Generator Interconnection Procedures

Level 1 & 2

Certified Inverter Projects with

DER Capacity

Less Than or Equal to 150 kW[1]

August 23, 2023

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[1] Non-Certified Inverter based generation projects, synchronous and induction projects less than or equal to 150kW are defined as Level 3 projects and are implemented under the Level 3 procedures and applications

INTRODUCTION

Level 1 & 2 – Less than or equal to 150kWac

This Generator Interconnection Procedure document outlines the process & requirements used to install or modify certified inverter-based generation projects with DER Capacity ratings less than or equal to 150 kWac[2] and designed to operate in parallel with the Consumers Energy Company (Consumers Energy or the Company) electric system. Technical requirements (data, equipment, relaying, telemetry, metering) are defined according to generation type, location of the interconnection, and mode of operation (Export or Non-Export). The process is designed to provide an expeditious interconnection to the Consumers Energy electric system that is both safe and reliable.

This document has been filed with the Michigan Public Service Commission (MPSC) and complies with rules established for the interconnection of parallel generation to the Consumers Energy electric system in the MPSC Order in Case No. U-20890.

The term "Project" will be used throughout this document to refer to electric generating equipment and associated facilities that are not owned or operated by Consumers Energy. The term "Applicant" means a person or entity submitting an interconnection application, a legacy net metering program application, or a distributed generation program application. An applicant is not required to be an existing customer of an electric utility.

This document does not address other Project concerns such as environmental permitting, local ordinances, or fuel supply. Nor does it address agreements that may be required with Consumers Energy, an Alternate Electric Supplier, and/or the transmission provider, or state or federal licensing, to market the Project's energy. An interconnection request does not constitute a request for transmission or establishment / modification of existing electrical lines or electric service.

It may be possible for Consumers Energy to adjust the requirements stated herein on a case-by-case basis. The review necessary to support such adjustments, however, may be extensive and may exceed the costs and time frames established by the MPSC and addressed in these procedures. Therefore, if requested by the Applicant, adjustments to these requirements will only be considered if the Applicant agrees in advance to compensate Consumers Energy for the added of the additional reviews, and to also allow Consumers Energy additional time for the additional reviews.

Consumers Energy may apply for a technical waiver from one or more provisions of these rules and the MPSC may grant a waiver upon a showing of good cause.

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INTERCONNECTION PROCESS

CUSTOMER PROJECT PLANNING PHASE

An Applicant may contact Consumers Energy before or during the application process regarding the project. Consumers Energy can be reached by phone, e-mail, or by the external website to access information, forms, rates, and agreements. Consumers Energy requires a pre-application report to be completed for Level 4 or greater projects.

An interconnection process flow diagram can be found in ***Appendix A***.

Interconnection fees and timelines can be found in ***Appendix B***. Procedure definitions can be found in ***Appendix C***.

PRE-APPLICATION REPORT

An Applicant shall submit a completed pre-application report form (**Appendix J)** for any proposed level 4 or 5 project. A pre-application report fee will be required (**Appendix B**). Consumers Energy provides the following in its pre-application reports if the following is existing and readily available, otherwise it will be indicated as such in the report:

1. The substation bus, bank, or circuit most likely to serve the proposed point of common coupling (PCC). This identification does not necessarily indicate that this would be the circuit to which the project would ultimately connect.
2. The total capacity, in MWac, of the substation bus, bank, or circuit based on normal or operating ratings likely to serve the proposed PCC.
3. The existing export capacity, in MWac, interconnected to a substation bus, bank, or circuit likely to serve the proposed PCC.
4. The export capacity, in MWac, of DER not yet built, but found in previously accepted interconnection applications, for a substation bus, bank, or circuit likely to serve the proposed PCC.
5. The available capacity, in MWac, of the substation bus, bank, or circuit likely to serve the proposed PCC.
6. The substation nominal distribution voltage.
7. The nominal distribution circuit voltage as the proposed PCC.
8. The label, name, or identifier of the distribution circuit on which the proposed PCC is located.
9. The approximate circuit distance between the proposed PCC and the substation.
10. The actual or estimated peak load and minimum load data at any relevant line section or sections, including daytime minimum load and absolute minimum load, when available. If not

readily available, the report must indicate whether the generator is expected to exceed the minimum load on the circuit.

11. Whether the point of common coupling is located behind a line voltage regulator and whether the substation has a load tap changer.
12. Limiting conductor ratings from the proposed point of common coupling to the distribution substation.
13. Number of phases available at the primary voltage level at the proposed point of common coupling, and, if a single phase, distance from the 3-phase circuit.
14. Whether the common coupling point is on a spot network, area network, grid network, radial supply, or secondary network.
15. Based on the proposed PCC, power quality issues may be present on the circuit.
16. Whether or not the area has been identified as having a prior affected system.
17. Whether or not the site will require a system impact study for high voltage distribution based on size, location, and existing system configuration.

Consumers Energy will process pre-application report requests in the order that they are received. Pre-application reports will be provided within 20 business days of receipt of the completed request form and payment of the fee. Any pre-application reports produced by Consumers Energy are non-binding and do not confer any rights on the Applicant. Pre-application reports will only contain existing and readily available data, though Consumers Energy will note where information is not readily available. A request for a pre-application report does not obligate Consumers Energy to conduct a study or other analysis of the proposed Project if data is not readily available.

An applicant may request additional pre-application reports, including different proposed PCCs for the same project, and each such additional pre-application will require a distinct fee. No more than 10 pre-application reports may be submitted by an applicant and its affiliates during a 1-week period.

APPLICATION REVIEW & TRACK ASSIGNMENT

The Applicant must first submit an Interconnection Application or a Combined Interconnection and Distributed Generation Application to Consumers Energy. A separate application is required for each Project, or Project site. If a single Project contains multiple types of DER, include all DER in a single application form. The blank Interconnection Application or Combined Interconnection and Distributed Generation Application can be found on the Consumers Energy website (www.consumersenergy.com).

An Applicant shall complete a submittal of required interconnection application and interconnection filing fee per the table in Appendix B. For any interconnection filing fee paid to Consumers Energy, the Applicant shall file an application within 10 business days, or the fee will be returned. Any application submitted to Consumers Energy shall have its fee paid by the later of 10 business days or the due date indicated on an associated invoice, or the application will be withdrawn.

Documentation of site control must be submitted with the application by the Applicant. For level 1 and level 2 DERs, proof of site control may be demonstrated by the site owners' signature and contact information on the application. For level 3 or greater DERs, site control may be demonstrated by providing documentation that shows any of the following:

- Ownership of, a leasehold interest in, or a right to develop a site for the purpose of constructing and operating the DER.
- An enforceable option to purchase or acquire a leasehold site for this purpose.
- A legally binding agreement transferring a present real property right to specified real property along with the right to construct and operate a DER on the specified real property for a period of time not less than 5 years.

An Applicant is required to provide the export capacity in the application, which is either the DER Capacity or a lower amount defined below when using one of the following methods.

- The Applicant's load can be used to ensure power is not continuously exported across the point of common coupling when the DER Capacity is less than 50% of the Applicant's verifiable minimum load over the past 12 months. The Applicant must list the export capacity as zero in the application when the above condition is met.
- The Applicant may install a reverse power protective function for power limited projects to ensure power is not continuously exported above a desired limit across the point of common coupling. The Applicant must list the export capacity in the application to the desired limit when using a reverse power protective function. The reverse power setting will be set slightly above the desired value.
- The Applicant may install an under-power protective function for power limited projects to ensure at least a minimum amount of power is imported across the point of common coupling and, therefore, that power is not continuously exported. The Applicant must list the export capacity as zero in the application when using an under power protective function.
- The Applicant may install a Nationally Recognized Testing Laboratory (NRTL) Certified Power Control System (PCS) to ensure power is not continuously exported above a desired limit across the point of common coupling, and if so, the DER disconnects from the distribution system, ceases to energize the distribution system, or halts energy production within 2 seconds if the period of continuous inadvertent export exceeds 30 seconds. Failure of the control or inverter system for more than 30 seconds, resulting from loss of control or measurement signal, or loss of control power, must result in the DER entering an operational mode where no energy is exported across the point of common coupling to the distribution system. The Applicant must list the export capacity as the desired limit in the application when using a NRTL PCS.
- The Applicant may propose alternative methods to ensure power is not continuously exported above a mutually agreed upon limit across the point of common coupling. The Applicant must provide detailed documentation stating how the alternate method limits export and inadvertent export to levels approved by Consumers Energy. The Applicant must list the export capacity as the mutually agreed upon limit in the application when using an alternate method.

Consumers Energy will notify the Applicant within 10 business days of receipt of an Interconnection Application. If any portion of the Interconnection Application, data submittal (site plan and one-line diagrams), or filing fee is incomplete and/or missing, Consumers Energy will return the application and data to the Applicant with explanations. The Applicant will need to resubmit the application with all the missing items. The Applicant shall provide a modified application within 60 business days from the date the Applicant was notified by Consumers Energy, with up to two resubmissions during this time to provide a modified application. After each submission of information, Consumers Energy will notify the Applicant within 10 business days that the interconnection application is either accepted or rejected due to continuing deficiencies. If the Applicant does not meet the timelines required, the application may be withdrawn. Once Consumers Energy has accepted the application, Consumers Energy will notify the Applicant that the application is complete and whether the Project will be processed following the non-export track, fast track, or study track.

NON-EXPORT TRACK

The non-export track is available to projects under 2 MWac[3] of DER Capacity with an export capacity of zero requesting to connect to the Low Voltage Distribution system. Within 20 business days of providing notice of an approved application, Consumers Energy will perform a study using the initial review screens in Appendix H to determine the suitability of the interconnection equipment and provide the results.

If the results indicate that no interconnection facilities, distribution upgrades, further study, or Project modifications are required, Consumers Energy will provide specifications within 20 business days for any equipment required to be installed to the Applicant. Within 10 business days of receiving the equipment specifications, the Applicant shall notify Consumers Energy whether it will proceed to an Interconnection and Operating Agreement or will withdraw the application. The failure of the Applicant to notify Consumers Energy within the required time shall result in the application being withdrawn.

If the proposed interconnection passes the initial review screens but requires a facilities study, the Applicant will proceed to Facilities Study.

If the proposed interconnection fails any of the initial review screens, and Consumers Energy does not or cannot determine that the DER may be interconnected consistent with safety, reliability, and power quality standards, Consumers Energy shall notify the Applicant and provide the Applicant with the results of the application of the initial review screens. Consumers Energy shall provide the Applicant with the options to attend a customer options meeting, proceed to Supplemental Review, submit a

[3] Consumers Energy distribution transformers are typically tapped to HVD lines. The protective line relaying at electric HVD substations is required to protect HVD lines with infeed from LVD connected DER. The 2MWac threshold is required to enable Consumers Energy to study the impact of the DER on HVD protective line relaying.

project modification, or withdraw the application. The Applicant shall have 10 business days to decide on a course of action and notify Consumers Energy, otherwise the application shall be withdrawn. After the application is accepted, the initial review screen process will be repeated.

Upon the Applicant's request, Consumers Energy and the Applicant shall schedule a customer options meeting between Consumers Energy and the Applicant to review possible facility modifications, screen analysis, and related results to determine what further steps are needed to permit the DER to be connected safely and reliably to the distribution system. The customer options meeting must take place within 30 business days of the date of notification. Consumers Energy shall provide the Applicant with the options of proceeding to Supplemental Review, proceeding to the Study Track, submitting a project modification, or withdrawing the application. The Applicant shall have 20 business days to decide on a course of action and notify Consumers Energy, otherwise the application shall be withdrawn. The customer options meeting may take place in person or via telecommunications.

If a Project modification is offered by Consumers Energy, the Applicant shall either withdraw the interconnection application or provide a modified application within 60 business days from the date the Applicant was notified by Consumers Energy, with up to 2 resubmissions during this time to provide a modified application. The application modifications must mitigate or eliminate the factors that caused the interconnection application to fail 1 or more of the initial review screens. After each submission of information, Consumers Energy will notify the Applicant within 10 business days that the interconnection application is either accepted or rejected due to continuing deficiencies. If the Applicant does not meet the timelines required, the application may be withdrawn. After the application is accepted, the initial review screen process will be repeated.

If the results indicate further study is required, Consumers Energy will present options and the Applicant shall decide whether to proceed to a supplemental review under the fast-track process, the study track, or to withdraw the application. The Applicant shall have 10 business days to decide on a course of action and notify Consumers Energy, otherwise the application may be withdrawn.

When an Applicant changes from a non-exporting system to an exporting system, the Applicant shall submit a new interconnection application.

FAST TRACK

The fast track is available to Projects up to 5 MWac requesting to connect to the Low Voltage Distribution system. Level 5 applications proposing to interconnect at 4.8 kV or below are not eligible for the fast track. These applications may include applications that provide for the use of an acceptable method for limited export. An Applicant may choose to forgo the fast track for an eligible project and proceed directly to the study track. Consumers Energy may aggregate all existing and proposed generation on a site in determining fast track eligibility.

Within 20 business days of providing notice of an approved application, Consumers Energy will perform a study using the initial review screens in Appendix H to determine the suitability of the interconnection equipment and provide the results. Consumers Energy may waive application of any of the initial review screens. This timeline is reduced to within 10 business days for level 1 and level 2 projects.

If the proposed interconnection passes the initial review screens, or if the proposed interconnection fails the screens but Consumers Energy determines that the DER may be interconnected consistent with safety, reliability, and power quality standards, Consumers Energy shall notify the Applicant and inform the Applicant whether the Project will proceed to Facilities Study or directly to Interconnection and Operating Agreement.

If the proposed interconnection fails any of the initial review screens, and Consumers Energy does not or cannot determine that the DER may be interconnected consistent with safety, reliability, and power quality standards, Consumers Energy shall notify the Applicant and provide the Applicant with the results of the application of the initial review screens. Consumers Energy shall provide the Applicant with the options to attend a customer options meeting, proceed to Supplemental Review, submit a project modification, or withdraw the application. The Applicant shall have 10 business days to decide on a course of action and notify Consumers Energy, otherwise the application shall be withdrawn.

Upon the Applicant's request, Consumers Energy and the Applicant shall schedule a customer options meeting between Consumers Energy and the Applicant to review possible facility modifications, screen analysis, and related results to determine what further steps are needed to permit the DER to be connected safely and reliably to the distribution system. The customer options meeting must take place within 30 business days of the date of notification. Consumers Energy shall provide the Applicant with the options of proceeding to Supplemental Review, proceeding to the Study Track, submitting a project modification, or withdrawing the application. The Applicant shall have 20 business days following the meeting to decide on a course of action and notify Consumers Energy, otherwise the application shall be withdrawn. The customer options meeting may take place in person or via telecommunications.

If a Project modification is offered by Consumers Energy, the Applicant shall provide a modified application within 60 business days from the date the Applicant was notified by Consumers Energy, with up to 2 resubmissions during this time to provide a modified application. The application modifications must mitigate or eliminate the factors that caused the interconnection application to fail 1 or more of the initial review screens. After each submission of information, Consumers Energy will notify the Applicant within 10 business days that the interconnection application is either accepted or rejected due to continuing deficiencies. If the Applicant does not meet the timelines required, the application may be withdrawn. After the application is accepted, the initial review screen process will be repeated.

SUPPLEMENTAL REVIEW

An applicant shall submit payment of the supplemental review fee (Appendix B) within 20 business days of agreeing to a supplemental review. If payment of the fee has not been received by Consumers Energy within 25 business days, the application shall be withdrawn.

Within 30 business days after the Applicant pays the applicable supplemental review fee, and provides reasonable requested data, Consumers Energy will perform a study using the supplemental review screens in Appendix I and notify the Applicant of the results. Consumers Energy may waive application of any of the supplemental review screens.

If the proposed interconnection passes the supplemental review screens, or if the proposed interconnection fails the screens but Consumers Energy determines that the DER may be interconnected consistent with safety, reliability, and power quality standards, Consumers Energy shall notify the Applicant and inform the Applicant whether the Project will proceed to Facilities Study or directly to Interconnection and Operating Agreement.

If the proposed interconnection fails any of the supplemental review screens, and Consumers Energy does not or cannot determine that the DER may be interconnected consistent with safety, reliability, and power quality standards, Consumers Energy shall notify the Applicant and provide the Applicant with the results of the application of the supplemental review screens. Consumers Energy shall provide the Applicant with the options to proceed to the Study Track or withdraw the application. The Applicant shall have 10 business days to decide on a course of action and notify Consumers Energy, otherwise the application shall be withdrawn.

STUDY TRACK

The study track is available to all Projects that are not eligible for the non-export track, or the fast track. Projects that do not pass the initial review screens or supplemental review screens or are otherwise identified to require further study while proceeding through another track may also be evaluated in the study track. A Project that is eligible for the fast track may also elect to be evaluated in the study track.

If a project is ineligible for any other study track, Consumers Energy shall provide an individual study agreement to the Applicant within 10 business days after the interconnection application has been accepted.

If a project begins in another track and is moved to the study track for any other reason listed above, within 10 business days after the Applicant has notified Consumers Energy to proceed to the study track, Consumers Energy shall provide an individual study agreement.

INDIVIDUAL STUDY PROCESS

Consumers Energy will proceed to study each Project in the order in which the Projects were placed into the study track, considering withdrawn interconnection applications and electrically remote Projects. An electrically remote Project in an individual study may be studied on an expedited schedule relative to electrically coincident DERs. Electrically remote DERs will be studied in the order that the interconnection applications were deemed complete.

Upon request of the Applicant, a scoping meeting shall be scheduled to discuss the interconnection application and review existing fast track results, if any. The scoping meeting must take place within 20 business days after the interconnection application is considered complete by Consumers Energy or, if applicable, the fast track has been completed and the Applicant has elected to continue with the system impact study or facilities study

If a Project in an individual study is delayed due to an affected system issue, other Projects that were placed into the study track on a later date may continue to progress.

An individual study will begin in the System Impact Study section and proceed to Facilities Study.

SYSTEM IMPACT STUDY

Consumers Energy will provide the Applicant with a system impact study agreement within five business days of entering the study track either directly after an application is deemed complete or after a Project moves to the study track from another track. The Applicant shall return the completed system impact study agreement, provide any technical data requested by Consumers Energy, and pay the required fee (Appendix B) within 20 business days, including an appropriate credit, if any, for previously completed fast track or non-export track studies, to the extent they reduce the cost of the system impact study. Consumers Energy may consider the application withdrawn if the system impact study agreement, payment, and required technical data are not returned within 20 business days.

The system impact study report will identify and describe the electric system impacts that would result if the proposed Project were interconnected without electric system modifications. It will also provide a non-binding, good faith list of facilities that are required because of the application and non-binding estimates of costs and time to construct these facilities.

Consumers Energy will complete the system impact study and provide both a system impact study and, if necessary, a facilities study agreement within 60 business days of receipt of the signed system impact study agreement, payment of all applicable fees, and any necessary technical data.

Consumers Energy may request reasonable additional data from the Applicant within 20 business days of beginning the system impact study. Consumers Energy and the Applicant shall work together to resolve the additional data request so that Consumers Energy will be able to complete the system impact study within the 60 business day period. If the Applicant does not provide the requested

additional data in a timely manner, Consumers Energy will notify the Applicant that the system impact study is on hold and the date the hold started. Consumers Energy will resume work on the study when the additional data is received.

Within 15 business days of receiving the system impact study report, the Applicant shall notify Consumers Energy whether it elects to pursue a system impact study review meeting, proceed to Facilities Study, or withdraw the application. If the Applicant fails to notify Consumers Energy within 15 business days, Consumers Energy may consider the application to be withdrawn.

Upon request by Applicant, a system impact study review meeting shall be scheduled to review system impact study results and determine what further steps are needed to permit the Project to be connected safely and reliably to the distribution system. The system impact study review meeting must take place within 25 business days of Consumers Energy receiving notification that the Applicant plans to attend a system impact study review meeting. At the meeting Consumers Energy will offer the Applicant to proceed to Facilities Study, proceed directly to Interconnection & Operating Agreement if utility determines Facility study is not needed, or withdraw the application. If an applicant fails to notify Consumers Energy of its selection within 45 business days of the meeting, Consumers Energy may consider the application to be withdrawn.

FACILITIES STUDY

If a Project receives a system impact study, Consumers Energy will provide the Applicant with a facilities study agreement with the system impact study report. If no system impact study was performed, Consumers Energy will provide a facilities study agreement within 10 business days of proceeding to Facilities Study. The Applicant shall return the signed facilities study agreement and pay the required facilities study fee (Appendix B) within 20 business days, including an appropriate credit, if any, for previously completed fast track or non-export track studies, to the extent they reduce the cost of the facilities study. Consumers Energy may withdraw the application if the facilities study agreement and payment are not returned within 20 business days.

The facilities study report will specify and estimate the cost of the required equipment, engineering, procurement, and construction work, including overheads, needed to interconnect the Project, and an estimated timeline for the completion of construction.

Consumers Energy will complete the facilities study and provide a facilities study report to the Applicant within 80 business days of the receipt of the signed facilities study agreement and payment of the facilities study fee.

Within 10 business days of receiving a facilities study report from Consumers Energy, the Applicant shall notify Consumers Energy whether it elects to pursue a facilities study review meeting, proceed to an Interconnection & Operating Agreement, or withdraw the application. If the Applicant fails to notify

Consumers Energy within 10 business days, Consumers Energy may consider the application to be withdrawn.

Upon request by Applicant, a facilities study review meeting shall be scheduled to review facilities study results and determine what further steps are needed to permit the Project to be connected safely and reliably to the distribution system. The facilities study review meeting must take place within 25 business days of Consumers Energy receiving notification that the Applicant plans to attend a facilities study review meeting. At the meeting Consumers Energy will offer the Applicant to proceed to Interconnection & Operating Agreement or withdraw the application. If an applicant fails to notify Consumers Energy of its selection within 20 business days of the meeting, Consumers Energy may withdraw the application.

COST ALLOCATION METHODOLOGY

Shared interconnection facilities shall be split equally amongst Applicants whose Projects necessitate the shared interconnection facilities. Once an Applicant's Project interconnection facilities are in service, the upfront original cost to install those interconnection facilities can no longer be shared by future Applicants. Costs of ongoing ownership, maintenance, and future repair/replacement can still be shared by future applicants that share the interconnection facilities in accordance with interconnection agreements.

Shared distribution upgrade costs shall be allocated according to the impact of each Applicant's generator on the limits exceeded for the shared distribution facilities. A simple example is shown below for a thermal constraint and the same methodology would be used for voltage, interrupting capability, or other constraints.

Limit Exceeded	Distribution Upgrade Cost	Impact of Project A	Impact or Project B
Loading on line X exceeded limit by 5 MVA	line X upgrade ($1M)	3 MVA	2 MVA
Cost Allocation		=(3/5*$1M) =$0.6M	=(2/5*$1M) =$0.4M

Distribution upgrade costs for higher queued Applicants that have agreed to proceed to interconnection agreements will not be considered for cost allocation to lower queued applicants, unless requested and agreed to by all applicants affected.

Distribution upgrade costs and allocations of costs are subject to change due to the potential for an Applicant to withdraw up until an Applicant's Project is in service and costs are reconciled per the interconnection agreements. Consumers Energy shall endeavor to notify an Applicant as soon as possible after the it becomes aware that an Applicant's cost for distribution upgrades changes due to any other Applicant withdrawing a Project or Projects.

AFFECTED SYSTEM STUDY PROCESS

If during a System Impact Study or a Facilities Study Consumers Energy determines that another utility's system may be affected by a proposed interconnection project, Consumers Energy shall notify the Applicant of such and place the Project in an on-hold status regarding all interconnection study timelines while an affected system study is completed. Consumers Energy shall send notification and information on the project to the affected system owner and request that an affected system study be completed, and scope, costs, and lead times of any upgrades required on the affected system be provided. Once Consumers Energy receives the affected system study results from the affected system owner, the results will be incorporated into the Consumers Energy study report, and the hold will be removed from the Project and the interconnection timelines will resume.

INTERCONNECTION AND OPERATING AGREEMENT

A level 1, 2, and 3 interconnection agreement or a level 4 and 5 interconnection agreement will be provided to the Applicant in this stage dependent on Project level. An Applicant shall pay the actual cost of the interconnection facilities and distribution upgrades, subject to R 460.964 (8).

Level 1, 2, or 3 Projects Only

For level 1, 2, or 3 Projects, where no construction of interconnection facilities or distribution upgrades is required, Consumers Energy will provide its standard level 1, 2 and 3 interconnection agreement, which may include modifications to address any special operating conditions, to the Applicant within 3 business days of reaching this stage. If construction of interconnection facilities or distribution upgrades is required, Consumers Energy will provide its standard level 1, 2 and 3 interconnection agreement with modifications to address any special operating conditions, required construction activities, estimated construction milestone timing, and estimated cost to the Applicant within 5 business days of reaching this stage. The Applicant and Consumers Energy will mutually agree on the timing of construction milestones.

The applicant shall sign and return the interconnection agreement with payment, if applicable, within 20 business days of receiving the agreement. If this deadline is missed, the Applicant will be informed of the missed deadline and granted an extension of 15 business days. If the interconnection agreement and payment are not received during the 15-business-day extension, Consumers Energy may consider the interconnection application withdrawn.

Consumers Energy will countersign and provide a completed copy of the interconnection agreement within 10 business days of the Applicant returning the signed interconnection agreement.

Level 4 or 5 Projects Only

For level 4 or 5 projects, Consumers Energy will provide its level 4 and 5 interconnection agreement, which may include modifications to address any special operating conditions, within 15 business days of

reaching this stage. When construction interconnection facilities or distribution upgrades is necessary, the level 4 and 5 interconnection agreement will contain either estimated timelines for completion of activities and estimates of construction costs or a timetable when these requirements can be determined. The interconnection agreement will include a payment schedule that corresponds to the milestones established.

The Applicant shall sign and return the interconnection agreement with payment, if applicable, within 30 business days of receiving the agreement. If this deadline is missed, the Applicant will be informed of the missed deadline and granted an extension of 15 business days. If the interconnection agreement and payment are not received during the 15-business-day extension, Consumers Energy may consider the interconnection application withdrawn.

Consumers Energy will countersign and provide a completed copy of the interconnection agreement within 10 business days of the Applicant returning a mutually agreed-upon and signed interconnection agreement.

INSPECTION, TESTING, AND COMMISSIONING

The Applicant is required to notify Consumers Energy when the installation of a Project and any required local code inspection and approval is complete. The Applicant is also required to provide any test reports or configuration documents as defined in the standard level 1, 2, and 3 interconnection agreement or level 4 and 5 interconnection agreement.

Consumers Energy will review the Applicant's inspection, test reports, or configuration documents and communicate its intent to perform a witness or commissioning test or waive its rights to perform a witness test and commissioning test, within 10 business days. If Consumers Energy finds the Applicant's inspection, test reports, or configuration documents to be incomplete, insufficient, or unsatisfactory, Consumers Energy shall provide the reasons for doing so in writing and the Applicant shall have not less than 20 business days or a mutually agreed upon timeframe with Consumers Energy to implement corrections to those documents. The Applicant, after taking corrective action, shall request Consumers Energy to reconsider the inspection, test reports, or configuration documents.

If Consumers Energy intends to witness or perform commissioning test, it must do so within ten business days of receiving the notification from the Applicant for level 1, 2, and 3 projects. For level 4 and 5 projects, the tests must be performed within a mutually agreed upon timeline. Within 5 business days of receipt of the completed commissioning test report, Consumers Energy will notify the Applicant it has accepted or rejected the commissioning test report and if it has found the site to be satisfactory. If the commissioning test is accepted and the site is found satisfactory, Consumers Energy will notify the Applicant, and the Project will proceed to Authorization to Operate in Parallel.

The commissioning testing required by Consumers Energy may include but is not limited to confirmation of installed equipment, functional testing, and verification of protection and control system settings.

Consumers Energy will provide the utility settings and commissioning test requirements prior to witness testing. The Applicant is responsible for applying Consumers Energy requirements prior to the date of witness testing and may request temporary parallel authorization if needed to apply and confirm the requirements.

If Consumers Energy waives its right to visit the site and inspect the Project or perform the commissioning tests, it will provide a written waiver to the Applicant within 10 days of receiving notice. The Applicant shall provide Consumers Energy with the completed commissioning test report within 20 business days of receipt of this waiver. Within 5 business days of receipt of the completed commissioning test report, Consumers Energy will notify the Applicant it has accepted or rejected the commissioning test report. If the commissioning test is accepted, Consumers Energy will notify the Applicant, and the Project will proceed to Authorization to Operate in Parallel.

If Consumers Energy attempts to conduct the inspection and testing at the arranged time and is unable to access the Project or complete the testing, the Project must remain disconnected until the Applicant and Consumers Energy can complete the inspection and testing.

If Consumers Energy rejects a commissioning test or finds a site unsatisfactory, it will provide its reasons for doing so in writing, and the Applicant has 20 business days to implement corrections. The Applicant, after taking corrective action, shall request Consumers Energy to reconsider its findings. Do note that the Applicant may be billed the actual cost of any re-inspections.

If the Applicant does not notify Consumers Energy that the Project is installed and ready to test, Consumers Energy may, in writing, query the status of the Project. If the Applicant does not provide a written response within 10 business days or no progress is evident, Consumers Energy may consider the Project withdrawn.

AUTHORIZATION TO OPERATE IN PARALLEL

Consumers Energy will provide the Applicant with written authorization to operate its Project in parallel with Consumers Energy's distribution system within five business days of all the following conditions being met:

- Consumers Energy notified the Applicant that the commissioning test and inspection, where applicable, are accepted.
- The Applicant has executed a standard level 1, 2, and 3 interconnection agreement or level 4 and 5 interconnection agreement and complied with all applicable parallel operation requirements as set forth in these procedures and the applicable interconnection agreement.
- The Applicant complied with all applicable local, state, and federal requirements.
- Consumers Energy has received payment in full for all outstanding bills.

With this written authorization, the Project is considered approved for parallel operation, the Project may begin operating, and the Applicant is considered an interconnection customer.

The Applicant shall not operate its Project in parallel with Consumers Energy's distribution system without prior written permission to operate from Consumers Energy. Subject to reasonable timing and other conditions, including completion of conditions in the applicable interconnection agreement or these procedures, Consumers Energy will allow for reasonable, but limited, testing before written authorization has occurred.

MATERIAL MODIFICATION PROCESS

In the event of a change to the Project design any time after receiving notification by Consumers Energy of a complete interconnection application, the Applicant will be required to submit a revised interconnection application, including the associated fee, detailing the proposed changes to Consumers Energy for review. The Application Review section above details the process by which Consumers Energy will review this application. At such a time when the revised interconnection is deemed complete by Consumers Energy, Consumers Energy will determine whether the proposed changes constitute a Material Modification and, if so, whether any further restudy is required. If further restudy is required, the Applicant shall notify Consumers Energy whether it will withdraw the proposed changes, withdraw the application, or continue with the restudy, at the associated fee, within 10 business days of being notified of the determination or Consumers Energy may withdraw the application.

A definition of Material Modification is included in Appendix C.

All Material Modifications need to be reviewed by Consumers Energy to determine if they are acceptable without further or additional study as written above. Each Material Modification must be reviewed by Consumers Energy on a case-by-case basis. A non-exhaustive list of example Material Modifications that may or may not require additional study are listed below.

Material Modifications that would be acceptable and typically would not require re-study:

a. Inverter Changes
    i. Export capacity remains unchanged (a minor change in total output may be allowed depending on connection type and/or previous study results)
    ii. The number of inverters changes, but the total export capacity remains the same
b. Small Transformer Changes (base rating remains unchanged)
    i. Minor Impedance change (evaluated on a case-by-case basis, dependent on connection type and/or previous study results)
    ii. X/R Ratio change only
c. Changes to collector system cable lengths (conductor type/size remains unchanged)
    i. Minor change in lengths (evaluated on a case-by-case basis, dependent on connection type and/or previous study results)

d. Small relocation of the point of interconnection (evaluated on a case-by-case basis)

Material Modifications that would typically require re-study to determine acceptability:

a. Inverter Changes (other than above)
b. Collector System Re-Design
    i. System Voltage Change
    ii. Number of Transformation Levels change
c. Transformer base rating or impedance change (other than above)
d. Collector system cable changes (other than above)
e. Relocation of the point of interconnection (other than above)
f. Change in export limitations of a project (e.g., non-export to export, increasing power limiting settings, etc.)

If a DER must be restudied due to a Material Modification, the electric utility may offer an expedited study of the application with the proposed modification if possible. Timelines for the potential expedited studies if available will be communicated to the Applicant along with any associated study fees and study agreements. The timelines and fees will be determined on a case-by-case basis and determined based on the scope and scale of the modifications and extent of study required.

OPERATIONAL PROVISIONS

The Project may not commence parallel operation until approval has been given by Consumers Energy. The completed installation is subject to inspection by Consumers Energy prior to approval. Preceding this inspection, all contractual agreements must be executed by the Applicant.

DISCONNECTION

Consumers Energy may refuse to connect, or may disconnect, a project from the electric system if any of the following conditions apply:

a. Lack of written authorization from Consumers Energy to interconnect or fully executed Generator Interconnection and Operating Agreement.
b. Termination of interconnection by mutual agreement.
c. Noncompliance with technical or contractual requirements in the Generator Interconnection and Operating Agreement, after 30 business days of notification is provided to the Applicant of the technical or contractual deficiency that does not degrade the reliability of the distribution system, electric utility equipment, and electric customers' equipment or presents a safety hazard.
d. Electric distribution system emergency.
e. Routine maintenance, repairs, and modifications, performed in a reasonable time and with prior notice.

f. Other material noncompliance with technical or contractual requirements in the Generator Interconnection and Operating Agreement.

Consumer Energy may require disconnection of a Project from the distribution system for the above conditions, which may include but is not limited to the following examples:

a. When public safety is being jeopardized.
b. During voltage, frequency, or loading problems.
c. When abnormal sectionalizing or circuit configuration occurs on the Consumers Energy system.
d. During scheduled shutdown of Consumers Energy equipment, necessary to facilitate maintenance or repairs.
e. In the event electrical interference (e.g., Voltage Flicker, Harmonic Distortion, etc.) is demonstrated to Consumers Energy customers, suspected to be caused by the Project, and such interference exceeds then current system standards. Consumers Energy reserves the right to install special test equipment as may be required to perform a disturbance analysis and monitor the operation and control of the Project to evaluate the quality of power produced by the Project. If no standards exist, then the applicable tariffs and rules governing electric service shall apply. If the Project is the source of the interference, and that interference exceeds Consumers Energy standards or generally accepted industry standards, then it shall be the responsibility of the Applicant to eliminate the interference problem.
f. When the Project or its associated synchronizing and protective equipment fails or is demonstrated by Consumers Energy to be improperly maintained, to present a hazard to the Consumers Energy system or its customers.
g. Whenever the Project is operating isolated (islanded) with other Consumers Energy customers, for whatever reason.

Consumers Energy may disconnect electric service to disconnect a Project from the electric system, pursuant to R 460.136.

MAINTENANCE AND TESTING

Consumers Energy reserves the right to test the relaying and control equipment that involves protection of the Consumers Energy electric system whenever Consumers Energy determines a reasonable need for such testing exists.

The Applicant is solely responsible for conducting and documenting periodic maintenance and testing on the generating equipment and its associated control, protective equipment, interrupting devices, and

main Isolation Device[4], per manufacturer recommendations. Refer to the Sample Periodic Interconnection Test Log (Appendix K).

If protective relaying is required per the technical requirements, the Applicant is responsible for conducting and documenting periodic maintenance and testing every 4 years on relays and the associated interrupting devices, control schemes, and batteries, unless a written extension is provided by Consumers Energy. If testing is required, it shall be conducted in accordance with the test procedures provided by Consumers Energy as part of inspection testing.

Consumers Energy reserves the right to witness the testing. The Applicant is responsible for maintaining written reports for the above tests for four years. These written reports shall be made available to Consumers Energy upon request.

INSURANCE

For level 3, 4, and 5 projects, the Applicant shall obtain and continuously maintain, as required in the applicable interconnection agreement, General Liability insurance written on a standard occurrence form, or other form acceptable to Consumers Energy, and covering bodily injury and property damage liability with a per occurrence and annual policy aggregate amount of at least:

Interconnection Level	Minimum Limit
3	$1,000,000
4	$2,000,000
5	$3,000,000

When requested in writing by Consumers Energy, said limit shall be increased each to a limit no greater than the amount arrived at by increasing the original limit by the same percentage change as the Consumer Price Index - All Urban Workers (CPI-U.S. Cities Average). Such a policy shall include, but not be limited to, contractual liability for indemnification assumed by the Applicant under the applicable interconnection agreement.

Consumers Energy Company, its Directors, Officers, and Employees are to be included as ADDITIONAL INSUREDS and such coverage shall be primary to any insurance maintained by Consumers Energy

[4] Main Isolation Device – When required by Consumers Energy operating practices, a readily accessible, lockable, visible-break isolation device located between Consumers Energy and the Project.

Company. Consumers Energy shall not be responsible for any unpaid premiums under the Applicant's policy.

TECHNICAL REQUIREMENTS

The following discussion details the technical requirements for interconnection of Level 1 & 2 Projects less than or equal to 150 kWac of generation[5]. For Projects within this capacity rating range, Consumers Energy has made a significant effort to simplify the technical requirements. This effort has resulted in adoption of IEEE Standard 1547-2018, Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces, being incorporated herein by reference.

Certain requirements, as specified by this document, must be met to provide compatibility between the Project equipment and the Consumers Energy electric system, and to ensure that the safety and reliability of the electric system is not degraded by the interconnection. Consumers Energy reserves the right to evaluate and apply newly developed protection and/or operation schemes at its discretion. All protective schemes and functions are evaluated for compliance to IEEE 1547. In addition, Consumers Energy reserves the right to evaluate Projects on an ongoing basis as system conditions change, such as circuit loading, additional generation placed online, etc.

MAJOR COMPONENT DESIGN REQUIREMENTS

The data requested for all major equipment and relaying proposed by the Applicant must be submitted as part of the initial interconnection application for review and approval by Consumers Energy (Appendix D). Consumers Energy may request additional data be submitted during the interconnection process to clarify the operation of the Project facilities.

Once installed, the interconnection equipment must be reviewed and approved by Consumers Energy prior to being connected to the Consumers Energy electric system and before parallel operation is allowed.

DATA

The data that Consumers Energy requires to evaluate the proposed interconnection is documented on the generator interconnection application (Appendix D). A site plan and one-line diagram showing interconnection protection system are required as part of the application data. For Level 2 projects, the one-line diagram must be sealed by a professional engineer licensed in the state of Michigan or by an electrical contractor licensed in the state of Michigan with the electrical contractor's license number noted on the diagram. The generator manufacturer supplied data package should also be supplied.

[5] Non-Certified Inverter based generation projects, synchronous and induction projects less than or equal to 150kWac are defined as Level 3 projects and are implemented under the Level 3 procedures and applications.

The Applicant may request Consumers Energy study the Project at a reduced power output (Export Capacity) below the DER nameplate capacity. The Applicant must provide the export capacity and method used to reduce the power output as part of the application data for review and approval by Consumers Energy.

ISOLATING TRANSFORMER(S)

No isolation transformer is required between the generator and the secondary distribution connection. If a transformer is utilized, the transformer shall meet the following requirements.

- The transformer shall comply with the current ANSI Standard C57.12.
- The transformer should have voltage taps on the high and/or low voltage windings sufficient to assure satisfactory generator operation over the range of voltage variation expected on the Consumers Energy electric system.
- The transformer utility and Project side winding connections shall be selected using the following table. The transformer may have multiple project side windings.

PCC Voltage	Utility System Configuration PCC	Transformer Winding Connection		Special Requirements
		Utility Side	Project Side	
46 kV	Grounded Wye	Delta	No Preference	
		Grounded Wye	Delta	See Note 1
Below 46 kV	Grounded Wye	Grounded Wye	Ungrounded Wye	See Note 2
			Grounded Wye	See Notes 3, 4
	Delta	Delta	No Preference	

Table – Three Phase Transformer Winding Connections

Note 1: Requires the Project to be connected to its own dedicated line exit.

Note 2: Additional transformers connected to the Project side transformer winding cannot in combination with each other be a source of zero sequence current. For example, an ungrounded wye to delta transformer with the neutrals of both ungrounded wye transformer windings connected. The connection of the neutrals would cause the series combination of the grounded wye to ungrounded wye transformer and the ungrounded wye to delta transformer to mimic a grounded wye to delta transformer which is a source of zero sequence current.

Note 3: Additional transformers connected to the Project side transformer winding cannot be a source of zero sequence current. For example, the transformer may not be connected Grounded Wye (utility side) – Delta (Project side).

Note 4: Additional transformers connected to the Project side transformer winding cannot be connected as Delta.

ISOLATION DEVICE

When required by Consumers Energy operating practices, a readily accessible, lockable, visible-break isolation device will be located between Consumers Energy and the Project. It can be a rackable circuit breaker, circuit switcher, pole top switch, load-break disconnect, etc., depending on the electrical system configuration. The following are required of the isolation device:

- Must be approved for use on the Consumers Energy system.
- Must comply with current relevant ANSI and/or IEEE Standards.
- Must have load break capability, unless used in series with a three-phase interrupting device.
- Must be rated for the application.
- If used as part of a protective relaying scheme, it must have adequate interrupting capability. Consumers Energy will provide maximum short circuit currents and X/R ratios for faults at the PCC, upon request.
- Must be a blade style, visible, operable, and accessible by Consumers Energy (24 hours a day, 7 days a week).
- The isolation device will be used as a protective tagging point. The device must have visible open break provisions for padlocking in the open position, and it must be gang operated. If the device has automatic operation, the controls must be located remote from the device.
- Must be clearly marked to include signage per the National Electrical Code (NEC), as applicable.

INTERCONNECTION FACILITIES

The available system voltage, as well as equipment and operational constraints influence the chosen point of interconnection. Consumers Energy has the ultimate authority to determine the acceptability of a particular PCC.

- Any new line construction to connect the Project to the existing Consumers Energy's electric system will be constructed and owned by the Applicant, including any easements and rights-of-way needed for the Applicant's interconnection lines unless determined otherwise by the utility that the utility should construct and own any of the lines/facilities required for interconnection. Consumers Energy's protective device will provide protection of the Applicant's line. An example is the utility determines that the point of interconnection for a 46 kV connected project is at an existing Consumers Energy Substation "A". Then the Applicant would be responsible for obtaining easements and building/owning the 46 kV line from their project location to the existing CE owned Substation "A" and Consumers Energy would install a 46 kV breaker at Substation "A" for automatic isolation of faults on the Applicant-owned 46 kV line. Applicant

owned interconnection lines and facilities design must be coordinated with Consumers Energy and approved for use to connect to the Consumers Energy electric system. If applicant-owned interconnection facilities are determined to cause outages or reliability issues to existing Consumers Energy customers, the Applicant must correct/mitigate, as necessary.

TERMINATION STRUCTURE

The Applicant is responsible for ensuring that structural material strengths are adequate for all requirements. Upon written request, Consumers Energy will provide maximum dead-end line tension information. The structure shall adhere to the latest edition of the National Electric Safety Code (NESC) as adopted by the Commission.

Electrical clearances shall adhere to the latest edition of the NESC as adopted by the Commission and shall be coordinated with Consumers Energy.

The installation of disconnect switches, bus support insulators, and other equipment shall comply with accepted industry practices.

Surge arresters shall be selected to coordinate with the BIL rating of major equipment and rated for the application.

INVERTERS

Certified inverter Projects must use inverter(s) that conform to the IEEE 1547-2018 standard. To show compliance, a certificate of compliance from an OSHA approved national recognized testing laboratory must be submitted as part of the application and the manufacturer must mark the equipment such that a field inspection can verify the certification. The certification of compliance must clearly state the inverter has been tested to UL 1741 using IEEE 1547-2018 as the functional Source Requirement Document.

The inverters shall be certified to meet the following performance Categories.

1. Normal Operating Performance – Category B
2. Abnormal Operating Performance – Category III *

* The manufacturer is required to mark the abnormal operating category on the equipment.

If the requirements of this section are met, the inverter is deemed “certified” as defined within Appendix C.

INTERCONNECTION PROTECTION

Utility-grade relaying is not required for certified inverter Projects unless reverse or underpower relaying is required for power limited projects. Any additional relaying which may be necessary to protect equipment at the Project is solely the responsibility of the Applicant.

AUTOMATIC RECLOSING

Consumers Energy employs automatic multiple-shot reclosing on most of the circuit breakers and circuit reclosers to increase the reliability of service to its customers. Automatic single-phase overhead reclosers are regularly installed on distribution circuits to isolate faulted segments of these circuits.

The Applicant is advised to consider the effects of Automatic Reclosing (both single-phase and three-phase) to assure that the Project's internal equipment will not be damaged. In addition to the risk of damage to the Project, an out-of-phase reclosing operation may also present a hazard to Consumers Energy equipment not rated or built to withstand this type of reclosing.

Consumers Energy will determine relaying and control equipment (e.g., volt check relays) that needs to be installed to protect its own equipment from out-of-phase reclosing. Installation of this protection will be done by Consumers Energy at the expense of the Applicant. Consumers Energy shall not be liable to the customer with respect to damage(s) to the Project arising because of Automatic Reclosing.

SINGLE-PHASE SECTIONALIZING

Consumers Energy also installs single-phase fuses and/or reclosers on its distribution circuits to increase the reliability of service to its customers. Three-phase generator installations may require replacement of fuses and/or single-phase reclosers with three-phase circuit breakers or circuit reclosers at the Applicant's expense.

INTERCONNECTION PROTECTION SETTINGS

RELAY SETTING CRITERIA

The Applicant is required to set the relaying per the following guidelines.

32R Relay – Reverse Power

This relay will be applied to limited export projects. The reverse power relay must be selected such that it can detect a power flow into the Consumers Energy system above the Project export

capacity. The relay will normally be set to have 102% of the export capacity and will trip after a 5 second time delay. The delay will avoid unnecessary tripping for momentary conditions.

32U Relay – Under Power (Min Import)

This relay will be applied to limited export projects. The under-power relay must be selected such that it can detect a minimum amount of power flow from the Consumers Energy system. The relay will normally be set near its minimum (most sensitive) setting and will trip after a 5 second time delay. The delay will avoid unnecessary tripping for momentary conditions. Special consideration should be taken when selecting and setting an under-power function due to the minimum operating quantities required for the function to operate correctly.

INVERTER SETTING CRITERIA

The Applicant is required to set the inverter to meet the default IEEE 1547-2018 requirements, including default settings to meet Category III shall trip, ride through, and frequency-droop (Freq-Watt) requirements.

Consumers Energy may request changes to settings that impact the safety and reliability of the electric distribution system. Consumers Energy and the Project shall work together to implement any proposed setting changes.

MISCELLANEOUS OPERATIONAL REQUIREMENTS

Miscellaneous requirements include synchronizing equipment, ramp rates, reclose blocking, reactive requirements, and system stability limitations.

OPERATING IN PARALLEL

The Applicant will be solely responsible for the required synchronizing equipment and for properly synchronizing the Project with the Consumers Energy electric system. Voltage fluctuation at the PCC during synchronization is limited per IEEE 1547-2018.

The Project must be capable of controlling the output of active power (ramp rates) after synchronization to avoid issues on the Consumers Energy system, which includes but is not limited to voltage fluctuations, harmonics, or oscillations. The Project shall, upon request by Consumers Energy, modify the active power output characteristics to prevent such issues after synchronization.

The Project must be designed to prevent the Project from energizing into a de-energized Consumers Energy line. The Project's circuit breaker or contactor must be blocked from closing in on a de-energized Consumers Energy distribution system.

VOLTAGE AND FREQUENCY RIDE THROUGH

Certified inverter Projects are required to meet ride through requirements by implementing the inverter setting criteria defined within these procedures.

All under/over voltage and under/over frequency protective functions installed by the Applicant or Consumers Energy are required to coordinate with ride through requirements.

REACTIVE POWER CONTROL CAPABILITY AND VOLTAGE CONTROL

The Project shall be designed to be capable of maintaining a continuous rated power output for the export portion of the Project, at a power factor within the range of 0.9 (inject) to 0.9 (absorb) for inverter-based Projects.

The Applicant shall control voltage at the PCC in accordance with instructions (e.g., voltage or reactive power schedule) provided by Consumers Energy. Inverter based Projects shall be certified, to be capable of controlling the voltage level at the export portion of the Project using the control modes specified in the following table.

Control Mode
Specified Power Factor (SPF)
Voltage-Reactive Power (Volt-VAr)
Active Power- Reactive Power (Watt-Var)
Constant Reactive Power
Voltage-Active Power (Volt-Watt)

Consumers Energy existing rate schedules, incorporated herein by reference, contain power factor adjustments based on the power factor of the metered load at these facilities.

FREQUENCY CONTROL

Inverter based Projects shall be certified, to be capable of controlling frequency using the control mode(s) specified in the following table. Non-Export projects are subject to the requirement.

Control Mode
Frequency-Watt

The control modes shall respond to frequency measurements at the inverter terminals. Certified inverter Projects are required to meet the frequency control requirements by implementing the inverter setting criteria defined within these procedures.

SYSTEM STABILITY AND SITE LIMITATIONS

The Applicant is responsible for evaluating the consequences of unstable generator operation or voltage transients on the Project equipment, and determining, designing, and applying any relaying which may be necessary to protect that equipment. This type of protection is typically applied on individual generators to protect the Project Facilities.

Consumers Energy will determine if operation of the Project will create objectionable voltage flicker and/or disturbances to other Consumers Energy customers and develop any required mitigation measures at the Applicant's expense.

REVENUE METERING REQUIREMENTS

Consumers Energy will own, operate, and maintain all required billing metering equipment. If the Applicant is electing to participate in the Distributed Generation program, Consumers Energy shall provide a meter or meters capable of measuring the flow of energy in both directions at no additional charge to a distributed generation program customer.

NON-EXPORT PROJECTS

A Consumers Energy meter will be installed that only records energy deliveries to the Project.

EXPORT PROJECTS

The billing metering may need to be replaced. A dedicated data Communication Circuit is required to allow remote access to the billing meter by Consumers Energy.

The Applicant shall provide Consumers Energy access to the premises at reasonable times to install, turn on, disconnect, inspect, test, read, repair, or remove the metering equipment. The Applicant may, at its option, have a representative witness this work.

The metering installations shall be constructed in accordance with the practices which normally apply to the construction of metering installations for residential, commercial, or industrial customers. For Level

2 Projects, at least two meters will be required: one at the PCC and one at the generator. For Projects with multiple generators, metering of each generator may be required. When practical, multiple generators may be metered at a common point provided the metered quantity represents only the gross generator output.

Consumers Energy shall supply to the Applicant all required metering equipment and the standard detailed specifications and requirements relating to the location, construction, and access of the metering installation and will provide consultation pertaining to the meter installation as required. Consumers Energy will try to coordinate delivery of these materials with the Applicant's installation schedule during normal scheduled business hours.

The Applicant may be required to provide a mounting surface for the metering equipment. The mounting surface and location must meet Consumers Energy specifications and requirements.

The responsibility for equipment installation is shared between Consumers Energy and the Applicant. The Applicant may be required to install some of the metering equipment on its side of the PCC, including instrument transformers, cabinets, conduits, and mounting surfaces. Consumers Energy shall install the meters and appropriate communication links. Consumers Energy will try to coordinate installation of these items with the Applicant's schedule during normal scheduled business hours.

COMMUNICATION REQUIREMENTS

COMMUNICATION INTERFACE

A Communication Interface allows for the exchange of data between Consumers Energy and the Project. A Communication Interface is not required.

COMMUNICATION CIRCUITS

Data Communication Circuits allow for the remote exchange of data between Consumers Energy and equipment located at the Project. Metering requires the use of data Communication Circuits. The Applicant is responsible for all costs including materials, installation, operating, telecommunication, maintenance, cancellation fees and monthly charges for the data Communication Circuits.

Consumers Energy will determine the quantity and type (e.g., cellular, fiber, copper, radio) of the data Communication Circuits required for the application. Consumers Energy is responsible for ordering and acquiring any leased data Communication Circuits required for the Project. In some cases, the Applicant may be required by Consumers Energy to order and acquire the leased data Communication Circuits. Consumers Energy will provide information (e.g., costs, availability) regarding leased data Communication Circuits once made available by the telecommunication provider. Consumers Energy is

not responsible for any delays caused by the telecommunication provider in providing such information or increased interconnection costs.

APPENDIX A

INTERCONNECTION PROCESS FLOW DIAGRAM

[Insert Diagram]

APPENDIX B

COSTS

Interconnection Table – Applicant Costs

	Pre-Application Review	Application Review	Supplemental Review	System Impact Study	Facilities Study
Distributed* Generation	N/A	$50	$0	$0	$0
Non-Export Track (certified)	$300	$100 + $1/kWac	$1,000	Not to Exceed $10,000	Not to Exceed $15,000
Non-Export Track (non-certified)	$300	$100 + $2/kWac	$1,000	Not to Exceed $10,000	Not to Exceed $15,000
Fast Track (certified)	$300	$100 + $1/kWac	$1,000	Not to Exceed $10,000	Not to Exceed $15,000
Fast Track (non-certified)	$300	$100 + $2/kWac	$1,000	Not to Exceed $10,000	Not to Exceed $15,000
Study Track	$300	$300*	N/A	Not to Exceed $10,000	Not to Exceed $15,000

* Any Legacy Net Metering or Distributed Generation program fee in combination with any applicable fast track initial review fee, fast track supplemental review fees and any study track fees, must not exceed a total of $50.

APPENDIX C

PROCEDURE DEFINITIONS

AC: means alternating current at 60 Hertz.

Affected System: Another electric utility's distribution system, a municipal electric utility's distribution system, the transmission system, or transmission system- connected generation which may be affected by the proposed interconnection

Alternative electric supplier (AES): As defined in section 10g of 1939 PA 3, MCL 460.10g.

Applicant: The person or entity submitting an interconnection application, a legacy net metering program application, or a distributed generation program application. An applicant is not required to be an existing customer of an electric utility.

Application: An interconnection application, a legacy net metering program application, or a distributed generation program application.

Area Network: A location on the distribution system served by multiple transformers interconnected in an electrical network circuit.

Business day: Monday through Friday, starting at 12:00:00 a.m. and ending at 11:59:59 p.m., excluding the following electric utility holidays: New Year's Day, Martin Luther King Jr. Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, Day after Thanksgiving, Christmas Eve, Christmas Day, and New Year's Eve, and any day in which electric service is interrupted for 10% or more of an electric utility's customers.

Calendar day: Every day, including Saturdays, Sundays, and holidays.

Certified: An inverter-based system has met acceptable safety and reliability standards by a nationally recognized testing laboratory in conformance with IEEE 1547.1-2020 and the UL 1741 September 28, 2021, edition except that prior to commercial availability, inverter-based systems which conform to the UL 1741SA September 7, 2016, edition are acceptable.

Commission: The Michigan Public Service Commission.

Commissioning test: The test and verification procedure that is performed on a device or combination of devices forming a system to confirm that the device or system, as designed, delivered, and installed, meets the interconnection and interoperability requirements of IEEE 1547-2018. and IEEE 1547.1-2020. A commissioning test must include visual inspections and may include, as applicable, an operability and functional performance test and functional tests to verify interoperability of a combination of devices forming a system.

Conforming: The information in an interconnection application is consistent with the general principles of distribution system operation and DER characteristics.

Customer: A person or entity who receives electric service from an electric utility's distribution system or a person who participates in a legacy net metering program or distributed generation program through an alternative electric supplier or electric utility.

DC: Direct current.

Distributed energy resource (DER): A source of electric power and its associated facilities that is connected to a distribution system. DER includes both generators and energy storage devices capable of exporting active power to a distribution system. An electric vehicle that operates solely as a load is not considered a DER for purpose of this definition.

DER Capacity: The aggregate capacity of the site in real power (W) using the nameplate rating in AC.

Distributed Generation Program: The distributed generation program approved by the commission and included in an electric utility's tariff pursuant to section 6a (14) of 1939 PA 3, MCL 460.6a, or established in an alternative electric supplier distributed generation program plan.

Distribution system: The structures, equipment, and facilities owned and operated by an electric utility to deliver electricity to end users, not including transmission and generation facilities that are subject to the jurisdiction of the federal energy regulatory commission.

Distribution Upgrades: The additions, modifications, or improvements to the distribution system necessary to accommodate a DER's connection to the distribution system.

Electric utility: Any person or entity whose rates are regulated by the commission for selling electricity to retail customers in this state.

Electrically coincident: Two or more proposed DERs associated with pending interconnection applications have operating characteristics and nameplate capacities which require that distribution upgrades will be necessary if the DERs are installed in electrical proximity with each other on a distribution system.

Electrically remote: A proposed DER does not electrically coincide with a DER that is associated with a pending interconnection application.

Eligible electric generator: A methane digester or renewable energy system with a generation capacity limited to the customer's electrical need and that does not exceed the following:

- 150 kWac of aggregate generation at a single site for a renewable energy system.
- 550 kWac of aggregate generation at a single site for a methane digester.

Energy storage device: A device that captures energy produced at one time, stores that energy for a period of time, and delivers that energy as electricity for use at a future time. For purposes of these rules, an energy storage device may be considered a DER.

Export capacity: The amount of power that can be transferred from the DER to the distribution system. Export capacity is either the nameplate rating or a lower amount if limited using an acceptable means defined in the interconnection procedures.

Facilities study: A study to specify and estimate the cost of the equipment, engineering, procurement, and construction work if distribution upgrades or interconnection facilities are required.

Fast track: The procedure used for evaluating a proposed interconnection that makes use of screening processes, as described in R 460.944 to R 460.950.

Grid network: A configuration of a distribution system or an area of a distribution system in which each customer is supplied electric energy at the secondary voltage by more than 1 transformer.

High Voltage Distribution: The distribution system that operates at a voltage of 25,000 Volts or greater, not including transmission facilities.

IEEE: Institute of Electrical and Electronics Engineers.

IEEE 1547: IEEE "Standard for Interconnecting and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces".

IEEE 1547.1: IEEE "Standard Conformance Test Procedures for Interconnecting Distributed Energy Resources with Electric Power Systems Interfaces."

Inadvertent export: Unscheduled export of active power from a DER, exceeding a specified magnitude and for a limited duration, due to fluctuations in load following behavior.

Initial review: The fast-track initial review screens.

Interconnection: The process undertaken by an electric utility to construct the electrical facilities necessary to connect a DER with a distribution system so that parallel operation can occur.

Interconnection agreement: An agreement containing the terms and conditions governing the electrical interconnection between the electric utility and the Applicant or interconnection customer. Where construction of interconnection facilities or distribution upgrades are necessary, the agreement, or amendments, shall specify estimated timelines, cost estimates, and payment milestones for construction of facilities and distribution upgrades to interconnect a DER into the distribution system, and shall identify design, controls, settings, procurement, installation, and construction requirements associated with installation of the DER.

Interconnection coordinator: A person or persons designated by the electric utility who shall serve as the point of contact from which general information on the application process and on the affected system or systems can be obtained through informal request by the applicant or interconnection customer.

Interconnection customer: The person or entity, which may include the electric utility, responsible for ensuring a DER is operated and maintained in compliance with all local, state, and federal laws, as well as with all rules, standards, and interconnection procedures. An electric utility is not considered an interconnection customer for temporary DER or a substation backup energy storage device project.

Interconnection facilities: Any equipment required for connecting a DER to a distribution system.

Interconnection procedures: The requirements that govern project interconnection adopted by each electric utility and approved by the commission.

Interconnection study agreement: An agreement between an applicant and an electric utility for the electric utility to study a proposed DER.

kW: kilowatt.

kWac: The electric power, in kilowatts, associated with the alternating current output of a DER at unity power factor

kWh: kilowatt-hours.

Legacy net metering program: The true net metering or modified net metering programs in place prior to commission approval of a distributed generation program tariff pursuant to section 6a (14) of 1939 PA 3, MCL 460.6a, and prior to the establishment of an alternative electric supplier distributed generation plan.

Level 1: A certified project of 20kWac or less.

Level 2: A certified project of greater than 20 kWac and not more than 150 kWac.

Level 3: A project 150 kWac or less that is not certified, or a project greater than 150 kWac and not more than 550 kWac.

Level 4: A project of greater than 550 kWac and not more than 1 MWac.

Level 5: A project of greater than 1 MWac.

Level 4 and 5 interconnection agreement: An interconnection agreement applicable to level 4 and 5 interconnection applications.

Limited export: The exporting capability of a DER whose export capacity is limited by means specified in the interconnection procedures.

Low Voltage Distribution: The distribution system that operates at a voltage of 2,400 Volts or greater, but less than 25,000 Volts.

Mainline: A conductor that serves as the three-phase backbone of a low voltage distribution circuit.

Material modification: A modification to the DER nameplate rating, DER export capacity, electrical size of components, bill of materials, machine data, equipment configuration, or the interconnection site of the DER at any time after receiving notification by the electric utility of a complete interconnection application. Replacing a component with another component that has near-identical characteristics does not constitute a material modification when agreed to by the electric utility. For the proposed

modification to be considered material, it shall have been reviewed and been determined to have or anticipated to have a material impact on 1 or more of the following:

(i) The cost, timing, or design of any equipment located between the point of common coupling and the DER.
(ii) The cost, timing, or design of any other application.
(iii) The electric utility's distribution system or an affected system.
(iv) The safety or reliability of the distribution system.

Methane digester: A renewable energy system that uses animal or agricultural waste to produce fuel gas that can be burned for electricity or steam generation.

MW: Megawatt.

MWac: The electric power, in megawatts, associated with the alternating current output of a DER at unity power factor.

Nameplate rating: The sum of maximum rated power output of all a DER's constituent generating units and energy storage units as identified on the manufacturer nameplate, regardless of whether it is limited by any approved means. Nameplate rating includes nominal voltage (V), current (A), maximum active power (W), apparent power (VA), and reactive power (VAr) on an alternating current (AC) basis.

Nationally recognized testing laboratory: Any testing laboratory recognized by the accreditation program of the U.S. Department of Labor Occupational Safety and Health Administration.

Network protector: Those devices associated with a secondary network used to automatically disconnect a transformer when reverse power flow occurs.

Non-export: An installed electric generation project which operates in parallel with the electric utility with a relay protection scheme and isolating device preventing energy flow back to the utility.

Non-export track: The procedure for evaluating a proposed interconnection that will not inject electric energy into an electric utility's distribution system.

Parallel operation: The operation, for longer than 100 milliseconds of a DER while connected to the energized distribution system.

Point of common coupling (PCC): The point where the DER connects with the electric utility's distribution system.

Power control system: Systems or devices that electronically limit or control steady state currents to a programmable limit.

Project: Electrical generating equipment and associated facilities that are not owned or operated by an electric utility.

Radial supply: A configuration of a distribution system or an area of a distribution system in which each customer can only be supplied electric energy by 1 substation transformer and distribution line at a time.

Readily available: No creation of data is required, and little or no computation or analysis of data is required.

Renewable energy system: Term as defined in section 11(i) of 2008 PA 295, MCL 460.1011(i).

Secondary network: Those areas of a distribution system that operate at a secondary voltage level and are networked.

Site: Means a contiguous site, regardless of the number of meters at that site. A site that would be contiguous but for the presence of a street, road, or highway is considered to be contiguous.

Spot network: A location on the distribution system that uses 2 or more inter-tied transformers to supply an electrical network circuit.

Standard level 1, 2, and 3 interconnection agreement: The statewide interconnection agreement approved by the commission and applicable to levels 1, 2 and 3 interconnection applications. A cover sheet including modifications to address any special operating conditions may be added.

Study track: The procedure used for evaluating a proposed interconnection utilizing a system impact study and facilities study.

Supplemental review: The fast-track supplemental review screens.

System impact study: A study to identify and describe the impacts to the electric utility's distribution system that would occur if the proposed DER were interconnected exactly as proposed and without any modifications to the electric utility's distribution system. A system impact study also identifies affected systems.

Temporary DER: A DER that is installed on the distribution system by the electric utility with the intention of not operating at the site permanently.

UL: Underwriters Laboratory.

UL 1741: September 28, 2021, edition of the "Standard for Safety of Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources".

UL 1741 CRD for PCS: The Certification Requirement Decision for Power Control Systems for the standard titled Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources, March 8, 2019.

APPENDIX D

INTERCONNECTION APPLICATION

[INSERT APPLICATION 1]

[INSERT APPLICATION 2]

[INSERT APPLICATION 3]

[INSERT APPLICATION 4]

[INSERT APPLICATION 5]

[INSERT APPLICATION 6]

[INSERT APPLICATION 7]

[INSERT APPLICATION 8]

[INSERT APPLICATION 9]

[INSERT APPLICATION 10]

[INSERT APPLICATION 11]

[INSERT APPLICATION 12]

[INSERT APPLICATION 13]

[INSERT APPLICATION 14]

APPENDIX E

SYSTEM IMPACT STUDY, FACILITIES STUDY, AND SUPPLEMENTAL REVIEW AGREEMENTS

[Study 1]

[Study 2]

[Study 3]

[Study 4]

[Study 5]

[Study 6]

APPENDIX F

INTERCONNECTION AND PARALLEL OPERATING AGREEMENT

[agree 1]

[agree 2]

[agree 3]

[agree 4]

[agree 5]

[agree 6]

[agree 7]

[agree 8]

[agree 9]

[agree 10]

[agree 11]

APPENDIX G

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APPENDIX H

INITIAL REVIEW SCREENS

The initial review screens include the following:

(i) The entire proposed DER, including all aggregated site generation and point or points of interconnection, must be located within Consumers Energy's service territory.

(ii) For interconnection of a proposed DER to a radial distribution circuit, the aggregated generation, including the proposed DER, on the circuit may not exceed 15% of the line section annual peak load as most recently measured or calculated if measured data is not available. A line section is that portion of Consumers Energy's distribution system connected to a customer bounded by automatic sectionalizing devices or the end of the distribution line. Consumers Energy shall consider 100% of applicable loading, if available[6], instead of 15% of line section peak load for level 1 and level 2 DER. This screen does not apply to level 1 and level 2 non-export DER applications.

(iii) For interconnection of a proposed DER to the load side of network protectors, the proposed DER must utilize an inverter-based equipment package and, together with the aggregated other inverter-based DERs, may not exceed the smaller of 5% of a network's maximum load or 50 kWac.

(iv) The proposed DER, in aggregation with other DERs on the distribution circuit, may not contribute more than 10% to the distribution circuit's maximum fault current at the point on the primary voltage nearest the proposed point of common coupling. This screen does not apply to level 1 applications.

(v) The proposed DER, in aggregate with other DERs on the distribution circuit, may not cause any distribution protective devices and equipment or interconnection customer equipment on the system to exceed 87.5% of the short circuit interrupting capability. An interconnection may not be proposed for a circuit that already exceeds 87.5% of the short circuit interrupting capability. Distribution protective devices and equipment include, but are not limited to, substation breakers, fuse cutouts, and line reclosers. This screen does not apply to level 1 applications.

(vi) The initial review screen determines the type of interconnection to a primary distribution line for the proposed DER, according to the requirements specified in the table in this subdivision. This screen includes a review of the type of electrical service provided to the Applicant, including line configuration and the transformer connection to limit the potential for creating over-voltages on the Consumers Energy's distribution system due to a loss of ground during the operating time of any anti-islanding function.

Primary Distribution Line Type	Type of Interconnection to Primary Distribution Line	Result
3-phase, 3 wire	3-Phase or Single Phase, Phase-to-Phase	Pass screen
3-phase, 4 wire	Effectively Grounded 3-Phase or Single-Phase, Line-to-Neutral	Pass screen

[6] Consumers Energy expects time of day loading to be available for use in Fast Track screens by September 2024.

(vii) If the proposed DER is to be interconnected on single-phase shared secondary, the aggregate export capacity on the shared secondary, including the proposed DER export capacity, may not exceed 20 kWac or 65% of the transformer nameplate rating.

(viii) If the proposed DER is single-phase and is to be interconnected on a center tap neutral of a 240-volt service, its addition may not create an imbalance between the 2 sides of the 240-volt service of more than 20% of the nameplate rating of the service transformer.

(ix) If the proposed DER is single-phase and is to be interconnected to a 3-phase service, its nameplate rating may not exceed 10% of the service transformer nameplate rating.

(x) If the proposed DER's point of common coupling is behind a line voltage regulator, the DER's nameplate rating must be less than 250 kWac. This screen does not include substation voltage regulators.

APPENDIX I

SUPPLEMENTAL REVIEW SCREENS

The supplemental review screens includethe following:

Minimum Load Screen. Where 12 months of line section minimum load data, including onsite load but not station service load served by the proposed DER, are available, can be calculated, can be estimated from existing data, or can be determined from a power flow model, the aggregate export capacity on the line section must be less than minimum load for all line sections bounded by automatic sectionalizing devices upstream of the proposed DER. If minimum load data are not available, or cannot be calculated, estimated, or determined, Consumers Energy shall include the reason or reasons that it is unable to calculate, estimate, or determine minimum load in its supplemental review results notification. All the following must be applied:

(i) The type of generation used by the proposed DER will be considered when calculating, estimating, or determining circuit or line section minimum load. Solar photovoltaic generation systems with no battery storage must use daytime minimum load. All other generation must use absolute minimum load unless an operating schedule is provided.
(ii) When this screen is being applied to a DER that serves some station service load, only the export capacity may be considered.
(iii) Consumers Energy shall not consider as part of the aggregate generation, for purposes of this supplemental screen, DER Capacity known to be already reflected in the minimum load data.

Voltage and Power Quality Screen. In aggregate with existing generation on the line section, all the following conditions must be met:

(i) The voltage regulation on the line section can be maintained in compliance with relevant requirements under all system conditions.
(ii) The voltage fluctuation is within acceptable limits as defined by the IEEE Standard 1453-2015, IEEE Recommended Practice for the Analysis of Fluctuating Installations on Power Systems.

Safety and Reliability Screen. The location of the proposed DER and the aggregate export capacity on the line section may not create impacts to safety or reliability that require application of the study track to address. Consumers Energy shall consider all the following when determining potential impacts to safety and reliability in applying this screen:

(i) Whether the line section has significant minimum loading levels dominated by a small number of customers, such as several large commercial customers.
(ii) Whether the loading along the line section is uniform.
(iii) Whether the proposed DER is located less than 0.5 electrical circuit miles for less than 5 kV or less than 2.5 electrical circuit miles for greater than 5 kV from the substation. In addition, whether the line section from the substation to the point of common coupling is a mainline rated for normal and emergency ampacity.
(iv) Whether the proposed DER incorporates a time delay function to prevent reconnection of the DER to the distribution system until distribution system voltage and frequency are within normal limits for a prescribed time.

(v) Whether operational flexibility is reduced by the proposed DER, such that transfer of the line section or sections of the DER to a neighboring distribution circuit or substation may trigger overloads, power quality issues, or voltage issues.

(vi) Whether the proposed DER employs equipment or systems certified by a recognized standards organization to address technical issues including, but not limited to, islanding, reverse power flow, or voltage quality.

APPENDIX J

PRE-APPLICATION REPORT FORM

Pre-app 1

APPENDIX K

SAMPLE PERIODIC INTERCONNECTION TEST LOG

IEEE 1547 Periodic test and verifications: All interconnection-related protective functions and associated batteries shall be periodically tested at intervals specified by the manufacturer, system integrator, or the authority who has authority over the DR interconnection. Periodic test reports or a log for inspection shall be maintained.

IEEE 1547 Cease to Energize Functionality test: Check the cease to energize functionality by operating a load interrupting device and verify the equipment ceases to energize its output terminals and does not restart/reconnect for the required time delay. The test shall be performed on each phase individually.

The electric utility recommends periodic interconnection tests but not less than the periodic interval specified by the manufacturer. If no testing interval is provided, testing shall occur every two years. The output terminals should cease to energize within 2 seconds of operation (electrically opening) of the load interrupting device during the Cease to Energize Functionality test. Please refer to the manufacturer for more specific information as it relates to the manufacturer recommendations for periodic interconnection tests and reconnect time upon restoration of the load interrupting device (electrically closing).

Date	Time	Cease to Energize Functionality Test: Pass/Fail	Person Performing Test