of written notice provided by Buyer, to take corrective action to bring the Generation Facilities' interconnection in compliance with the terms of the Agreement; or

b. Seller breaches any material term of the Agreement if (A) such breech can be cured within thirty (30) days after Buyer's notice of such breach and Seller fails to so cure or (B) Seller fails to commence and pursue said cure within such thirty (30) day period if a longer cure period is needed.

c. Buyer Defaults. Buyer shall commit a default (an "Buyer Default") if it breaches any material term of the Agreement if such breech can be cured within thirty (30) days after Seller's or Host Facility's notice of such breach and Company fails to so cure or (B) Seller fails to commence and pursue said cure within such thirty (30) day period if a longer cure period is needed.

d. Termination. The Agreement may terminate prior to the expiration of the Initial Term or any subsequent term at the earliest date that one of the following events occur:

i. In the event of a Seller Default or a Buyer Default and the default is continuing, the non-defaulting party may terminate the Agreement;

ii. The Parties mutually agree in writing to terminate the Agreement; or

iii. In the event operation of the Generation Facilities becomes illegal or impracticable as the consequence of the application of any statute, law or governmental rule or regulation or compliance with such regulation requires Buyer to incur costs and the Seller or Host Facility are unwilling to reimburse Buyer for such cost.

e. Permanent Disconnection. In the event the Agreement is terminated, Buyer shall have the right to disconnects the Generation Facilities or direct the Seller to disconnect the Generation Facilities.

11. Termination of Any Applicable Existing Agreement. From and after the date when service commences under this Agreement, this Agreement shall supersede any prior oral and/or written agreement or understanding between Buyer and Seller concerning the service covered by this Agreement and any such agreement or understanding shall be deemed to be terminated as of the date service commences under this Agreement.

12. Force Majeure. For purposes of this Agreement, the term "Force Majeure" means any cause or event not reasonably within the control of the Party claiming Force Majeure, including, but not limited to, the following: acts of God, strikes, lockouts, or other industrial disturbances; acts of public enemies; orders or permits or the absence of the necessary orders or permits of any kind which have been properly applied for from the government of the United States, the State of Indiana, any political subdivision or municipal subdivision or any of their departments, agencies or officials, or any civil or military authority; unavailability of a fuel or resource used in connection with the generation of electricity; extraordinary delay in transportation; unforeseen soil conditions; equipment, material, supplies, labor or machinery shortages; epidemics; landslides; lightning; earthquakes; fires; hurricanes; tornadoes; storms; floods; washouts; drought; arrest; war; civil disturbances; explosions; breakage or accident to machinery, transmission lines, pipes or canals; partial or entire failure of utilities; breach of contract by any supplier, contractor, subcontractor, laborer or materialman; sabotage; injunction; blight; famine; blockade; or quarantine.

If any Party is rendered wholly or partly unable to perform its obligations under this Agreement because of Force Majeure, all Parties shall be excused from whatever obligations under this Agreement are affected by the Force Majeure (other than the obligation to pay money) and shall not be liable or responsible for any delay in the performance of, or the inability to perform, any such obligations for so long as the Force Majeure continues. The Party suffering an occurrence of Force Majeure shall, as soon as is reasonably possible after such occurrence, give the other Parties written notice describing the particulars of the occurrence and shall use commercially reasonable efforts to remedy its inability to perform; provided, however, that the settlement of any strike, walkout, lockout or other labor dispute shall be entirely within the discretion of the Party involved in such labor dispute.

13. Limitation of Liability. BUYER'S TOTAL LIABILITY TO THE SELLER FOR ALL CLAIMS OR SUITS OF ANY KIND, WHETHER BASED UPON CONTRACT, TORT (INCLUDING NEGLIGENCE), WARRANTY, STRICT LIABILITY OR OTHERWISE, FOR ANY LOSSES, DAMAGES, COSTS OR EXPENSES OF ANY KIND WHATSOEVER ARISING OUT OF, RESULTING FROM, OR RELATED TO THE PERFORMANCE OR BREACH OF THIS CONTRACT SHALL, UNDER NO CIRCUMSTANCES, EXCEED THE FINAL COST OF ANY INTERCONNECTION FACILITIES PAID FOR BY THE CUSTOMER-GENERATOR. BUYER SHALL NOT, UNDER ANY CIRCUMSTANCES, BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, PUNITIVE, OR CONSEQUENTIAL LOSSES, DAMAGES, COSTS, OR EXPENSES WHATSOEVER (INCLUDING, BUT NOT LIMITED TO, LOST OR REDUCED PROFITS, REVENUES, EFFICIENCY, PRODUCTIVITY, BONDING CAPACITY, OR BUSINESS OPPORTUNITIES, OR INCREASED OR EXTENDED OVERHEAD, OPERATING, MAINTENANCE OR DEPRECIATION COSTS AND EXPENSES).

14. Dispute Resolution. In the event of a dispute between the Parties arising out of or relating to this Agreement, such dispute shall be submitted within twenty (20) days of written notice, to a management panel composed of representatives of the respective Parties for informal dispute resolution or settlement prior to the institution of any other dispute resolution process. Should the informal dispute resolution process described herein be unsuccessful, the Parties agree that no written or oral representations made during the course of the attempted dispute resolution shall constitute a Party admission or waiver and that each Party may pursue any other legal or equitable remedy it may have available to it. The Parties agree that the existence of any

dispute or the institution of any dispute resolution process (either formal or informal) shall not delay the performance of each Party's undisputed responsibilities under this Agreement.

15. Notices. Except with respect to the notice of access required by paragraph 4, which notice shall be orally or in writing, at Buyer's election, or as otherwise provided in this Agreement, any notice, request, consent, demand, or statement which is contemplated to be made upon any Party hereto by any other Party hereto under any of the provisions of this Agreement, shall be in writing and sent by certified mail to all other Parties with a return receipt requested or via overnight courier with tracking capability to the address set forth below:

If notice or other transmittal (other than payment of invoices) is to Company:

Indianapolis Power & Light Company
One Monument Circle
Indianapolis, IN 46204
Attention: Director, Regulatory Affairs
Telephone: (317) 261-6713

With a copy to:

AES US Services, LLC
One Monument Circle
Indianapolis, IN 46204
Attention: Office of the General Counsel
Telephone: (317) 261-8244

If notice or other transmittal is to Seller:

_____

_____

_____

Attention: _____

Telephone: _____

With a copy to:

_____

_____

_____

Attention: _____

Telephone: _____

16. Assignment. No Party shall assign, sublet or otherwise transfer its rights or obligations under this Agreement, or any portion thereof, without the prior written consent of the other Parties, and any attempted assignment, subletting or transfer without such written consent shall be of no force or effect, which consent cannot be unreasonably withheld. As to any permitted assignment: (a) reasonable prior notice of any such assignment shall be given to the other Parties; and (b) any assignee shall expressly assume the assignor's obligations hereunder, unless otherwise agreed to by the other Parties in writing.

17. Commission Jurisdiction and Buyer Rules. Buyer is subject to the jurisdiction of the Commission. To the extent that Commission approval of this Agreement may be required now or in the future, this Agreement and Buyer's commitments hereunder are subject to such approval.

18. Non-Waiver. None of the provisions of this Agreement shall be considered waived by a Party unless such waiver is given in writing. The failure of a Party to insist in any one ore more instances upon strict performance of any of the provisions of this Agreement or to take advantage of any of its rights hereunder shall not be construed as a waiver of any such provisions or the relinquishment of any such rights for the future, but the same shall continue and remain in full force and effect.

19. Governing Law. THIS CONSENT SHALL IN ALL RESPECTS BE GOVERNED BY, AND CONSTRUED IN ACCORDANCE WITH, THE LAWS OF THE STATE OF INDIANA, INCLUDING ALL MATTERS OF CONSTRUCTION, VALIDITY AND PERFORMANCE.

20. Amendment and Modification. This Agreement can only be amended or modified by a writing signed by both Parties.

21. Survival Rights. This Agreement shall continue in effect after termination to the extent necessary to allow or require either Party to fulfill its rights or obligation that arose under this Agreement.

22. No Third Party Beneficiaries. This Agreement is not intended to and does not create rights, remedies, or benefits of any character whatsoever in favor of any persons, corporation, associations, or entities other than the Parties, and the obligations herein assumed are solely for the use and benefit of the Parties, their successors in interest and, where permitted, their assigns.

23. Entire Agreement. This Agreement contains the entire Agreement and understanding between the Parties, their agents, and employees as to the subject matter of this Agreement. Each Party also represents that in entering into this Agreement, it has not relied on any promise, inducement, representation, warranty, agreement or other statement not set forth in this Agreement.

IN WITNESS WHEREOF, the Parties have executed this Agreement, effective as of the date first above written.

"BUYER"

Indianapolis Power & Light Company

By: _____

Date: _____

Name: _____

Title: _____

"SELLER"

Customer

By: _____

Date: _____

Name: _____

Title: _____

Generation Facilities Description

The generation facility is for property owner located at . This level 1 solar distributed generation facility will have a nameplate output rating of . Finalizing the interconnection agreement and qualification for is dependent upon the Customer.

The site consists of generating equipment connected with inverters. This accumulates for a total inverter output generator capacity of as listed on the attached application. The inverter data sheet lists the UL 1741 and IEEE 1547 certificates and approvals.

Attachments

Interconnection Application

Single Line Drawing

Site Plan

Inverter Specifications

Certificate of Insurance

Other Electrical Specifications