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August 25, 2020

Via Electronic Mail
Mike Trahan
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Re: Interconnection Best Practices

Dear Mr. Trahan:

You asked for a comparison of Connecticut's distributed energy resource (DER) interconnection guidelines to the national best practices in five areas: hosting capacity analyses, sharing distribution upgrade costs, interconnection ombudsperson, public interconnection queues, and permanent interconnection working groups. This memo identifies best practice in each area, and how those practices benefit Connecticut's customers and electric distribution utilities (EDCs). This memo highlights certain states that are implementing these practices as examples; it does not endeavor to identify every single state implementing these practices.

Shute, Mihaly & Weinberger represents clients in interconnection proceedings across the United States. The firm has worked on over half of the country's interconnection rules and has advised numerous Public Utilities Commissions on how to develop interconnection procedures that reflect the latest policy innovations to ensure a safe, reliable, and efficient interconnection process.

I. Hosting Capacity Analyses

A hosting capacity analysis (HCA) provides the amount of distributed energy resources that can be accommodated on the distribution system under existing grid conditions and operations without adversely impacting operational criteria or requiring significant infrastructure upgrades. The EDCs in Connecticut currently publish maps showing HCA results, however, as described below those maps do not meet the national best practice. An HCA consistent with the best practice would do a better job helping customers site DERs and design DERs that support, rather than strain, the distribution system. Improved HCA maps would benefit customers because the EDCs would receive fewer interconnection applications that require time-consuming study or expensive

upgrades. Instead, with improved information, customers would propose to interconnect DERs with characteristics and at locations that support rather than strain the distribution system. The EDCs' operations would become more efficient, and customers would more efficiently invest their own capital to help state meet its clean energy goals.

The HCAs of utilities in California and Nevada represent the national best practice because they provide an abundant amount of useful information in a user-friendly format. Southern California Edison's HCA map, publicly available at https://ltmdrpep.sce.com/drpep/, is a good example.

Quality HCA maps include two elements: (1) basic distribution system data that requires no specific modeling and (2) the modeled hosting capacity results that identify what amount of DER capacity can be interconnected without triggering upgrades. Compared to the maps of the Connecticut EDCs, SCE's map includes much more basic distribution system data that helps customer determine where to site and how to design DERs. Attachment A to this memo provides a list of basic distribution system that utilities make available their HCA.

The maps in California and Nevada also provide more detail on the HCA results. Rather than providing just one single value representing all types of constraints, they identify a value for each type of constraint (*i.e.*, the capacity that can be accommodated without triggering voltage violations and a separate value showing the capacity that can be accommodated without triggering a thermal violation). In addition, HCA results are provided for various hours throughout the year, recognizing that the hosting capacity can vary significantly through the day and between seasons. Together, this level of granularity is more useful as it is possible for the customer to design systems around specific constraints and also to vary production based upon daily or seasonal limitations.

The California and Nevada maps are updated monthly to reflect system changes. Eversource last updated its map in October 2019 and it is unclear if they plan to update the map again.[1] United Illuminating updates its map on a quarterly basis.[2] With monthly updates, maps provide customers with a reliable estimate of the available level of hosting capacity throughout the year. The benefits provided by an HCA—including preventing interconnection queue backlogs and unlocking the potential for new DERs by informing

[1] CT Pub. Util. Reg. Authority, Dkt. 17-06-02, Eversource Energy's Distributed Energy Resource Hosting Capacity Map Status Report (March 26, 2020).
[2] CT Pub. Util. Reg. Authority, Dkt. 17-06-03, United Illuminating Company's Final Report for Hosting Capacity Analysis and Mapping, at 28 (April 17, 2020).

their siting and design—only materialize when a utility publishes up-to-date results. Customers cannot make decisions based on outdated HCA results.

SCE's map provides users multiple ways to search HCA data, while the Connecticut EDCs' HCAs are not searchable. The searchability of the HCA is fundamental and necessary for it to really be utilized by applicants in a manner that benefits the grid. For example, a customer can use a filter function on SCE's map to find all locations on the distribution system that have enough capacity available to host a solar project over 2 MW, then download the results in a spreadsheet. The California utilities also provide API access to HCA data, which allows customers to load all of the data displayed on the map into the customer's own GIS application and perform machine-based queries. Providing the ability to search the HCA data via the map, and API access, ensures that the data can be fully utilized by customers, regulators, and stakeholders in the most useful format.

DER stakeholders in California and Nevada trust the HCA process because they vetted its inputs and methodology in a working group. Just like a transmission planning process, stakeholders should have the ability to review the inputs and methodology of the HCA. The underlying details of how the methodology is set up and the assumptions therein there really drive whether the information is useful for decision making. The best practice for vetting the HCA's technical details is for PURA to form an HCA working group, chaired by PURA staff, charged with providing recommendations on inputs, assumptions, criteria thresholds, methodology, validation plan, and the format of results, within 6 months. To guide these discussions it is also helpful for the Commission to clearly articulate the use cases for the HCA as that helps determine what functionality is necessary.[3] After the working group submits its report, the regulatory body typically accepts comments from parties on its contents, and then issues an order accepting the report's consensus recommendations resolving any non-consensus issues.

II. Sharing Distribution System Upgrade Costs.

A. Rate Basing Distribution System Upgrades for Small Net Metering Systems.

Small net metering systems normally do not trigger distribution system upgrades. When these systems do trigger upgrades, the costs are significant for one project to bear,

[3] For more information on HCA details, use cases, working groups and methodologies, see Interstate Renewable Energy Council, Optimizing the Grid: A Regulator's Guide to Hosting Capacity Analyses for Distributed Energy Resources (December 2017), available at: https://irecusa.org/publications/optimizing-the-grid-regulators-guide-to-hosting-capacity-analyses-for-distributed-energy-resources/.

but when spread across all projects can be very small. California and New York do not require the applicants of these small net metering systems to pay for all the distribution system upgrades they trigger. This streamlines the administrative costs of interconnection because the utility does not spend time developing cost estimates, collecting deposits, and then reconciling actuals to estimates for the upgrades. It incentivizes utilities to perform, rather than obstruct, these upgrades because they make a return on the capital cost added to rate base. As a result, customers who want to install a small net metering system will encounter few, if any, barriers due to the need for grid upgrades. New York exempts net metering projects at or under 25 kW from paying more than $350 for distribution upgrades,[4] while California exempts net metering projects below 1 MW from paying any distribution upgrade costs.[5]

When implementing this policy, the California Public Utility Commission (CPUC) reasoned that net metering was designed to encourage customer adoption of DERs, and requires the equal treatment of DER customers and load customers.[6] Therefore the CPUC concluded that upgrades triggered by small systems should be rate based, just as upgrades triggered by small load customers are rate based and paid by all customers.[7] Since 2002, the CPUC has tracked distribution upgrade costs incurred under this policy so that it can change the policy should the socialization of these costs prove unreasonable.[8] The CPUC has not changed its policy in the past 18 years, nor to our knowledge has any California utility argued for such a change. The most recent annual reports submitted by the California utilities on net metered projects below 1 MW show that the costs for distribution upgrades, if spread across all applications, would be less than $2 per project in San Diego Gas & Electric's territory (which is probably the most comparable to Connecticut in terms of size) to up to $242 per project in Southern California Edison's

[4] NY Pub. Service Comm., Standardized Interconnection Requirements and Application Process for New Distributed Generators and Energy Storage Systems 5 MW or Less Connected in Parallel with Utility Distribution Systems, Appendix E: Cost Sharing for System Modifications & Cost Responsibility for Dedicated Transformer(s) and Other Safety Equipment for Net Metered Customers (Dec. 2019) (NY SIR) (provided as Attachment B to this memo).
[5] CA Pub. Util. Comm., Dkt. R. 99-10-025, Decision 02-03-057, Opinion Interpreting Public Utilities Code Section 2827, at 14 (March 25, 2002).
[6] *Id*. at 10.
[7] *Id*. at 14 ("Generators eligible for net energy metering . . . are exempt from paying for costs associated with interconnection studies, distribution system modifications, or application review fees.").
[8] *Id*., at 11.

territory.[9] The costs would likely be lower in Connecticut since the overall penetration of solar deployed in California is very high.

B. Sharing Upgrade Costs Among Larger DERs.

There are two ways that states share upgrade costs among larger DERs, both of which are based on practices used to determine the cost allocation of transmission system upgrades: the reimbursement of certain upgrade costs, and a group study process.

For larger projects, New York requires the reimbursement of certain high value distribution system upgrade costs among all DERs that benefit from the upgrade.[10] This sharing ensures that a single project is not responsible for shouldering all of the costs of an upgrade when that upgrade enables the placement of other DERs in future years. Customers are more likely to agree to expensive upgrades with the knowledge that they are likely to reimbursed for some of these costs in the future. To prevent cross-subsidization, such policies should be crafted narrowly to ensure that all projects required to reimburse upgrade costs benefited from that upgrade, the cost are apportioned equitably, and any reimbursements flow back to DER customers in a timely manner.

Other states have implemented a group study process that includes a cost-sharing mechanism for larger projects. Massachusetts and California allow for group interconnection studies and upgrade cost sharing in certain situations.[11]

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[9] San Diego Gas & Electric Co, Advice Letter 3426-E, Information Only Filing Regarding Net Energy Metering Costs (Aug. 30, 2019); Southern California Edison, Advice Letter 4074-E, Information-Only Advice Letter, Southern California Edison Co.'s Report on Net Energy Metering Interconnection Costs (Sept. 19, 2019).

[10] NY SIR, Appendix E (Mandatory cost sharing for upgrades above $250,000. The first project triggering an eligible upgrade pays the entire cost upfront. Subsequent projects above 200 kW benefiting from the upgrade reimburse the first project pro rata based on the total AC watts the upgrade serves.); NY Pub. Service Comm., Dkt. 16-E-0560, Order Adopting Interconnection Management Plan and Cost Allocation Mechanism, and Making Other Findings, at 9-10 (Jan. 25, 2017).

[11] Southern CA Edison, Rule 21, Sheets 72-82, available at https://library.sce.com/content/dam/sce-doclib/public/regulatory/tariff/electric/rules/ELECTRIC_RULES_21.pdf; Mass. Dept. Pub. Util., Dkt. 17-164, Electric Distribution Companies' Proposed Interconnection of Distributed Generation Tariff, Section 3.4.1 - D.P.U. 17-164 Compliance Filing (May 29, 2020) (Proposed Group Study Process Cost Allocation Provisions); Massachusetts Electric Co., Standards for Interconnection of Distributed Generation, at 65, https://ngus.force.com/servlet/servlet.FileDownload?file=0150W00000E6Vhr.

III. Interconnection Ombudsperson.

Connecticut's current interconnection guidelines allow a party to provide a written request for dispute resolution, and if the dispute is not resolved in eight to ten business days, the parties must attempt mediation for thirty days. If mediation is unsuccessful, either party may file a complaint at PURA.[12] It is rare for a customer to reach the end of this process because it is expensive and requires several months of effort before she can file a formal complaint. This means that interconnection disputes often lead a customer to abandon a project because the cost and time required to file a complaint consumes the project's entire profit margin. Moreover, customers often fear retaliation from a utility for filing a formal complaint because the utility continues to act as the interconnection gatekeeper for the customer's other DER projects.

The Interstate Renewable Energy Council's (IREC's) model interconnection procedures, which are based on the dispute resolution practices in California, Massachusetts, and Minnesota, represent the national best practice.[13] Section IV.C includes a well-defined dispute resolution procedure that puts all the facts before a knowledgeable and neutral party who provides a recommendation for a mutually satisfactory solution expeditiously.

The central feature of this process is the designation of a member of the Commission's staff as the Interconnection Ombudsperson.[14] The Interconnection Ombudsperson helps track and facilitate the efficient and fair resolution of disputes between customers and utilities. Having the utility's regulatory body serve in this capacity ensures that the Interconnection Ombudsperson is independent from, and not unduly influenced by, utility management. It also provides the Commission the ability to track informal complaints, understand how well the utility is responding to informal requests for resolution, and visibility into what policies are in need of clarification because they result in lots of disputes. The model interconnection procedures also recognize that there is a need to resolve disputes about timelines more rapidly than other types of disputes, and provides an accelerated timeline for the consideration of timeline disputes.

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[12] Eversource Energy and The United Illuminating Co., Guidelines for Generator Interconnection (Fast Track and Study Processes) § 6.2 (April 5, 2019); Eversource Energy and The United Illuminating Co., Guidelines for the Interconnection of Residential Single Phase Certified Inverter Based Generating Facilities of 20 kW (ac) or Less § 3.2 (April 5, 2019).

[13] Interstate Renewable Energy Council, Model Interconnection Procedures (2019) § IV.C, https://irecusa.org/publications/irec-model-interconnection-procedures-2019 (provided as Attachment C).

[14] *Id.*

Like Connecticut's current guidelines, the process in the model interconnection procedures requires parties to first attempt to work together to amicably resolve the dispute within a specified timeframe. If parties are unable to resolve disputes by working together, they may seek assistance from the Interconnection Ombudsperson to resolve the dispute. If the dispute persists, the customer may file a formal complaint with the Commission.

IV. Public Distribution System Interconnection Queues

All utilities maintain an interconnection queue, and the best practice is for utilities to publish the queue on their websites in a downloadable spreadsheet format, and to update the published queue at least monthly. Sharing the queue with the public is valuable, because it gives all parties greater insight into the interconnection process. Applicants can tell how many projects are ahead of them in line, as well as where those projects are sited, and consider how that might impact their decisions regarding their own projects. Of particular importance are disclosure of the dates that allow visibility into project progress through major milestones in the process, and information about the failure rate of the Fast Track and Supplemental Review screens. Utilities and regulators can also look to the queue to identify and address any bottlenecks or other problems in the process.

The national best practice is for the public queue to contain the data fields found in Attachment 8 to IREC's model procedures.[15] A similar approach has already been adopted in multiple jurisdictions across the country. For example, California requires the publication of a distribution system interconnection queue,[16] Massachusetts requires disclosure of similar information to the State Department of Energy Resources, which then uses this information to generate public information identifying the type and

[15] Interstate Renewable Energy Council, Model Interconnection Procedures, Attachment 8: Public Queue Requirements (provided as Attachment C to this memo).
[16] *See* Pacific Gas and Electric Company, https://www.pge.com/pge_global/common/word_xls/for-our-business-partners/interconnection-renewables/energy-transmission-and-storage/wholesale-generator-interconnection/PublicQueueInterconnection.xls, (accessed Nov. 13, 2018); San Diego Gas & Electric Company, https://www.sdge.com/more-information/customer-generation/wdat-rule21-generation-interconnection-queue, ("SDG&E WDAT & Rule 21 Interconnection Queue") (accessed Nov. 13, 2018); Southern California Edison Company (SCE), https://www.sce.com/wps/portal/home/regulatory/open-access-information (accessed Nov. 13, 2018) ("Public WDAT-Rule 21 Queue").

quantity of DER projects currently in the queue.[17] Other states including Maryland,[18] Minnesota,[19] New York,[20] and Hawaii publish similar data.[21] The public queue should protect customer confidentiality, for example by identifying projects by number rather than the customer's name.

V. Permanent Interconnection Working Group Structure

Establishing a permanent working group allows customers and EDCs the opportunity to dialogue about interconnection issues and, if structured well, is likely to prevent some conflicts. California, Hawaii, Massachusetts, Minnesota, North Carolina, and New York established permanent or semi-permanent interconnection working groups. The most productive working groups are facilitated by professional regulatory staff sitting in an *ex officio* role. When Commission staff facilitate meetings, utilities are more often forthcoming with information and are less likely to take obstructionist positions.

The voting structure also determines how effective a working group is at preventing conflict and speeding up interconnections. Working groups with the best outcomes provide equal votes to DER stakeholders and utilities. When utilities have more votes, and can veto any DER advocates' proposal, working groups are less productive. Effective working groups also provide DER stakeholders representing small rooftop projects and larger projects individual votes, as the interests of these groups sometimes diverge. Other stakeholders, such as independent system operators and ratepayer advocates, often sit in an *ex officio* role. Their input informs the discussion, but they need not vote on recommendations or attend every meeting.

Some states, such as New York, established separate working groups for policy and technical issues. When this occurs, the most inclusive process authorizes either

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[17] *See* Erica McConnell & Cathy Malina, *Knowledge is Power: Access to Grid Data Improves the Interconnection Experience for All*, Greentech Media (Jan. 31, 2017), https://www.greentechmedia.com/articles/read/knowledge-is-power-access-to-grid-data-and-improves-the-interconnection-exp.
[18] Md. Code Regs. 20.50.09.06.L.3.
[19] MN Pub. Util. Comm., Dkt. E-999/CI-16-521,Order Establishing Updated Interconnection Process and Standard Interconection [sic] Agreement, at 4 (Aug. 13, 2018).
[20] *See* NY State Dept. of Pub. Service, *SIR Inventory Information*, http://www3.dps.ny.gov/W/PSCWeb.nsf/All/286D2C179E9A5A8385257FBF003F1F7E?OpenDocument (accessed Nov. 13, 2018)
[21] *See* Hawaiian Electric, *Integration Tools and Resources,* https://www.hawaiianelectric.com/clean-energy-hawaii/integration-tools-and-resources/integrated-interconnection-queue (accessed Nov. 13, 2018).

working groups to discuss any issue that its members take an interest in. Many interconnection topics involve an overlap between policy and technical issues; those topics may be heard by either or both working groups.

The most effective working groups are open to any person who wishes to participate (however, voting is often restricted to certain individuals). It is often harder for nonprofits and other DER stakeholders to consistently provide licensed engineers to participate in workgroups on their behalf. Allowing any person to participate ensures that any productive advocate can work with utility engineers to advance the conversation in the technical working group. Access should only be limited if there is a consistent issue identified with how parties are participating, typically there is effective self selection and no need to prevent access to the process.

Working groups are sometimes able to reach consensus on certain policies. In that case, regulatory bodies can authorize the working group incorporate consensus decisions into a technical standards document that is a binding on EDCs and customers.

However, some working groups decisions require the regulatory body to modify one of its orders or rules. In those cases, it is helpful for the regulatory body to have an established process for considering and accepting recommendations from the working group. One effective model is to allow the working group to file reports and recommendations (whether consensus or non-consensus) in a formal docket. If the report requests commission action, the commission then establishes a practice of accepting comments, and then acting on, the recommendation in a timely manner.

A monthly cadence for working group meetings is likely appropriate as the working group launches, but may be too frequent in the long-term. After an initial launch period for the working group, quarterly meetings are likely a better cadence, as they would allow all stakeholders time to craft proposals after discussions on technical issues.

Please do not hesitate to contact me if you have any questions about the practices described in this memorandum.

Very truly yours,

SHUTE, MIHALY & WEINBERGER LLP

Yochanan Zakai

Attachment A	Basic Distribution System Data Available in Hosting Capacity Maps
Attachment B	NY Pub. Service Comm., Standardized Interconnection Requirements and Application Process for New Distributed Generators and Energy Storage Systems 5 MW or Less Connected in Parallel with Utility Distribution Systems, Appendix E: Cost Sharing for System Modifications & Cost Responsibility for Dedicated Transformer(s) and Other Safety Equipment for Net Metered Customers.
Attachment C	Interstate Renewable Energy Council, Model Interconnection Procedures (2019)

cc: Sky Stanfield

ATTACHMENT A

Attachment A

Basic Distribution System Data Available in Hosting Capacity Maps

Substation Data
Name or identification number
Voltages
Substation transformers nameplate rating
Existing Generation (weekly refresh rate)
Queued Generation (weekly refresh rate)
Total Generation (weekly refresh rate)
8760 Load profile by substation and transformer
Percentage of residential, commercial, industrial customers
Currently scheduled upgrades
Has protection and/or regulation been upgraded for reverse flow (yes/no)
Number of substation transformers and whether a bus-tie exists
Notes (include any other relevant information to help guide interconnection applicants, including electrical restrictions, known constraints, etc.)

Feeder Data
Name or identification number
Which substation the feeder connects to
Feeder voltage
Number of phases
Which substation transformer the feeder connects to
Feeder type: radial, network, spot, mesh etc.
Feeder length
Feeder conductor size and impedance
Service Transformer rating
Service Transformer daytime minimum load
Existing Generation (weekly refresh rate)
Queued Generation (weekly refresh rate)
Total Generation (weekly refresh rate)
8760 Load profile
Percentage of residential, commercial, industrial customers
Currently scheduled upgrades
Notes (other relevant information to help guide interconnection applicants)

ATTACHMENT B

New York Public Service Commission

Standardized Interconnection Requirements and Application Process for New Distributed Generators and Energy Storage Systems 5 MW or Less Connected in Parallel with Utility Distribution Systems

December 2019

APPENDIX E

COST SHARING FOR SYSTEM MODIFICATIONS & COST RESPONSIBILITY FOR DEDICATED TRANSFORMER(S) AND OTHER SAFETY EQUIPMENT FOR NET METERED CUSTOMERS

Generator Type	Generator Size	Equipment Cost to **Residential** Net Metered Customers	Equipment Cost to **Non-Residential** Net Metered Customers****
Micro-CHP	Less than or equal to 10 kW	$350 maximum	N/A
Fuel Cell	Less than or equal to 10 kW	$350 maximum	As determined by Utility*
Fuel Cell	Over 10 kW up to 2MW	N/A	As determined by Utility*
Solar	Less than or equal to 25 kW	$350 maximum	$350 maximum
Solar****	Over 25 kW up to 2 MW	N/A	As determined by Utility*
Micro-hydroelectric	Less than or equal to 25 kW	$350 maximum	As determined by Utility*
Micro-hydroelectric	Over 25 kW up to 2 MW	N/A	As determined by Utility*
Wind **	Less than or equal to 25 kW	$750 maximum	$750 maximum
Wind	Over 25 kW up to 2 MW	N/A	As determined by Utility*
Farm Wind ***	Over 25 kW up to 500 kW	N/A	$5,000 maximum***
Farm Waste ***	Up to 2 MW	N/A	$5,000 maximum***

* Subject to review by the Commission at the request of the Customer. Such costs can include the total costs for upgrades to ensure the adequacy of the distribution system which would not have been necessary but for the interconnection of the net metered DG resource (as per PSL §66-l(3)(c)(iii)).

** Residential and Non-Residential Wind Customers with a total rated capacity up to 25 kW, Farm Wind may be required to also pay for feeder line upgrades that would not be required but for the interconnection of the net metered DG resource. Residential and Non-Residential Wind, and Farm Wind Customers are responsible for all feeder line upgrade costs if the total nameplate rating of the generating equipment exceeds 20% of the rated capacity of the feeder line (as per PSL §66-l(5)(c)(ii)). Farm Wind Customers are responsible for 50% of feeder line upgrade costs if the total nameplate rating of the generating equipment does not exceed 20% of the rated capacity of the feeder line (as per PSL §66-l(2)).

*** For Farm Wind projects with a total nameplate rating of the generation equipment that does not exceed 20% of the rated capacity of the local feeder line to which the project will connect, that portion of the CESIR costs related to transformers or other equipment installed at the customer's site is included in the $5,000 limitation; however, the customer is also responsible for 50% of the CESIR costs related to feeder line upgrades. Farm Wind projects with a total nameplate rating of the generation equipment that does exceed 20% of the rated capacity of the local feeder line to which the project will connect, CESIR costs related to transformers or other equipment installed at the customer's site is included in the $5,000 limitation; however, Farm Wind customers are responsible for the CESIR costs related to feeder line upgrades.

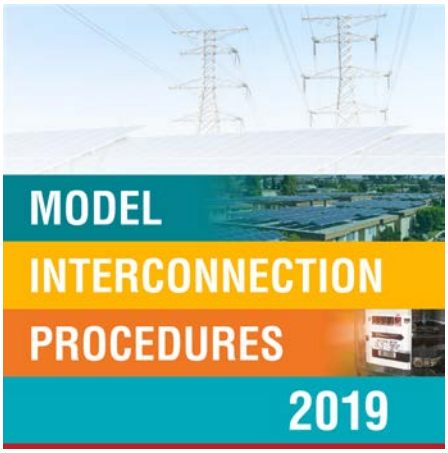
**** The first project triggering an eligible upgrade will initially bear 100% of the cost, while subsequent projects benefitting from those upgrades will reimburse the first project developer. The share of the costs paid by subsequent developers shall be calculated by the utility as the ratio of the total upgrade cost to the total AC watts the upgrade serves. If a third project uses the upgrade, the utility will perform a new calculation based on the new number of total watts served; the third project will pay its share and the utility will divide the third project's contribution among the first two projects. Sharing continues according to this formula until the capacity of the upgrade is used up or the net costs to the participating projects falls to $100,000 or lower, whichever comes first. The utilities shall administer the allocation process and track the payments among contributing projects. The utilities are authorized to collect a $750 fee from applicants for processing each reimbursement. The Equipment Upgrade Cost Sharing Requirement is limited in several ways. First, cost sharing only applies to substation 3V0 protection, substation transformer upgrades, and other substation-level shared upgrades. Second, only those upgrades that cost in excess of $250,000 are subject to sharing. Third, projects below 200 kW AC in size are not required to participate.

ATTACHMENT C

MODEL INTERCONNECTION PROCEDURES

2019

IREC



Interstate Renewable Energy Council

September 2019

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About IREC

IREC builds the foundation for rapid adoption of clean energy and energy efficiency to benefit people, the economy, and the planet. Our vision is a 100% clean energy future that is reliable, resilient, and equitable. IREC is an independent, not-for-profit 501(c)(3) organization that relies on the generosity of donors, sponsors, and public and private program funders to support our work.

INTRODUCTION

Initially developed in 2005 and updated in 2009 and 2013, *IREC's Model Interconnection Procedures, 2019 Edition* (2019 Model Procedures) synthesize and reflect the evolving best practices for safe and reliable interconnections of distributed energy resources (DERs)[1] on the electricity grid. For nearly 15 years, this publicly available, complimentary resource has helped guide and inform state utility regulators, energy industry professionals, utilities, policymakers, and other energy DER stakeholders as they develop and/or refine the rules for grid access. The goal of these Model Procedures is to streamline the process for safe and reliable interconnection for all DER customers, while also helping states and utilities save time and resources as they address interconnection issues.

These Model Procedures are informed by IREC's active intervention in dozens of state interconnection rulemakings over the years and participation in the Federal Energy Regulatory Commission (FERC) process to develop and update the Small Generator Interconnection Procedures (SGIP). In addition, IREC's consultation and coordination with DER developers, trade associations, utilities, manufacturers, national laboratories, consumer advocates, regulators, and other energy stakeholders informs our evolving understanding of interconnection issues and emerging best practices.

The 2019 Model Procedures reflect the latest evolutions in processes, practices and technologies that can facilitate higher penetrations of DERs on the grid, while still maintaining grid safety and reliability. The components of the procedures are intended to ensure a more efficient and cost-effective project development process, which saves money and time for consumers, developers and utilities alike. Among other changes, the 2019 Model Procedures include the following important updates:

- ***Interconnection of Energy Storage Systems:*** The procedures establish an initial framework for review of energy storage systems seeking to connect to the distribution grid. Although this is an evolving space, the guidance provided herein is intended to begin to address the uniquely flexible and controllable nature of energy storage.

- ***Requirements for Publishing a Public Queue and Reporting:*** New requirements have been added to ensure key data is publicly available, so all stakeholders have fair access to information about how the interconnection process is proceeding to inform decision-making.

- ***Updated Dispute Resolution Process:*** These new provisions include the creation of an interconnection ombudsperson role to provide for a neutral third party to help resolve and mitigate interconnection disputes more efficiently. A fair and efficient dispute resolution process can help address interconnection challenges, while also avoiding the need for more time-intensive complaints before the utility commissions.

[1] The term Distributed Energy Resources, or DERs, refers to resources located on the distribution system (in front of or behind the customer meter).

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- ***Clarification to the Material Modifications Provisions:*** These changes clarify what level of change requires a resubmittal of the interconnection application, for both existing interconnected projects and projects in the queue.

IREC's 2019 Model Procedures provide guidance and best practices on the following important issues and related questions impacting the interconnection of DERs to the grid. Ideally, the questions within each category should be clearly addressed in statewide interconnection procedures to clarify the process for all involved stakeholders.

APPLICABILITY & ELIGIBILITY

1. Does the state have interconnection standards that apply uniformly to all utilities within the state's jurisdiction?

2. Are the interconnection standards applicable to all projects or are there size or design limitations that may prevent state jurisdictional projects from having a clear path to interconnection?

3. What DERs are covered by the interconnection standards?

4. Is energy storage explicitly addressed, defined, and given a clear path to proceed through the interconnection review process?

SYSTEM SIZE & REVIEW PROCESS

5. What are the size limits for the different levels of review?

6. Is there an option to have expedited review process for small, inverter-based systems unlikely to trigger adverse system impacts? (e.g., under 25 kW)

7. Is there an option for a Fast Track review process for larger DERs (e.g., up to 5 MW) that utilizes a set of technical screens to determine whether projects are unlikely to require system upgrades and/or negatively impact the safety and reliability of the grid?

8. What technical screens are applied for the Fast Track review process?

9. Is there a transparent Supplemental Review Process for interconnection applications that fail the Fast Track screens?

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TIMELINES

10. Are both the utility and the interconnection customer meeting established timelines?

11. What methods, approaches and tools are in place to improve the timeliness of the interconnection process (e.g., electronic application submittal, tracking and signatures)?

12. Is there an explicit process to clear projects from the interconnection queue if they do not progress?

13. Are there clear timelines for construction of upgrades or meter installs?

DISPUTE RESOLUTION

14. Is there a clear, efficient and fair dispute resolution process?

INFORMATION SHARING & TRANSPARENCY

15. Is there a Pre-Application report that allows DER customers to obtain (for a reasonable fee) basic information about their proposed point of interconnection *prior* to submitting a full interconnection application?

16. Is there a transparent reporting process and publication of the interconnection queue to allow customers and regulators to see how projects in the queue are progressing?

Beyond the issues addressed in IREC's Model Procedures, there are a number of interconnection-related questions that states and utilities will need to address as a result of the adoption of *IEEE Standard 1547™-2018 for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces* ("IEEE Std 1547™-2018" or the "Standard"). This voluntary, nationally applicable Standard by the Institute of Electrical and Electronics Engineers will transform how DERs interact with and function on the electric distribution system. More specifically, the Standard requires DERs to be capable of providing specific grid support functionalities relating to voltage, frequency, communications and controls. Once widely utilized, these functionalities will enable higher penetration of DERs on the grid, while maintaining grid safety and reliability and providing new grid and consumer benefits.

Any current state rules and utility interconnection procedures that are based on IEEE Std 1547™-2003 will need to be updated to reflect these recent revisions. Clearly defining DER settings in statewide interconnection rules will help increase efficiency, minimize confusion, and reduce costs. States or utilities which have not yet adopted interconnection rules could begin the process today with IEEE Std 1547™-2018 in mind, to avoid having to amend their rules again later (which could be inefficient and resource intensive for all involved stakeholders). IREC's

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Making the Grid Smarter: Primer on Adopting the New IEEE Std 1547™-2018 for Distributed Energy Resources provides a helpful summary of these issues and the corresponding policy considerations for states, utilities and other stakeholders. The primer is available along with other related IREC resources at www.irecusa.org.

Lastly, since IREC's Model Procedures were last updated in 2013, the market for energy storage has evolved significantly, which introduces new considerations into the interconnection process. For example, energy storage systems are controllable in a way not typically seen with distributed generation. In addition, many energy storage systems can be designed with the capability to limit or prevent export onto the grid. In some cases, an inverter-based power control system may have limited amounts of inadvertent export while the system responds to changes in load fluctuation. As a result of these unique characteristics, best practices for how best to analyze the grid impacts of energy storage are still emerging. These Model Procedures recognize these concepts and create an initial framework for reviewing energy storage and verifying energy storage system capabilities. However, the procedures do not resolve the question of how projects that inadvertently export should be evaluated in the screening process. IREC anticipates that the interconnection of energy storage will rapidly evolve in the coming years and looks forward to providing further updates as best practices emerge.

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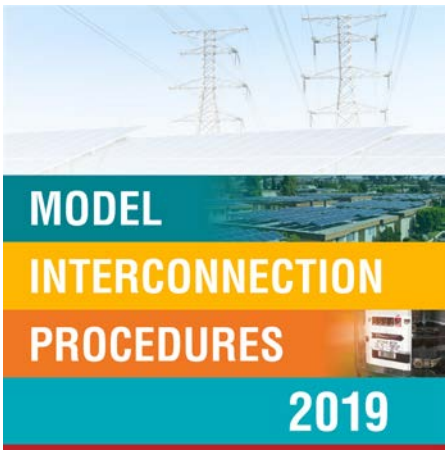

MODEL INTERCONNECTION PROCEDURES

TABLE OF CONTENTS

ATTACHMENTS

I. OVERVIEW

A. Scope

These Interconnection Procedures are applicable to all state-jurisdictional interconnections of Generating Facilities, including Energy Storage Devices.[1]

B. Order of Review

1. Optional Pre-Application Report: Potential applicants may request this optional report in order to get information about system conditions at their proposed Point of Interconnection without submitting a full interconnection Application.

2. Interconnection Review: There are four interconnection review paths, Levels 1 through 4, with options to undertake Supplemental Review and/or an Applicant Options Meeting prior to entering Level 4. The Utility will process the Applications in the order of their queue position as established by Section I.C.3 unless the Application is part of a group study pursuant to Section I.C.5.

   The four interconnection review paths are:

   a. Level 1 - For Certified inverter-based Generating Facilities that have a Nameplate Rating of 25 kilowatts (kW)[2] or less.

   b. Level 2 - For Generating Facilities that have a Nameplate Rating of up to 5 megawatts (MW), depending on line capacity and distance from substation, as detailed in the table in Section III.B.2.a.

   c. Level 3 - For Generating Facilities up to 10 MW that do not export power to the Utility (other than Inadvertent Export).

   d. Level 4 - For all Generating Facilities that do not qualify for Level 1, 2 or 3.

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[1] Depending on state law, individual utility procedures may govern interconnections, particularly for municipal and cooperative utilities and public utility districts. These model Interconnection Procedures may be modified to apply to a particular utility. State or utility procedures do not apply when the U.S. Federal Energy Regulatory Commission (FERC) has jurisdiction over the interconnection, as is the case for many transmission interconnections, and on rare occasions, for distribution interconnections.

[2] Throughout these Interconnection Procedures, all rated capacity figures are measured in alternating current (AC).

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C. Application Submission and Processing

1. Submission: The Applicant shall submit the Application (in either Attachment 3 or Attachment 4) to the Utility along with the applicable processing fee or deposit. No additional fees for processing of the Application shall be required unless specified in these Interconnection Procedures.

2. Completeness Review: The Utility shall record the date and time of the Application's receipt. The Utility shall notify the Applicant within three (3) Business Days that the Application has been received. Within ten (10) Business Days of receipt, the Utility shall notify the Applicant whether the Application is complete. If the Application is incomplete, the Utility shall provide the Applicant with a list of all information that the Applicant must provide to complete the Application. The Applicant must provide the requested information within ten (10) Business Days, or the Application will be deemed withdrawn.

3. The Queue: The Utility shall assign the Application a queue position based on when it is deemed complete under Section I.C.2. The Utility shall maintain a single queue, which may be sortable by geographic region (e.g., feeder or substation).[3] The queue shall contain all of the information listed in Attachment 8. The queue shall be publicly available on the Utility's website and shall be updated at least monthly.

4. Modifications to Application or to an Existing Generating Facility:

    a. At any time after an Application is deemed complete, including after the receipt of Fast Track, Supplemental Review, System Impact Study, and/or Facilities Study results, the Applicant or the Utility may identify modifications to the planned Generating Facility that may improve the costs and benefits (including reliability) of the Generating Facility, and/or the ability of the Utility to accommodate the interconnection. An existing Generating Facility may also propose such modifications. The

[3] Alternately, some states allow the maintenance of a separate queue for small projects proceeding under expedited review procedures such as the Level 1 review process. These projects are typically able to move ahead rapidly without the need for upgrades that impact other project and thus it is feasible to create a separate queue for these projects. In any case, the queue should be published in a manner that protects customer confidentiality. Also, if there is a delay in reviewing the completeness of applications, they shall be reviewed in the order received so that queue position is not undermined.

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Applicant shall submit to the Utility, in writing, all proposed modifications to any information provided in the Application or Interconnection Agreement for existing Generating Facilities. The Utility may not unilaterally modify the Application.

b. Within ten (10) Business Days of receipt of a proposed modification, the Utility shall notify the Applicant whether a proposed modification to either an Application or an existing Generating Facility constitutes a Material Modification.

   i. If the proposed modification is determined to be a Material Modification, then the Utility shall notify the Applicant in writing that the Applicant may: 1) withdraw the proposed modification; or 2) proceed with a new Application for such modification. The Applicant shall provide its determination in writing to the Utility within ten (10) Business Days after being provided the Material Modification determination results. If the Applicant does not provide its determination, the proposed modification shall be deemed withdrawn.

   ii. If the proposed modification is determined not to be a Material Modification, then the Utility shall notify the Applicant in writing that the modification has been accepted and that the Applicant shall retain its eligibility for interconnection, including its place in the interconnection queue. Existing generating facilities may make the modification without requiring a new Application.

c. Any dispute as to the Utility's determination that a modification constitutes a Material Modification shall proceed in accordance with the dispute resolution provisions in Section IV.C of these procedures.

d. Any modification to machine data, equipment configuration, or to the interconnection site of the Generating Facility not agreed to in writing by the Utility and the Applicant may be deemed a withdrawal of the Application and may require submission of a new Application, unless proper notification of each Party by the other as described in Sections I.C.4.a and I.C.4.b. The terms of the

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Interconnection Agreement apply for existing Generating Facilities.

5. Group Study: In some instances, typically where multiple Generating Facilities are electrically interrelated, studying them jointly in a group study process could increase cost and time efficiencies. If the Utility and the Applicant mutually agree, the Application may be studied in a group with other applications.[4]

6. Continued Review: If an Application is denied approval for interconnection under one level, but the Applicant decides to continue with review under another level within ten (10) Business Days of receipt of that denial, the Applicant shall retain its original queue position.

D. Applicable Standards

Unless waived by the Utility, a Generating Facility must comply with the standards identified in Attachment 2, as applicable.

II. PRE-APPLICATION REPORT[5]

A. Pre-Application Report Request

1. A Pre-Application Report Request shall include:

   a. Contact information (name, address, phone number, and email address).

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[4] In markets with substantial interconnection activity it can be difficult for utilities to complete studies in a timely manner where there are many projects in the queue. Some states have created group or cluster study processes to try to move the study process faster. Group studies do create additional complexities, however, and no best practice has emerged on how to best handle them. It does make sense to allow them where a natural group of projects emerge (particularly where one developer is the proponent for multiple projects) and there can be a group study timeline and cost allocation worked out on a mutually agreeable basis.

[5] In addition to Pre-Application Reports, some utilities are now publishing publicly available maps of their systems, which provide basic information such as line voltage and capacity at specific points on the systems, or even offer actual calculated hosting capacity for each node. Adoption of mapping tools enable customers to get information without requiring utility staff time and can reduce the number of requests for Pre-Application Reports. California's Rule 21 also provides for an Enhanced Pre-Application Report. For an additional fee, an applicant can request additional packages of information from the utility, including information about minimum load, existing upstream protection devices, available fault current at the proposed Point of Interconnection, transformer data, and primary and secondary services characteristics. These can help applicants design projects more correctly from the start with fewer surprises later in the process.

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b. A proposed Point of Interconnection. The proposed Point of Interconnection shall be defined by latitude and longitude, site map, street address, utility equipment number (e.g., pole number), meter number, account number, or some combination of the above sufficient to clearly identify the location of the Point of Interconnection.

c. Generating Facility type (e.g., solar, wind, combined heat and power, storage, solar plus storage, etc.).

d. Nameplate Rating and Generating Capacity (if different).

e. Single- or three-phase configuration.

f. Whether generator is stand-alone or will service on-site load.

g. Whether new service is requested.

h. $300 non-refundable processing fee.

2. In requesting a Pre-Application Report, a potential Applicant understands that:

a. The existence of "available capacity" in no way implies that an interconnection up to this level may be completed without impacts because there are many variables studied as part of the interconnection review process.

b. The distribution system is dynamic and subject to change.

c. Data provided in the Pre-Application Report may become outdated and not useful at the time of submission of the complete Application.

B. Pre-Application Report

1. Within ten (10) Business Days of receipt of a completed Pre-Application Report Request, the Utility shall provide a Pre-Application Report. The Pre-Application Report shall include the following information, if available:

a. Total capacity (MW) of substation/area bus or bank and circuit likely to serve proposed site.

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b. Aggregate existing Generating Capacity (MW) interconnected to the substation/area bus or bank and circuit likely to serve proposed site.

c. Aggregate queued Generating Capacity (MW) proposing to interconnect to the substation/area bus or bank and circuit likely to serve proposed site.

d. Available capacity (MW) of substation/area bus or bank and circuit likely to serve proposed site. Available capacity is the total capacity less the sum of existing and queued Generating Capacity, accounting for all load served by existing and queued generators. Note: Generators may remove available capacity in excess of their Generating Capacity if they serve on-site load and utilize export controls which limit the their Generating Capacity to less than their nameplate rating.

e. Whether the proposed Generating Facility is located on an area, spot or radial network.

f. Substation nominal distribution voltage or transmission nominal voltage if applicable.

g. Nominal distribution circuit voltage at the proposed site.

h. Approximate circuit distance between the proposed site and the substation.

i. Relevant Line Section(s) and substation actual or estimated peak load and minimum load data, when available.

j. Number and rating of protective devices and number and type of voltage regulating devices between the proposed site and the substation/area.

k. Whether or not three-phase power is available at the site and/or distance from three-phase service.

l. Limiting conductor rating from proposed Point of Interconnection to distribution substation.

m. Based on proposed Point of Interconnection, existing or known constraints such as, but not limited to, electrical dependencies at that location, short circuit interrupting capacity issues, power quality or stability issues on the circuit, capacity constraints, or secondary networks.

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n. Any other information the Utility deems relevant to the Applicant.

2. The Pre-Application Report need only include pre-existing data. A Pre-Application Report request does not obligate the Utility to conduct a study or other analysis of the proposed project in the event that data is not available. If the Utility cannot complete all or some of a Pre-Application Report due to lack of available data, the Utility will provide the potential Applicant with a Pre-Application Report that includes the information that is available and identify the information that is unavailable.

3. Notwithstanding any of the provisions of this Section, the Utility shall, in good faith, provide Pre-Application Report data that represents the best available information at the time of reporting.

III. INTERCONNECTION REVIEW

A. Level 1: Screening Criteria and Process for Certified Inverter-Based Generating Facilities Not Greater than 25 kW

1. Application: An Applicant must submit a Level 1 Application, pursuant to Section I.C.1, using the standard form provided in Attachment 3 to these Interconnection Procedures, which may be sent electronically to a recipient designated by the Utility. An Applicant executes the standard Interconnection Agreement for Level 1 by submitting a Level 1 Application. A Utility may elect to charge a standard Application fee of up to $100 for Level 1 review.[6]

2. Applicable Screens:

   a. Facility Size: The Generating Facility has a Nameplate Rating not greater than 25 kW and is using a UL 1741 Certified inverter.

   b. For interconnection of a Generating Facility to a radial distribution circuit, the Generating Facility's Generating Capacity[7] aggregated

[6] Most states apply a Level 1 Application fee in the $100 to $200 range, though a number of states have chosen to waive the fee for net-metered facilities. In general, the appropriate fee should ensure that the Utility is compensated, on average, for a conducting reasonably efficient process. This can be achieved by requiring a utility to provide data regarding its actual costs for processing Level 1 applications and how many Level 1 applications it processes. This same approach should be used for setting any fee in these Interconnection Procedures.

[7] Currently there is no best practice for how Screen 2.b (Section III.A.2.b) should address the potential for Inadvertent Export from Generating Facilities incorporating the methods in Section IV.E.5 or IV.E.6 to limit their Generating Capacity. Whether the Generating Capacity, as proposed here, or Nameplate Rating is more appropriate for study under Screen 2.b (Section III.A.2.b) should be addressed as part of individual states' review and update of their interconnection procedures.

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with all other generation capable of exporting energy on a Line Section will not exceed 15 percent of the Line Section's[8] annual peak load as most recently measured at the substation or calculated for the Line Section.

c. If the Generating Facility is to be interconnected on a single-phase shared secondary, then the aggregate generation capacity on the shared secondary, including the Generating Facility's Generating Capacity, will not exceed 65 percent of the transformer nameplate power rating.

d. If the Generating Facility is single-phase and is to be interconnected on a transformer center tap neutral of a 240-volt service, its addition will not create an imbalance between the two sides of the 240-volt service of more than 20 percent of the nameplate rating of the service transformer.

e. For interconnection of a Generating Facility within a Spot Network or Area Network, the aggregate Nameplate Rating including the Generating Facility's Nameplate Rating may not exceed 50 percent of the Spot Network or Area Network's anticipated minimum load. If solar energy Generating Facilities are used exclusively, only the anticipated daytime minimum load shall be considered. The Utility may select any of the following methods to determine anticipated minimum load:

   i. the Spot Network or Area Network's measured minimum load in the previous year, if available;

   ii. five percent of the Spot Network or Area Network's maximum load in the previous year;

   iii. the Applicant's good faith estimate, if provided; or

   iv. the Utility's good faith estimate if provided in writing to the Applicant along with the reasons why the Utility

[8] Clarification of the relevant Line Section is sometimes necessary. If the point of common coupling is downstream of a line recloser, include those medium voltage (MV) Line Sections from the recloser to the end of the feeder. If the 15 percent criterion is passed for aggregate distributed generation and peak load at first upstream recloser, then the screen is passed. If the point of common coupling is upstream of all line reclosers (or none exist), include aggregate distributed generation relative to peak load of the feeder measured at the substation. If the 15 percent criterion is passed for the aggregate distributed generation and peak load for the whole feeder, then the screen is passed. A fuse must be manually replaced and is therefore not considered an automatic sectionalizing device.

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considered the other methods to estimate minimum load inadequate.

3. Time to process screens: Within seven (7) Business Days after the Utility notifies the Applicant that the Application is complete, the Utility shall notify the Applicant whether the Generating Facility meets all of the applicable Level 1 screens.

4. Screens failure: Despite the failure of one or more screens, the Utility, at its sole option, may approve the interconnection provided such approval is consistent with safety and reliability. If the Utility cannot determine that the Generating Facility may nevertheless be interconnected consistent with safety, reliability, and power quality standards, the Utility shall provide the Applicant with specific information on the reason(s) for failure in writing. In addition, the Utility shall allow the Applicant to select one of the following, at the Applicant's option:

   a. Undergo Supplemental Review in accordance with Section III.D; or

   b. Continue evaluating the Application under Level 4, Section III.F.

   The Applicant must notify the Utility of its selection within ten (10) Business Days or the Application will be deemed withdrawn.

5. Approval: If the proposed interconnection passes the screens, the Application shall be approved, and the Utility will provide the Applicant an executable Interconnection Agreement within the following timeframes.

   a. If the proposed interconnection requires no construction of facilities by the Utility on its own system,[9] the Utility shall provide the Applicant with a copy of the Level 1 Application form, signed by the Utility, forming the Level 1 Interconnection Agreement, at the time the screen results are provided. If the Utility does not notify an Applicant whether an Application is approved or denied in writing within twenty (20) Business Days after notification of the Level 1 review results, the Interconnection Agreement signed by the Applicant as part of the Level 1 Application shall be deemed effective.

   b. If the proposed interconnection requires Interconnection Facilities or any distribution system modifications, the Application shall be

[9] This sub-provision (a) permits the installation of any metering or other commercial devices.

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processed under Level 2 starting at Section III.B.5 and shall use the Interconnection Agreement in Attachment 5 associated with the Level 2 process. The Applicant shall be notified of this upon receiving notification of the screen results.

6. Unless extended by mutual agreement of the Parties, within six (6) months of formation of an Interconnection Agreement or six (6) months from the completion of any upgrades, whichever is later, the Applicant shall commence operation of the Generating Facility. The Applicant must provide the Utility with at least ten (10) Business Days' notice of the anticipated start date of the Generating Facility.

7. Within ten (10) Business Days of receiving the notice of the anticipated start date of the Generating Facility, the Utility may conduct an inspection of the Generating Facility at a time mutually agreeable to the Parties. If the Generating Facility passes the inspection, the Utility shall provide written notice of the passage within three (3) Business Days. If a Generating Facility initially fails a Utility inspection, the Utility shall offer to redo the inspection at the Applicant's expense at a time mutually agreeable to the Parties. If the Utility determines that the Generating Facility fails the inspection, the Utility must provide the Applicant with a written explanation detailing the reasons for the failure and any standards violated. If the Utility determines no inspection is necessary, it shall notify the Applicant within three (3) Business Days of receiving the notice of the anticipated start date.

8. An Applicant may begin interconnected operation of a Generating Facility provided that there is an Interconnection Agreement in effect, the Utility has received proof of the electrical code official's approval, and the Generating Facility has received written notice that it passed any inspection required by the Utility or received notice that none is required.[10] Evidence of approval by an electric code official includes a signed Certificate of Completion in the form of Attachment 6 or other inspector-provided documentation.

B. Level 2: Screening Criteria and Process for Generating Facilities Meeting Specified Size Criteria Up to 5 MW, Depending on Line Capacity and Distance from Substation

1. Application: An Applicant must submit a Level 2 Application, pursuant to Section I.C, using the standard form provided in Attachment 4 to these

[10] Upon interconnected operation, the Applicant becomes an Interconnection Customer.

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Interconnection Procedures, which may be sent electronically to a recipient designated by the Utility. A Utility may elect to charge a standard Application fee of up to $100 plus $10 per kW of Nameplate Rating up to a maximum of $2,000 for Level 2 review.

2. Applicable screens:

a. Facility Size: Generating Facility's Nameplate Rating does not exceed the limits identified in the table below, which vary according to the voltage of the line at the proposed Point of Interconnection. Generating Facilities located within 2.5 miles of a substation and on a main distribution line with minimum 600-amp capacity are eligible for Level 2 interconnection under higher thresholds.

Line Capacity	**Level 2 Eligibility**	
	Regardless of location	**On ≥ 600 amp line and ≤ 2.5 miles from substation**
≤ 4 kV	< 1 MW	< 2 MW
5 kV – 14 kV	< 2 MW	< 3 MW
15 kV – 30 kV	< 3 MW	< 4 MW
31 kV – 60 kV	≤ 4 MW	≤ 5 MW

b. For interconnection of a Generating Facility to a radial distribution circuit, the Generating Facility's Generating Capacity[11] aggregated with all other generation capable of exporting energy on a Line Section will not exceed 15 percent of the Line Section's[12] annual peak load as most recently measured at the substation or calculated for the Line Section.

c. The Generating Facility, aggregated with other generation on the

[11] Currently there is no best practice for how Screen 2.b should address the potential for Inadvertent Export from Generating Facilities incorporating the methods in Section IV.E.5 or IV.E.6 to limit their Generating Capacity. Whether the Generating Capacity, as proposed here, or Nameplate Rating is more appropriate for study under Screen 2.b (Section III.B.2.b) should be addressed as part of individual states' review and update of their interconnection procedures.

[12] Clarification of the relevant Line Section is sometimes necessary. If the point of common coupling is downstream of a line recloser, include those medium voltage (MV) Line Sections from the recloser to the end of the feeder. If the 15% criterion is passed for aggregate distributed generation and peak load at first upstream recloser, then the screen is passed. If the point of common coupling is upstream of all line reclosers (or none exist), include aggregate distributed generation relative to peak load of the feeder measured at the substation. If the 15% criterion is passed for the aggregate distributed generation and peak load for the whole feeder, then the screen is passed. A fuse must be manually replaced and is therefore not considered an automatic sectionalizing device.

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distribution circuit, will not contribute more than 10 percent to the distribution circuit's maximum Fault Current at the point on the high-voltage (primary) level nearest the proposed Point of Common Coupling.

d. The Generating Facility, aggregated with other generation on the distribution circuit, will not cause any distribution protective devices and equipment (including but not limited to substation breakers, fuse cutouts, and line reclosers), or Utility customer equipment on the system, to exceed 90 percent of the short circuit interrupting capability; nor is the interconnection proposed for a circuit that already exceeds 90 percent of the short circuit interrupting capability.

e. The Generating Facility complies with the applicable type of interconnection, based on the table below. This screen includes a review of the type of electrical service provided to the Interconnecting Customer, including line configuration and the transformer connection to limit the potential for creating over-voltages on the Utility's Electric Delivery System due to a loss of ground during the operating time of any Anti-Islanding function.

This screen does not apply to Generating Facilities with a gross rating of 11 kVA or less.[13]

Primary Distribution Line Configuration	Type of Interconnection to be Made to the Primary Circuit	Results/Criteria
Three-phase, three-wire	Any type	Pass Screen
Three-phase, four-wire	Single-phase, line-to-neutral	Pass Screen
Three-phase, four-wire (For any line that has such a section, or mixed three wire and four wire)	All Others	To pass, aggregate Generating Facility Nameplate Rating must be less than or equal to 10% of Line Section peak load

[13] This screen allows utilities to continue to maintain safety, reliability and power quality by identifying generators that pose overvoltage concerns and mitigating them through a technical solution. At the same time, it avoids a full study when one is not needed, i.e., for Generating Facilities below 11 kVA and for Generating Facilities below 10 percent of the Line Section's peak load. Both California (Rule 21) and Hawaii (Rule 14H) take similar approaches.

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f. If the Generating Facility is to be interconnected on a single-phase shared secondary, then the aggregate generation capacity on the shared secondary, including the Generating Facility's Generating Capacity, will not exceed 65 percent of the transformer nameplate power rating.

g. If the Generating Facility is single-phase and is to be interconnected on a transformer center tap neutral of a 240-volt service, its addition will not create an imbalance between the two sides of the 240-volt service of more than 20 percent of nameplate rating of the service transformer.

h. The Generating Facility's Nameplate Rating, in aggregate with other generation interconnected to the distribution low-voltage side of the substation transformer feeding the distribution circuit where the Generating Facility proposes to interconnect, will not exceed 10 MW in an area where there are known or posted transient stability limitations to generating units located in the general electrical vicinity (e.g., three or four transmission voltage level busses from the Point of Common Coupling), or the proposed Generating Facility shall not have interdependencies, known to the Utility, with earlier-queued Interconnection Requests, that would necessitate further study.

i. The Generating Facility's Point of Common Coupling will not be on a transmission line.

j. For interconnection of a Generating Facility within a Spot Network or Area Network, the Generating Facility must be inverter-based and use a minimum import relay or other protective scheme that will ensure that power imported from the Utility to the network will, during normal Utility operations, remain above one percent of the network's maximum load over the past year or will remain above a point reasonably set by the Utility in good faith. At the Utility's discretion, the requirement for minimum import relays or other protective schemes may be waived.

3. Time to process under screens: Within fifteen (15) Business Days after the Utility notifies the Applicant that the Application is complete, the Utility shall notify the Applicant whether the Generating Facility meets all of the applicable Level 2 screens.

4. Screens failure: Despite the failure of one or more screens, the Utility, at its sole option, may approve the interconnection provided it concludes such approval is consistent with safety and reliability. If the Utility cannot determine that the Generating Facility may nevertheless be interconnected

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consistent with safety, reliability, and power quality standards, the Utility shall provide the Applicant with detailed information on the reason(s) for failure in writing. In addition, the Utility shall allow the Applicant to select one of the following, at the Applicant's option:

a. Undergo Supplemental Review in accordance with Section III.D; or

b. Continue evaluating the Application under Level 4.

Upon receipt, the Applicant must notify the Utility of its selection within ten (10) Business Days or the Application will be deemed withdrawn.

5. Approval: If the proposed interconnection passes the screens, or fails the screens but passes Supplemental Review, the Application shall be approved, and the Utility will provide the Applicant an executable Interconnection Agreement within the following timeframes.

a. If the proposed interconnection requires no construction of facilities by the Utility,[14] the Utility shall provide the Interconnection Agreement to the Applicant within three (3) Business Days after the notification of Level 2 or Supplemental Review results.

b. If the proposed interconnection requires only Interconnection Facilities or Minor System Modifications, the Utility shall provide the Interconnection Agreement, along with a non-binding good faith cost estimate and construction schedule for such upgrades, to the Applicant within fifteen (15) Business Days after the notification of the Level 2 or Supplemental Review results.

c. If the proposed interconnection requires more than Interconnection Facilities and Minor System Modifications, the Utility may elect to either provide an Interconnection Agreement along with a non-binding good faith cost estimate and construction schedule for such upgrades within twenty (20) Business Days after notification of the Level 2 or Supplemental Review results, or the Utility may notify the Applicant within five (5) Business Days of notification of Level 2 or Supplemental Review results that the Utility will need

[14] As under Level 1, this sub-provision (a) permits the installation of any metering or other commercial devices. If such devices are required, the three-day timeline for provision of the interconnection agreement still applies.

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to complete a Facilities Study under Section III.F.5 to determine the necessary upgrades.

6. An Applicant that receives an Interconnection Agreement executed by the Utility shall have ten (10) Business Days to execute the agreement and return it to the Utility. An Applicant shall communicate with the Utility no less frequently than every six (6) months regarding the status of a proposed Generating Facility to which an Interconnection Agreement refers. Within twenty-four (24) months from an Applicant's execution of an Interconnection Agreement or six (6) months of completion of any upgrades, whichever is later, the Applicant shall commence operation of the Generating Facility. However, the Parties may mutually agree to an extension of this time if warranted, which shall not be unreasonably withheld. The Applicant must provide the Utility with at least ten (10) Business Days' notice of the anticipated start date of the Generating Facility.

7. Within ten (10) Business Days of receiving notice of the anticipated start date of the Generating Facility, the Utility may conduct an inspection at a time mutually agreeable to the Parties. If the Generating Facility passes the inspection, the Utility shall provide written notice of the passage within three (3) Business Days. If a Generating Facility initially fails the Utility inspection the Utility shall offer to redo the inspection at the Applicant's expense at a time mutually agreeable to the Parties. If the Utility determines that the Generating Facility fails the inspection, the Utility must provide the Applicant with a written explanation detailing the reasons and any standards violated. If the Utility determines no inspection is necessary, it shall notify the Applicant within three (3) Business Days of receiving the notice of the anticipated start date.

8. Upon Utility's receipt of proof of the electric code official's approval, an Applicant may begin interconnected operation of a Generating Facility, provided that there is an Interconnection Agreement in effect and that the Generating Facility has passed any inspection required by the Utility or received notice that none is required.[15] Evidence of approval by an electric code official includes a signed Certificate of Completion in the form of Attachment 6 or other inspector-provided documentation.

[15] Upon interconnected operation, the Applicant becomes an Interconnection Customer.

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C. Level 3: Screening Criteria and Process for Non-Exporting Generating Facilities

An Applicant may use the Level 2 process for a Generating Facility, including an Energy Storage Device, that uses protective devices as set forth in Section IV.E to assure that power will not be exported from the Generating Facility (except for any Inadvertent Export). However, the Utility shall notify the Applicant whether the Generating Facility meets all of the applicable Level 2 screens within ten (10) Business Days.

Screen B.2.b shall not apply to Non-Exporting Generating Facilities incorporating the methods in Section IV.E, subparagraphs 1–3 to prevent the export of power across the Point of Common Coupling.

An Applicant proposing to interconnect a Non-Exporting Generating Facility to a Spot Network or an Area Network is not eligible to use Level 3.

D. Supplemental Review

1. Within twenty (20) Business Days an Applicant's election to undergo Supplemental Review, the Utility shall perform Supplemental Review using the screens set forth below, notify the Applicant of the results, and include with the notification a written report of the analysis and data underlying the Utility's determinations under the screens.

    a. Where twelve (12) months of Line Section minimum load data is available, can be calculated, can be estimated from existing data, or can be determined from a power flow model, the Generating Facility's Generating Capacity aggregated with all other generation capable of exporting energy on the Line Section[16] is less than 100 percent of the minimum load for all Line Sections bounded by automatic sectionalizing devices upstream of the proposed Generating Facility. If the minimum load data is not available, or cannot be calculated or estimated, the Generating Facility's Generating Capacity[17] aggregated with all other generation capable of exporting energy on the Line Section is less than 30 percent of the peak load for all Line Sections bounded by automatic

[16] See Footnote 8.

[17] Currently there is no best practice for how Supplemental Review Screen "a" should address the potential for Inadvertent Export from Generating Facilities incorporating the methods in Section IV.E.5 or IV.E.6 to limit their Generating Capacity. Whether the Generating Capacity, as proposed here, or Nameplate Rating is more appropriate for study under Screen "a" (Section III.D.1.a) be addressed as part of individual states' review and update of their interconnection procedures.

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sectionalizing devices upstream of the proposed Generating Facility.

i. The type of generation used by the proposed Generating Facility will be taken into account when calculating, estimating, or determining circuit or Line Section minimum load relevant for the application of this screen. Solar photovoltaic (PV) generation systems with no battery storage use daytime minimum load (e.g., 8 a.m. to 6 p.m.), while all other generation uses absolute minimum load.

ii. Load that is co-located with load-following, non-exporting or export-limited generation should be appropriately accounted for.

iii. The Utility will not consider as part of the aggregate generation for purposes of this screen generating facility capacity, including combined heat and power (CHP) facility capacity, known to be already reflected in the minimum load data.

b. In aggregate with existing generation on the Line Section:

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 IEEE Std 1547™; and

iii. The harmonic levels meet IEEE Std 1547™ limits at the Point of Interconnection.

c. The location of the proposed Generating Facility and the aggregate generation capacity on the Line Section do not create impacts to safety or reliability that cannot be adequately addressed without Application of Level 4. The Utility may consider the following factors and others in 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 (i.e., several large commercial customers).

ii. If there is an even or uneven distribution of loading along the feeder.

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iii. If the proposed Generating Facility is located in close proximity to the substation (i.e., ≤ 2.5 electrical line miles), and if the distribution line from the substation to the Generating Facility is composed of large conductor/feeder section (i.e., 600A class cable).

iv. If the proposed Generating Facility incorporates a time delay function to prevent reconnection of the generator to the system until system voltage and frequency are within normal limits for a prescribed time.

v. If operational flexibility is reduced by the proposed Generating Facility, such that transfer of the Line Section(s) of the Generating Facility to a neighboring distribution circuit/substation may trigger overloads or voltage issues.

vi. If the proposed Generating Facility utilizes Certified Anti-Islanding functions and equipment.

2. If the proposed interconnection passes the supplemental screens, the Application shall be approved and the Utility will provide the Applicant an executable Interconnection Agreement pursuant to the procedure set forth in Section III.B.5.

3. After receiving an Interconnection Agreement executed by the Utility, the Applicant shall proceed under the terms of the applicable level of review under which the Application was initially studied.

E. Applicant Options Meeting

If the Utility determines the Application cannot be approved without evaluation under Level 4 review, at the time the Utility notifies the Applicant of either the Level 1, 2, or 3 review or Supplemental Review results, the Utility shall provide the Applicant the option of proceeding to Level 4 review or of participating in an Applicant Options Meeting with the Utility to review possible Generating Facility modifications or the screen analysis and related results, to determine what further steps are needed to permit the Generating Facility to be connected safely and reliably. The Applicant shall notify the Utility in writing that it requests an Applicant Options Meeting or that it would like to proceed to Level 4 review within fifteen (15) Business Days of the Utility's notification, or the Application shall be deemed withdrawn. If the Applicant requests an Applicant Options Meeting, the Utility shall offer to convene a meeting at a mutually agreeable time within fifteen (15) Business Days of the Applicant's request.

F. Level 4: Study Process for All Other Generating Facilities

1. Application: An Applicant must submit a Level 4 Application using the

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standard form provided in Attachment 4 to these Interconnection Procedures, which may be sent electronically to a recipient designated by the Utility. An Applicant whose Level 1, Level 2, or Level 3 Application was denied may request that the Utility treat that existing Application already in the Utility's possession as a new Level 4 Application. Within three (3) Business Days of receipt of the Application or the Applicant's request to use the existing Application, the Utility shall acknowledge receipt of the Application or transfer of an existing Application to the Level 4 process and notify the Applicant whether or not the Application is complete. If the Application is incomplete, the Utility shall provide a written list detailing all information that the Applicant must provide to complete the Application. The Applicant will have twenty (20) Business Days after receipt of the list to submit the listed information. Otherwise, the Application will be deemed withdrawn. The Utility shall notify the Applicant within three (3) Business Days of receipt of the revised Application whether the revised Application is complete or incomplete. The Utility may deem the Application withdrawn if it remains incomplete.

2. Fees: An Application fee shall not exceed $100 plus $10 per kW of Nameplate Rating up to a maximum of $2,000, as well as charges for actual time spent on any interconnection study. Costs for Utility facilities necessary to accommodate the Applicant's Generating Facility interconnection shall be the responsibility of the Applicant as set forth in the Interconnection Agreement.

3. Scoping Meeting: The Utility will conduct an initial review that includes a scoping meeting with the Applicant within ten (10) Business Days of determining that an Application is complete. The scoping meeting shall take place in person, by telephone, or electronically by a means mutually agreeable to the Parties. At the scoping meeting, the Utility shall provide pertinent information such as: the available Fault Current at the proposed location, the existing peak loading on the lines in the general vicinity of the proposed Generating Facility, and the configuration of the distribution line at the proposed Point of Interconnection. By mutual agreement of the Parties, the scoping meeting, System Impact Study or Facilities Study may be waived.

4. System Impact Study:

    a. If the Parties do not waive the System Impact Study, within five (5) Business Days of the completion of the scoping meeting (or five (5) Business Days after completion of the Application or final step in Levels 1 to 3 if scoping meeting is waived), the Utility shall provide the Applicant with an Interconnection System Impact Study Agreement in Attachment 7A, including a good faith

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estimate of the cost and time to undertake the System Impact Study.

b. A System Impact Study for a Generating Facility shall include a review of the Generating Facility's adherence to IEEE Std 1547™. For Generating Facility components that are Certified, the Utility may not charge the Applicant for review of those components in isolation.

c. Each Utility shall include in its compliance tariff a description of the various elements of a System Impact Study it would typically undertake pursuant to this Section, including:

i. Load-Flow Study

ii. Short-Circuit Study

iii. Circuit Protection and Coordination Study

iv. Impact on System Operation

v. Stability Study (and the conditions that would justify including this element in the System Impact Study)

vi. Voltage-Collapse Study (and the conditions that would justify including this element in the System Impact Study).

d. Once an Applicant delivers to the Utility an executed System Impact Study Agreement and payment in accordance with that agreement, the Utility shall conduct the System Impact Study. The System Impact Study shall be completed within forty (40) Business Days of the Applicant's delivery of the executed System Impact Study Agreement.[18] The System Impact Study provided to the Applicant shall include a description of the Utility's analysis, conclusions, and the reasoning supporting those conclusions.

5. Facilities Study:

a. If the Utility determines that Electric Delivery System modifications required to accommodate the proposed

[18] If a proposed Application is found to require evaluation by an ISO/RTO or other external transmission provider there may need to be an adjustment to the timelines to allow said entity to evaluate the project. At all times Applicants should be kept informed of any delays on a regular basis.

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interconnection are not substantial, the System Impact Study will identify the scope and cost of the modifications defined in the System Impact Study results, and no Facilities Study shall be required.

b. If the Utility determines that necessary modifications to the Utility's Electric Delivery System are substantial, the results of the System Impact Study will include an estimate of the cost of the Facilities Study and an estimate of the modification costs. The detailed costs of any Electric Delivery System modifications necessary to interconnect the Applicant's proposed Generating Facility will be identified in a Facilities Study to be completed by the Utility.

c. If the Parties do not waive the Facilities Study, within five (5) Business Days of the completion of the System Impact Study, the Utility shall provide an Interconnection Facilities Study Agreement provided in Attachment 7B, including a good faith estimate of the cost and time to undertake the Facilities Study.

d. Once the Applicant executes the Facilities Study Agreement and pays the Utility pursuant to the terms of that agreement, the Utility shall conduct the Facilities Study. The Facilities Study shall include a detailed list of necessary Electric Delivery System upgrades and an itemized cost estimate, breaking out equipment, labor, operation and maintenance and other costs, including overheads, for completing such upgrades, which may not be exceeded by 125 percent if actual upgrades are completed.[19] The Facilities Study shall also indicate the milestones for completion of the Applicant's installation of its Generating Facility and the Utility's completion of any Electric Delivery System modifications, and the milestones from the Facilities Study (if any) shall be incorporated into the Interconnection Agreement. The Facilities Study shall be completed within forty-five (45) Business Days of the Applicant's delivery of the executed Facilities Study agreement.

[19] In order for Applicant's to have confidence that they understand the costs of any necessary upgrades it is important that Utilities be expected to provide cost estimates within a reasonable margin of error. States such as California and Massachusetts have implemented binding cost envelopes, while other states such as Minnesota are requiring careful tracking of costs that exceed a specified margin.

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6. Interconnection Agreement:

   a. Within five (5) Business Days of completion of the last study, the Utility shall execute and send the Applicant an Interconnection Agreement using the standard form agreement provided in Attachment 5 of these Interconnection Procedures, which shall incorporate the milestones (if any) from the Facilities Study. The Interconnection Agreement shall include an itemized quote, including overheads, for any required Electric Delivery System modifications, subject to the cost limit set by the Facilities Study cost estimate.

   b. Within forty (40) Business Days of the receipt of an Interconnection Agreement, the Applicant shall execute and return the Interconnection Agreement and notify the Utility of the anticipated start date of the Generating Facility. Unless the Utility agrees to a later date or requires more time for necessary modifications to its Electric Delivery System, the Applicant shall identify an anticipated start date that is within twenty-four (24) months of the Applicant's execution of the Interconnection Agreement. However, the Parties may mutually agree to an extension of this time if needed, which shall not be unreasonably withheld. The Applicant shall notify the Utility if there is any change in the anticipated start date of interconnected operations of the Generating Facility.

7. Inspection:

   a. The Utility shall inspect the completed Generating Facility installation for compliance with requirements and shall attend any required commissioning tests pursuant to IEEE Std 1547™. For systems greater than 10 MW, IEEE Std 1547™ may be used as guidance. The Utility shall conduct the inspection within ten (10) Business Days of receiving the notice of the anticipated start date at a time mutually agreeable to the Parties. If the Generating Facility passes the inspection, the Utility shall provide written notice of the passage within three (3) Business Days. If a Generating Facility initially fails a Utility inspection, the Utility shall offer to redo the inspection at the Applicant's expense at a time mutually agreeable to the Parties. If the Utility determines that the Generating Facility fails the inspection, it must provide a written explanation detailing the reasons and any standards violated. Provided that any required commissioning tests are satisfactory, the Utility shall notify the Applicant in writing within five (5) Business Days of completion of the inspection that operation of the Generating Facility is approved.

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8. Operation:

   a. Upon the Utility's receipt of proof of the electric code official's approval, an Applicant may begin interconnected operation of a Generating Facility, provided that there is an Interconnection Agreement in effect and that the Generating Facility has passed any inspection required by the Utility. Evidence of approval by an electric code official includes a signed Certificate of Completion in the form of Attachment 6 or other inspector-provided documentation.

IV. GENERAL PROVISIONS AND REQUIREMENTS

A. Timelines and Extensions

1. The Utility shall make reasonable efforts to meet all timelines set by these Interconnection Procedures.[20] If the Utility cannot meet a timeline, the Utility shall notify the Applicant in writing within one (1) Business Day after the missed deadline. The notification shall explain the reason for the Utility's failure to meet the deadline and provide an estimate of when the step will be completed. The Utility shall keep the Applicant updated of any changes in the expected completion date.

2. The Applicant may request in writing the extension of one timeline set by these Interconnection Procedures. The requested extension may be for up to one-half of the time originally allotted (e.g., a ten (10) Business Day extension for a twenty (20) Business Day timeframe). The Utility shall not unreasonably refuse this request. If further timeline extensions are necessary, the Applicant may request an extension in writing to the Interconnection Ombudsperson, who shall grant or deny the request, if it is reasonable, within three (3) Business Days.

B. Online Applications and Electronic Signatures

1. Each Utility shall allow interconnection Applications to be submitted via email or through the Utility's website.

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[20] Providing utilities some level of flexibility in meeting timelines in order to manage staffing in times of fluctuating application submittal rates and need to manage system emergencies is typical in most states. However, since the timelines are binding on applicants and utility delays can have real cost implications for projects it is important to ensure utilities understand there is some expectation of maintaining compliance with the timelines set forth within. Some states have begun to implement financial rewards and penalties for steady rates of compliance, while others are considering rigorous tracking to ensure Commissions are at least aware of where delays may be occurring.

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2. Each Utility shall dedicate an easy to locate page on their website to interconnection procedures. The relevant website page shall include:

   a. These Interconnection Procedures and attachments in an electronically searchable format,

   b. The Utility's Interconnection Application forms in a format that allows for electronic entry of data,

   c. The Utility's Interconnection Agreements, and

   d. The Utility's point of contact for submission of Interconnection Applications including email and phone number.

3. Each Utility shall allow electronic signatures to be used for interconnection Applications and Agreements.

C. Dispute Resolution

1. The Parties agree to attempt to resolve all disputes arising out of the interconnection process and associated study and interconnection agreements according to the provisions of this Section.

2. In the event of a dispute, the disputing Party shall provide the other Party a written Notice of Dispute containing the relevant known facts pertaining to the dispute, the specific dispute and the relief sought, and express notice by the disputing Party that it is invoking the procedures under this Section. The notice shall be sent to the non-disputing Party's email address and physical address set forth in the Interconnection Agreement or Application, if there is no Interconnection Agreement. A copy of the notice shall also be sent to Interconnection Ombudsperson.[21]

   The non-disputing Party shall acknowledge the notice within three (3) Business Days of its receipt and identify a representative with the authority to make decisions for the non-disputing Party with respect to the dispute.

3. If the dispute is principally related to one or both Parties' compliance with timelines specified in these Interconnection Procedures or associated agreements, the Parties shall seek assistance from Interconnection

[21] An Interconnection Ombudsperson can be designated by the Commission (typically Commission staff) to help track and facilitate the efficient and fair resolution of disputes. Some states have begun to look at processes which engage a technical master to help resolve disputes related to engineering questions that may arise in the interconnection process.

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Ombudsperson if the Parties cannot mutually resolve the dispute within eight (8) Business Days.[22]

4. If the dispute is not principally related to one or both Parties' compliance with a timeline, then the non-disputing Party shall provide the disputing Party with all relevant regulatory and/or technical details and analysis regarding any Utility interconnection requirements under dispute within ten (10) Business Days of the date of the notice of dispute. Within twenty (20) Business Days of the date of the notice of dispute, the Parties' authorized representatives shall meet and confer to try to resolve the dispute. Parties shall operate in good faith and use best efforts to resolve the dispute.

5. If a resolution is not reached in thirty (30) Business Days from the date of the notice of dispute, either (1) a Party may request to continue negotiations for an additional twenty (20) Business Days, or (2) the Parties may by mutual agreement make a written request for mediation to the Interconnection Ombudsperson. Alternatively, both Parties by mutual agreement may request mediation from an outside third-party mediator with costs to be shared equally between the Parties.

6. If the results of the mediation are not accepted by one or more Parties and there is still disagreement, the dispute shall proceed to the formal complaint process provided by the Commission.[23]

7. At any time, either Party may file a complaint before the Commission pursuant to its rules.

8. If neither Party elects to seek assistance from the Commission, or if the attempted dispute resolution fails, then either Party may exercise whatever rights and remedies it may have in equity or law consistent with the terms of these procedures.

D. Utility Reporting Requirement

Each Utility shall submit to the Commission two times per year and make available to the public on its website an interconnection report. The report shall contain information in the form required by Attachment 9, including relevant totals for both the year and the most recent reporting period.

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[22] The duration of the typical dispute resolution process is generally considered to be too long to be effective in assisting parties with timeline disputes. Thus, it is helpful to engage an Ombudsperson earlier on to facilitate disputes related to timelines where possible.

[23] This section must be modified if the relevant Commission does not have a formal complaint process.

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E. Limited-Export and Non-Exporting Generating Facilities

If a Generating Facility uses any configuration or operating mode in this Section IV.E, subparagraphs 1 through 6 to limit the export of electrical power across the Point of Common Coupling, then the Generating Capacity shall be only the amount capable of being exported (not including any Inadvertent Export). To prevent impacts on system safety and reliability, any Inadvertent Export from a Generating Facility must comply with the limits in subparagraphs 5 or 6. The Generating Capacity specified by the Interconnection Customer in the Application will subsequently be included as a limitation in the Interconnection Agreement. Other means not listed in Section IV.E may be utilized to limit export if mutually agreed upon by the Utility and Applicant.

1. Reverse Power Protection: To ensure power is never exported across the Point of Common Coupling, a reverse power Protective Function may be provided. The default setting for this Protective Function shall be 0.1% (export) of the service transformer's rating, with a maximum 2.0 second time delay.

2. Minimum Power Protection: To ensure at least a minimum amount of power is imported across the Point of Common Coupling at all times (and, therefore, that power is not exported), an under-power Protective Function may be provided. The default setting for this Protective Function shall be 5% (import) of the generating unit's total Nameplate Rating, with a maximum 2.0 second time delay.

3. Relative Distributed Energy Resource Rating: This option requires the Nameplate Rating of the generating unit, minus any auxiliary load, to be so small in comparison to its host facility's minimum load that the use of additional Protective Functions is not required to ensure that power will not be exported to the Electric Delivery System. This option requires the generating unit capacity to be no greater than 50% of the Interconnection Customer's verifiable minimum Host Load over the past 12 months.

4. Configured Power Rating: A reduced output rating utilizing the power rating configuration setting may be used to ensure the DER does not generate power beyond a certain value lower than the Nameplate Rating.[24]

5. Limited Export Utilizing Inverters or Control Systems: Generating Facilities may utilize, a Nationally Recognized Testing Laboratory

[24] The configuration setting corresponds to the active or apparent power ratings in Table 28 of IEEE Std 1547™-2018, as described in subclause 10.4. A local DER communication interface is not required to utilize the configuration setting as long as it can be set by other means.

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("NRTL") Certified Power Control System and inverter system that results in the Generating Facility disconnecting from the Electric Delivery System, ceasing to energize the Electric Delivery System or halting energy production within 2 seconds if the period of continuous Inadvertent Export exceeds 30 seconds.[25] 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 Generating Facility entering an operational mode where no energy is exported across the Point of Common Coupling to the Electric Delivery System.

6. Limited Export Using Mutually Agreed-Upon Means: Generating Facilities may be designed with other control systems and/or Protective Functions to limit export and Inadvertent Export to levels mutually agreed upon by the Applicant and the Utility. The limits may be based on technical limitations of the Interconnection Customer's equipment or the Electric Delivery System equipment. To ensure Inadvertent Export remains within mutually agreed-upon limits, the Interconnection Customer shall use an internal transfer relay, energy management system, or other customer facility hardware or software.

F. Miscellaneous Requirements

1. Applicant is responsible for construction of the Generating Facility and obtaining any necessary local code official approval (electrical, zoning, etc.).

2. Applicant shall conduct the commissioning test pursuant to the IEEE Standard 1547™ and comply with all manufacturer requirements.

3. To assist Applicants in the interconnection process, the Utility shall designate an employee or office from which basic information on interconnections can be obtained. Upon request, the Utility shall provide interested Applicants with all relevant forms, documents and technical requirements for filing a complete Application. Upon an Applicant's request, the Utility shall meet with an Applicant at the Utility's offices or by telephone prior to submission for up to one hour for Level 1 Applicants and two hours for other Applicants.

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[25] Some states impose an additional limitation on the amount of Inadvertent Export energy, e.g., 3 hours per month multiplied by the Generating Facility's Nameplate Rating, to ensure operation of the Generating Facility consistent with the terms of the Interconnection Application and/or Agreement. Systems tested to a standardized protocol for inadvertent export, such as that available from UL for Power Control Systems, may not be required to conform to this additional limitation. The UL 1741 Certification Requirement Decision on Power Control Systems may be used before a standard is available.

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4. The authorized hourly rate for engineering review under Supplemental Review or Level 4 shall be $100 per hour.[26]

5. A Utility shall not require an Applicant to install additional controls (other than a utility accessible disconnect switch for non-inverter-based Generating Facilities[27]), or to perform or pay for additional tests not identified herein to obtain approval to interconnect.

6. A Utility may only require an Applicant to purchase insurance covering Utility damages, and then only in the following amounts:[28]

   a. For non-inverter-based Generating Facilities:

Nameplate Rating > 5 MW	$3,000,000
2 MW < Nameplate Rating $\leq$ 5 MW	$2,000,000
500 kW < Nameplate Rating $\leq$ 2 MW	$1,000,000
50 kW < Nameplate Rating $\leq$ 500 kW	$500,000
Nameplate Rating $\leq$ 50 kW	Typical Homeowners[29]

   b. For inverter-based Generating Facilities:

Nameplate Rating > 5 MW	$2,000,000
1 MW < Nameplate Rating $\geq$ 5 MW	$1,000,000
Nameplate Rating $\geq$ 1 MW	no insurance

7. Additional protection equipment not included with the Interconnection Equipment Package may be required at the Utility's discretion as long as the performance of an Applicant's Generating Facility is not negatively impacted and the Applicant is not charged for any equipment that provides protection that is already provided by Certified interconnection equipment Certified.

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[26] The fixed hourly fee for engineering review may be adjusted to reflect standard rates in each state, but the hourly charge should be fixed so there are no disparities among Utilities or between different Applications to ensure fair treatment.

[27] A number of states have allowed Utilities to require external disconnect switches but specified that the Utility must reimburse Applicants for the cost of the switch. Several states have specified that an external disconnect switch may not be required for smaller inverter-based Generating Facilities. Recognizing that non-inverter-based Generating Facilities might present a hazard, Utilities may require a switch for these Generating Facilities.

[28] Insurance requirements are not typically separated by inverter and non-inverter-based Generating Facilities. However, concerns seem to center on the potential for non-inverter-based systems to cause damage to utility property. To IREC's knowledge, there has never been a claim for damages to a utility's property caused by an inverter-based system, and it seems that there is little theoretical potential for damage to a utility's property caused by an inverter-based system of less than a megawatt.

[29] The amount required by a typical homeowners insurance policy is generally adequate here, this amount may vary by state.

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8. Metering and Monitoring shall be as set forth in the Utility's tariff for sale or exchange of energy, capacity or other ancillary services.[30]

9. Telemetry may be required by the Utility for Generating Facilities with a Nameplate rating of 1 MVA or higher. See the Utility's interconnection handbook for details on equipment requirements.

10. Once an interconnection has been approved under these procedures, a Utility shall not require an Interconnection Customer to test its Generating Facility except that the Utility may require any manufacturer-recommended testing and:

    a. For Levels 2 and 3, the Utility may require periodic testing to verify adherence to the interconnection requirements. The frequency of periodic testing will be specified in the Utility's interconnection handbook or other appropriate documentation.

    b. For Level 4, all interconnection-related protective functions and associated batteries shall be periodically tested at intervals specified by the manufacturer, system integrator, or authority that has jurisdiction over the interconnection. Periodic test reports or a log for inspection shall be maintained.

    c. For functional software or firmware changes, hardware changes, protection settings or function changes, or changes to operating modes, the Utility may require retesting to ensure the Generating Facility still meets the requirements of IEEE Std 1547™. When required, the updated Generating Facility configuration and testing results shall be documented and submitted to the Utility.

11. A Utility shall have the right to inspect an Interconnection Customer's Generating Facility before and after interconnection approval is granted, at reasonable hours and with reasonable prior notice provided to the Interconnection Customer. If the Utility discovers an Interconnection Customer's Generating Facility is not in compliance with the requirements of IEEE Standard 1547™, and the non-compliance adversely affects the safety or reliability of the electric system, the Utility may require disconnection of the Interconnection Customer's Generating Facility until the Generating Facility complies with IEEE Standard 1547™.

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[30] Metering or other revenue based technical requirements that are necessary to qualify for rates or procurement programs such as Net Energy Metering ("NEM") should be addressed in the tariffs, regulations or rules related to those programs rather than in the interconnection procedures which are drafted to be agnostic with respect to the rates and procurement programs projects may utilize.

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12. The Interconnection Customer may disconnect the Generating Facility at any time without notice to the Utility and may terminate the Interconnection Agreement at any time with one day's notice to the Utility.

13. On the Application form, an Applicant may designate a representative to process an Application on Applicant's behalf, and an Interconnection Customer may designate a representative to meet some or all of the Interconnection Customer's responsibilities under the Interconnection Agreement.[31]

14. For a Generating Facility offsetting part or all of the load of a utility customer at a given site, that customer is the Interconnection Customer and that customer may assign its Interconnection Agreement to a subsequent occupant of the site.[32] For a Generating Facility providing all of its energy directly to a Utility, the Interconnection Customer is the owner of the Generating Facility and may assign its Interconnection Agreement to a subsequent owner of the Generating Facility. Assignment is only effective after the assignee provides written notice of the assignment to the Utility and agrees to accept the Interconnection Customer's responsibilities under the Interconnection Agreement.

15. If the Applicant is seeking approval for an Energy Storage Device, a separate application for the interconnection of new or modified load will not be required as a result of a customer's application for interconnection under these Interconnection Procedures and instead the review shall occur under these Interconnection Procedures.[33]

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[31] In the most common case, a residential customer may designate an installer as the representative. For larger Generating Facilities, a third-party owner might be the designated representative.

[32] In the most common case, an Interconnection Customer is a homeowner and this clause allows the homeowner to sell the home and assign the Agreement to the new owner. In many commercial situations, the Interconnection Customer is a lessee and this clause allows that lessee to move out at the end of a lease and assign the Agreement to a new lessee.

[33] In most states there are separate procedures for customers seeking to modify or connect new load. Rather than requiring two different application forms, timelines, etc. this review can be completed all through these Interconnection Procedures for energy storage customers that may charge from the grid. Note that further clarification may be required if new or expanded load customers are typically given a credit for any utility work or if cost allocation rules otherwise diverge between the procedures for interconnecting new load versus new generation.

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Attachment 1

Glossary of Terms

"Anti-Islanding" means a control scheme installed as part of the Generating or Interconnection Facility that senses and prevents the formation of an Unintended Island.

"Applicant" means a person or entity that has filed an Application to interconnect a Generating Facility to an Electric Delivery System. For a Generating Facility that will offset part or all of the load of a Utility customer, the Applicant is that customer, regardless of whether the customer owns the Generating Facility or a third party owns the Generating Facility.[1] For a Generating Facility selling electric power to a Utility, the owner of the Generating Facility is the Applicant.

"Applicant Options Meeting" has the meaning provided in Section III.E of these procedures.

"Application" means the Applicant's request, in accordance with these Interconnection Procedures, to interconnect a new Generating Facility, or to increase the capacity of, or make a Material Modification to the operating characteristics of, an existing Generating Facility that is interconnected with the Utility's Electric Distribution System.

"Area Network" means a section of an Electric Delivery System served by multiple transformers interconnected in an electrical network circuit generally used in large, densely populated metropolitan areas in order to provide high reliability of service and having the same definition as the term "secondary grid network" as defined in IEEE Std 1547™.

"Auxiliary Load" means electrical power consumed by any auxiliary equipment necessary to operate the Generator.

"Business Day" means Monday through Friday, excluding Federal and State Holidays.

"Certified" means a piece of equipment has been tested in accordance with the applicable requirements of IEEE Std 1547™ and IEEE Std 1547.1™ by any Nationally Recognized Testing Laboratory (NRTL) recognized by the United States Occupational Safety and Health Administration to test and certify equipment pursuant to the applicable standard and the equipment has been labeled and is publicly listed by such NRTL at the time of the interconnection application. UL 1741 is one such standard that ensures compliance with IEEE Std 1547™ and IEEE Std 1547.1™ and is applicable only to inverters. There may be additional or separate certifications available for specific pieces of equipment.

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[1] For a variety of reasons, a Generating Facility may be owned by a third party that contracts to sell energy or furnish the Generating Facility to the Utility's customer. In those cases, the Utility's customer is still the Applicant under this Agreement, though the Applicant may choose to designate the owner as Applicant's representative. Customers may also designate on the Application form installers or others to act on their behalf in the process.

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"Commission" means the *[insert name of the state utility commission or equivalent]*.

"Customer" means the entity that receives or is entitled to receive Distribution Service through the Utility's Electric Delivery System or is a retail customer of the Utility.

"Distribution Service" means the service of delivering energy over the Electric Delivery System pursuant to the approved tariffs of the Utility other than services directly related to the interconnection of a Generating Facility under these Interconnection Procedures.

"Electric Delivery System" means the equipment operated and maintained by a Utility to deliver electric service to end-users, including without limitation transmission and distribution lines, substations, transformers, Spot Networks and Area Networks.

"Energy Storage Device" means 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 Procedures, an Energy Storage Device can be considered a Generating Facility.

"Facilities Study" has the meaning provided in Section III.F.5 and Attachment 7B of these procedures.

"Fault Current" means electrical current that flows through a circuit and is produced by an electrical fault, such as to ground, double-phase to ground, three-phase to ground, phase-to-phase, and three-phase. A Fault Current is several times larger in magnitude than the current that normally flows through a circuit.

"Generating Capacity" means the maximum Nameplate Rating of a Generating Facility in alternating current (AC), except that where such capacity is limited by any of the methods of limiting electrical export in Section IV.E, the Generating Capacity shall be the net capacity as limited through the use of such methods (not including Inadvertent Export).

"Generating Facility" means the equipment used by an Interconnection Customer to generate, store, manage, interconnect and monitor electricity. A Generating Facility includes an Interconnection Equipment Package.

"IEEE" means the Institute of Electrical and Electronic Engineers.

"IEEE Standards" means the standards published by the IEEE, available at www.ieee.org.

"Inadvertent Export" means the unscheduled export of active power from a Generating Facility, exceeding a specified magnitude and for a limited duration, generally due to fluctuations in load-following behavior.

"Interconnection Agreement" means a standard form agreement between an Interconnection Customer and a Utility governing the interconnection of a Generating Facility to a Utility's

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Electric Delivery System, as well as the ongoing operation of the Generating Facility after it is interconnected. For Level 1, the standard form Interconnection Agreement is incorporated with the Level 1 Application, provided in Attachment 3 to these Interconnection Procedures. For Levels 2, 3 or 4, the standard form Interconnection Agreement is provided in Attachment 4 to these Interconnection Procedures.

"Host Load" means the electrical power, less the Generator Auxiliary Load, consumed by the Customer, to which the Generating Facility is connected.

"Interconnection Customer" means an Applicant that has entered into an Interconnection Agreement with a Utility to interconnect a Generating Facility and has interconnected that Generating Facility.

"Interconnection Equipment Package" means a group of components connecting an electric generator with an Electric Delivery System, and includes all interface equipment including switchgear, inverters or other interface devices. An Interconnection Equipment Package may include an integrated generator or electric source.[2]

"Interconnection Facilities" means the electrical wires, switches, and related equipment that are required in addition to the facilities required to provide electric Distribution Service to a Customer to allow interconnection. Interconnection Facilities may be located on either side of the Point of Common Coupling as appropriate to their purpose and design. Interconnection Facilities may be integral to a Generating Facility or provided separately. Interconnection Facilities may be owned by either the Interconnection Customer or the Utility.

"Interconnection Procedures" means these procedures including attachments.

"Island" or "Islanding" means a condition on the Utility's Electric Delivery System in which one or more Generating Facilities deliver power to Customers using a portion of the Utility's Electric Delivery System that is electrically isolated from the remainder of the Utility's Electric Delivery System.

"Level 1" has the meaning provided in Section III.A and Attachment 3 of these procedures.

"Level 2" has the meaning provided in Section III.B and Attachment 4 and Attachment 5 of these procedures.

"Level 3" has the meaning provided in Section III.C and Attachment 4 and Attachment 5 of these procedures.

"Level 4" has the meaning provided in Section III.F and Attachment 4 and Attachment 5 of these procedures.

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[2] The most common Interconnection Equipment Package is an inverter. However, a solar array and an inverter can be bundled as a complete Interconnection Equipment Package. In that case, the Generating Facility would simply be the Interconnection Equipment Package.

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"Limited Export" means the exporting capability of a Generating Facility whose Generating Capacity is limited by the use of any configuration or operating mode described in Section IV.E.

"Line Section" means that portion of the Utility's Electric Delivery System connected to a Customer bounded by automatic sectionalizing devices or the end of the distribution line.

"Material Modification" means a modification that has a material impact on the cost or timing of processing an Application with a later queue priority date or a change in the Point of Interconnection. A Material Modification does not include, for example, (a) a change of ownership of a Generating Facility, (b) a change or replacement of generating equipment that is a like-kind substitution in size, ratings, impedances, efficiencies, or capabilities of the equipment specified in the original Application, or (c) a reduction in the output of the Generating Facility of 10% or less.[3]

"Minor System Modifications" means modifications to a Utility's Electric Delivery System that involve little work or low costs (e.g., less than eight hours of work or $5,000 in materials). Minor System Modifications include, but are not limited to, activities like changing the fuse in a fuse holder cut-out or changing the settings on a circuit recloser.

"Nameplate Rating" means the sum total capacity of all of a Generating Facility's constituent generating units, regardless of whether it is limited by any of the methods in Section IV.E.

"Net Rating" means the Nameplate Rating of the Generating Facility minus the consumption of electrical power of the Auxiliary Load.

"Non-Export" or "Non-Exporting" means when the Generating Facility is sized and designed using any of the methods in Section IV.E, such that the output is used for Host Load only and no electrical energy (except for any Inadvertent Export) is transferred from the Generating Facility to the Electric Delivery System.

"Parties" means the Applicant and the Utility in a particular Interconnection Agreement. "Either Party" refers to either the Applicant or the Utility.

"Point of Common Coupling" means the point of connection between the Utility's Electric Delivery System and the Customer's electrical facilities.

"Point of Interconnection" means the point where the Interconnection Facilities connect with the Utility's Electric Delivery System. This may or may not be coincident with the Point of Common Coupling.

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[3] Different jurisdictions have taken varying approaches to defining what is a "material modification." Some states, like North Carolina and Minnesota, provide extensive examples of what is, and is not, a material modification, to set expectations and guide decision-making. Other states, like California, provide more limited guidance, leaving the determination more to utility discretion.

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"Power Control System" means systems or devices which electronically limit or control steady state currents to a programmable limit.

"Power Rating Configuration Setting" means the as-configured value of the active or apparent power ratings which is used as the rating within the Generating Facility. This alternative rating is associated with the nameplate information required by IEEE Std 1547™-2018 subclause 10.3, as allowed by subclause 10.4.

"Pre-Application Report" has the meaning provided in Section II.B of these procedures.

"Pre-Application Report Request" has the meaning provided in Section I.A of these procedures.

"Protective Function" means the equipment, hardware and/or software in a Generating Facility (whether discrete or integrated with other functions) whose purpose is to protect against conditions that, if left uncorrected, could result in harm to personnel, damage to equipment, loss of safety or reliability, or operation outside pre-established parameters required by the Interconnection Agreement.

"Spot Network" means a section of an Electric Delivery System that uses two or more inter-tied transformers to supply an electrical network circuit. A Spot Network is generally used to supply power to a single Utility customer or to a small group of Utility customers, and has the same meaning as the term is used in IEEE Std 1547™.

"Supplemental Review" has the meaning provided in Section III.D of these procedures.

"System Impact Study" has the meaning provided in Section III.F.4 and Attachment 7A of these procedures.

"UL" means the company by that name which has established standards available at http://ulstandardsinfonet.ul.com/ that relate to components of Generating Facilities.

"Unintended Island" means the creation of an Island without the approval of the Utility, usually following a loss of a portion of the Utility's Electric Delivery System.

"Utility" means an operator of an Electric Delivery System.[4]

[4] Some interconnection procedures reference the operator of the Electric Delivery System as the "Company" or the "Electric Delivery Company (EDC)." Here the term "Utility" is meant to include all investor-owned and public utilities, including cooperatives, municipal utilities and public utility districts. In deregulated states, the "wires" company is the Utility while the energy provider is not.

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Attachment 2

Codes and Standards[1]

1. IEEE Std 1547™, IEEE Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces[2];

2. IEEE Std 1547.1™, Standard Conformance Test Procedures for Equipment Interconnecting Distributed Energy Resources with Electric Power Systems and Associated Interfaces;

3. ANSI C84.1, Electric Power Systems and Equipment – Voltage Ratings (60 Hertz)

4. IEC TR 61000-3-7, Electromagnetic compatibility (EMC) - Part 3-7: Limits - Assessment of emission limits for the connection of fluctuating installations to MV, HV and EHV power systems;

5. IEC 61000-4-3, Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test;

6. IEC 61000-4-5, Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques – Surge immunity test;

7. IEEE Std 1547.2™, Application Guide for IEEE 1547 Standard for Interconnecting Distributed Resources with Electric Power Systems;

8. IEEE Std 1547.3™, Guide for Monitoring Information Exchange and Control of DR Interconnected with Electric Power Systems;

9. IEEE Std 1547.4™, IEEE Guide for Design, Operation, and Integration of Distributed Resource Island System with Electric Power Systems;

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[1] The standard documents have intentionally been listed without the respective publication year. Practice across states and utilities varies in this regard, and an intentional choice should be made whether or not to include the version or year of publication. If the particular version is included in the list of standards, then the interconnection procedures may need updating on a more regular basis as new versions become available and need to be referenced. However, technical requirements of different standard versions can vary significantly. Thus, while these Model Interconnection Procedures do not contain specific technical requirements based on standards, those documents that do contain specific technical requirements (such as those based on IEEE Std 1547™) should be reviewed when a new version of a standard becomes available to ensure that applicable elements of the new version are properly incorporated.

[2] IEEE 1547 provides: "For DER interconnections that include individual synchronous generator units rated 10 MVA and greater, and where the requirements of this standard conflict with the requirements of IEEE Std C50.12 or IEEE Std C50.13, the requirements of IEEE Std C50.12 or IEEE Std C50.13, as relevant to the type of synchronous generator used, shall prevail."

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10. IEEE Std 1547.6™, IEEE Recommended Practice for Interconnecting Distributed Resources with Electric Power Systems Distribution Secondary Networks;

11. IEEE Std 1547.7™, IEEE Guide for Conducting Distribution Impact Studies for Distributed Resource Interconnection;

12. IEEE Std 519™, IEEE Recommended Practices and Requirements for Harmonic Control in Electric Power Systems;

13. IEEE Std 1453™, IEEE Recommended Practice for the Analysis of Fluctuating Installation on Power Systems;

14. IEEE Std C37.90™, IEEE Standard for Relay Systems Associated with Electric Power Apparatus;

15. IEEE Std C37.90.1™, IEEE Standard Surge Withstand Capability (SEC) Tests for Protective Relays and Relay Systems;

16. IEEE Std C37.90.2™, IEEE Standard Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers;

17. IEEE C37.95™, IEEE Guide for Protective Relaying of Utility-Consumer Interconnections;

18. IEEE Std C50.12™, IEEE Standard for Salient-Pole 50 Hz and 60 Hz Synchronous Generators and Generator/Motors for Hydraulic Turbine Applications Rated 5 MVA and Above;

19. IEEE Std C50.13™, IEEE Standard for Cylindrical-Rotor 50 Hz and 60 Hz Synchronous Generators Rated 10 MVA and Above;

20. IEEE Std C62.41.2™, IEEE Recommended Practice on Characterization of Surges in Low Voltage (1000V and Less) AC Power Circuits;

21. IEEE Std C62.45™, IEEE Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000 V and Less) AC Power Circuits;

22. IEEE Std C62.92.1™, IEEE Guide for the Application of Neutral Grounding in Electric Utility Systems—Part I: Introduction;

23. IEEE Std C62.92.2™, IEEE Guide for the Application of Neutral Grounding in Electric Utility Systems, Part II – Grounding of Synchronous Generator Systems;

24. IEEE Std C62.92.6™, IEEE Guide for Application of Neutral Grounding in Electrical Utility Systems, Part VI--Systems Supplied by Current-Regulated Sources;

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25. IEEE Std 2030.5™, IEEE Adoption of Smart Energy Profile 2.0 Application Protocol Standard;

26. IEEE Std 1815™, IEEE Standard for Electric Power Systems Communications-Distributed Network Protocol (DNP3); and

27. UL 1741, Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources. UL 1741 compliance must be recognized or Certified by a Nationally Recognized Testing Laboratory as designated by the U.S. Occupational Safety and Health Administration.[3]

[3] Inverter certification to UL 1741 is routinely required. Some states have established lists of Certified inverters with UL 1741 certification as the primary criterion.

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Attachment 3

Level 1 Application and Interconnection Agreement for Inverter-Based Generating Facilities Not Greater than 25 kW

This Application is complete when it provides all applicable and correct information required below and includes a one-line diagram if required by the Utility and a standard Processing Fee of up to $100, if required by the Utility. This form should be made available in an electronically fillable format and it shall be permissible to submit the form with electronic signatures.

Applicant:

Name: _____

Address: _____

City: State, Zip: _____

Telephone (Day): _____ (Evening): _____

Email Address: _____

Utility Customer Number (if applicable): _____

Electricity Provider (if different from Utility):_____

Representative: (if different from Applicant)

Name: _____

Address: _____

City, State, Zip: _____

Telephone (Day): _____ (Evening): _____

Email Address: _____

Generating Facility Specifications:

All power ratings should be listed in AC throughout.

Location (if different from above): _____

Facility Owner (include percent ownership by any electric utility): _____

_____

Applicant Load: (kW) _____ (if none, so state)

Typical Reactive Load (if known): _____

Total number and type of generators to be interconnected pursuant to this Application: _____

_____

Total number of inverters to be interconnected pursuant to this Application: _____

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Total Aggregate Nameplate Rating for all Generators: (kW) _____ (kVA)_____

Generating Capacity[1]: (kW) _____ (kVA) _____

Limited-Export / Non-Export / Limited-Import Data:

If multiple export control systems are used, provide for each control system and use additional sheets if needed.

Is export controlled to less than the Total Aggregate Nameplate Rating? Yes: _____ No: ____

Method of export limitation: Power Control System / Reverse Power Protection / Minimum Power Protection / Other (describe): _____

Export controls are applied to how many generators? Multiple: _____ One: _____

If Power Control System is used, open loop response time: _____ (s)

Power Control System output limit setting: (kW) _____ (kVA) _____

Energy Storage System Power Control System operating mode:

Unrestricted: _____ Export Only: _____ Import Only: _____ No Exchange: _____

Describe which Generators the export control system controls:_____

_____

Individual Generator Data:

Provide for each Generator, use additional sheets if needed.

Generator Technology: Photovoltaic / Turbine/ Fuel Cell / Energy Storage/ Other (describe): ____

_____

Generator[2] Manufacturer, Model Name & Number: _____

Version Number: _____

Energy Source: Solar / Wind / Hydro / Other (describe): _____

If Energy Storage, usable capacity at maximum discharge rate: _____ (kWh)

Individual Inverter Data (if any):

Provide for each inverter, use additional sheets if needed.

Inverter Manufacturer: _____

Model Name & Number: _____

_____

[1] As limited by any export controls.

[2] E.g. the solar PV module manufacturer, battery manufacturer, etc.

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Version Number:_____

Nameplate Rating: (kW) (kVA) (AC Volts): _____

Rated Power Factor: (Underexcited) _____ (Overexcited) _____

Minimum Power Factor: (Underexcited) _____ (Overexcited) _____

Single phase: _____ Three phase: _____ (check one)

List of adjustable set points for the protective equipment or software: _____

Do export controls apply to this inverter? Yes:_____ No: _____

Single Phase: _____ Three Phase: _____ (check one)

Max design fault contribution current (choose one): Instantaneous: _____ RMS: _____

Is the inverter UL1741 Listed? Yes: _____ No: _____

If Yes, attach evidence of UL1741 listing.

If required by the Utility, attach a one-line diagram of the Generating Facility.

Applicant Signature (may be electronic)

I designate the individual or company listed as my Representative to serve as my agent for the purpose of coordinating with the Utility on my behalf through the interconnection process (*see* Procedures Section IV.F.13). INITIAL: _____

I hereby certify that, to the best of my knowledge, the information provided in this Application is true. I agree to abide by the terms and conditions for a Level 1 Interconnection Agreement, provided on the following pages.

Signed: _____

Title: _____

Date: _____

Operation is contingent on Utility approval to interconnect the Generating Facility.

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Utility Signature (may be electronic)

Interconnection of the Generating Facility is approved contingent upon the terms and conditions for a Level 1 Interconnection Agreement, provided on the following pages ("Agreement").

Utility Signature: _____

Title: _____ Application ID number: _____

Date: _____

Utility waives inspection? Yes _____ No _____

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Terms and Conditions for a Level 1 Interconnection Agreement

1.0 Construction of the Generating Facility

After the Utility executes the Interconnection Agreement by signing the Applicant's Level 1 Application, the Applicant may construct the Generating Facility, including interconnected operational testing not to exceed two hours.

2.0 Interconnection and Operation

The Applicant may operate the Generating Facility and interconnect with the Utility's Electric Delivery System once all of the following have occurred:

2.1. The Generating Facility has been inspected and approved by the appropriate local electrical wiring inspector with jurisdiction, and the Applicant has sent documentation of the approval to the Utility; and

2.2. The Utility has either:

2.2.1 Inspected the Generating Facility and has not found that the Generating Facility fails to comply with a Level 1 technical screen or a UL or IEEE standard; or

2.2.2 Waived its right to inspect the Generating Facility by not scheduling an inspection in the allotted time; or

Explicitly waived the right to inspect the Generating Facility.

3.0 Safe Operations and Maintenance

The Interconnection Customer shall be fully responsible to operate, maintain, and repair the Generating Facility as required to ensure that it complies at all times with IEEE Std 1547™.

4.0 Access

The Utility shall have access to the metering equipment of the Generating Facility at all times. The Utility shall provide reasonable notice to the Interconnection Customer when possible prior to using its right of access.

5.0 Disconnection

The Utility may temporarily disconnect the Generating Facility upon the following conditions:

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5.1. For scheduled outages upon reasonable notice.

5.2. For unscheduled outages or emergency conditions.

5.3. If the Generating Facility does not operate in the manner consistent with these terms and conditions of the Agreement.

5.4. The Utility shall inform the Interconnection Customer in advance of any scheduled disconnection, or as soon as possible after an unscheduled disconnection.

6.0 Indemnification

Each Party shall at all times indemnify, defend, and hold the other Party harmless from any and all damages, losses, claims, including claims and actions relating to injury to or death of any person or damage to property, demand, suits, recoveries, costs and expenses, court costs, attorney fees, and all other obligations by or to third parties, arising out of or resulting from the indemnified Party's action or inactions of its obligations under this Agreement on behalf of the indemnifying Party, except in cases of gross negligence or intentional wrongdoing by the indemnified Party.

7. 0 Insurance

The Interconnection Customer is not required to provide general liability insurance coverage as part of this Agreement, or through any other Utility requirement**.**

8.0 Limitation of Liability

Each Party's liability to the other Party for any loss, cost, claim, injury, liability, or expense, including reasonable attorney's fees, relating to or arising from any act or omission in its performance of this Agreement, shall be limited to the amount of direct damage actually incurred. In no event shall either Party be liable to the other Party for any indirect, incidental, special, consequential, or punitive damages of any kind whatsoever, except as allowed under paragraph 6.0.

9.0 Termination

9.1. This Agreement may be terminated under the following conditions:

9.1.1 By the Interconnection Customer: By providing written notice to the Utility.

9.1.2 By the Utility: If the Generating Facility fails to operate for any consecutive 12- month period or the Interconnection Customer fails to remedy a violation of these terms and conditions of the Agreement.

9.2. Permanent Disconnection: In the event the Agreement is terminated, the Utility shall have the right to disconnect its facilities or direct the Interconnection Customer to disconnect its Generating Facility.

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9.3. Survival Rights: This Agreement shall continue in effect after termination to the extent necessary to allow or require either Party to fulfill rights or obligations that arose under the Agreement.

10.0 Assignment

For a Generating Facility offsetting part or all of the load of a utility customer at a given site, that customer is the Interconnection Customer and that customer may assign its Interconnection Agreement to a subsequent occupant of the site. For a Generating Facility providing energy directly to a Utility, the Interconnection Customer is the owner of the Generating Facility and may assign its Interconnection Agreement to a subsequent owner of the Generating Facility. Assignment is only effective after the assignee provides written notice of the assignment to the Utility and agrees to accept the Interconnection Customer's responsibilities under the Interconnection Agreement.

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Attachment 4

Level 2, Level 3, and Level 4 Interconnection Application

This form should be made available in an electronically fillable format and it shall be permissible to submit the form with electronic signatures.

An Application is complete when it provides all applicable information required below and any required Application fee. A one-line diagram and a load flow data sheet must be supplied with this Application. Additional information to evaluate a request for interconnection may be required after an Application is deemed complete, however the Utility shall endeavor to identify data needs upfront rather than repeatedly asking for additional information.

Applicant requests review under (select one):

_____ Level 2 _____ Level 3 _____ Level 4

Written Applications should be submitted by mail or e-mail to:

Utility: _____

Address: _____

E-Mail Address: _____

Utility Contact Name: _____

Utility Contact Title: _____

1. Applicant Information

Legal Name of Applicant (if an individual, individual's full name)

Name: _____

Address: _____

City, State, Zip: _____

Telephone (Day): _____ (Evening):_____

E-Mail Address: _____

Representative (if different)

Name: _____

Address: _____

City, State, Zip: _____

Telephone (Day): _____ (Evening):_____

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E-Mail Address: _____

Type of interconnection (choose one): _____ Net Metering

_____ Load Response (no export)

_____ Wholesale Provider

Utility Account Number (for Generating Facilities at Utility customer locations): _____[1]

2. Generating Facility Specifications

All power ratings should be listed in AC throughout.

Location (if different from above): _____

Facility Owner (include percent ownership by any electric utility): _____

_____

Applicant Load: (kW) _____ (if none, so state)

Typical Reactive Load (if known): _____

Total number and type of generators to be interconnected pursuant to this Application: _____

_____

Total number of inverters to be interconnected pursuant to this Application: _____

Total Aggregate Nameplate Rating for all Generators: (kW) _____ (kVA)_____

Generating Capacity[2]: (kW) _____ (kVA) _____

(a) Limited-Export / Non-Export / Limited-Import Data:

If multiple export control systems are used, provide for each control system and use additional sheets if needed.

Is export controlled to less than the Total Aggregate Nameplate Rating? Yes: _____ No: ____

Method of export limitation: Power Control System / Reverse Power Protection / Minimum Power Protection / Other (describe): _____

Export controls are applied to how many generators? Multiple: _____ One: _____

If Power Control System is used, open loop response time: _____ (s)

_____

[1] If the Utility requires the customer's name on the application to match the customer on the bill this should be specified on the application.

[2] As limited by any export controls.

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Power Control System output limit setting: (kW) _____ (kVA) _____

Energy Storage System Power Control System operating mode:

Unrestricted: _____ Export Only: _____ Import Only: _____ No Exchange: _____

If relay is used to limit export, list relevant relay setpoints: _____

_____

Describe which Generators the export control system controls:_____

_____

(b) Individual Generator Data:

Provide for each Generator, use additional sheets if needed.

Generator Technology: Photovoltaic / Turbine/ Fuel Cell / Energy Storage/ Other (describe): ___

_____

Generator[3] Manufacturer, Model Name & Number: _____

Version Number: _____

Generator Nameplate Rating: _____

Energy Source: Solar / Wind / Hydro / Other (describe): _____

If Energy Storage, usable capacity at maximum discharge rate: _____ (kWh)

(c) Individual Inverter Data (if any):

Provide for each inverter, use additional sheets if needed.

Inverter Manufacturer: _____

Model Name & Number: _____

Version Number:_____

Nameplate Rating: (kW) (kVA) (AC Volts): _____

Rated Power Factor: (Underexcited) _____ (Overexcited) _____

Minimum Power Factor: (Underexcited) _____ (Overexcited) _____

Do export controls apply to this inverter? Yes:_____ No: _____

Single phase: _____ Three phase: _____ (check one)

List of adjustable set points for the protective equipment or software: _____

_____

_____

[3] E.g. the solar PV module manufacturer, battery manufacturer, etc. The inverter information is provided below.

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Single Phase: _____ Three Phase: _____ (check one)

Max design fault contribution current (choose one): Instantaneous: _____ RMS: _____

Is the inverter UL1741 Listed? Yes: _____ No: _____

If Yes, attach evidence of UL1741 listing.

(d) Rotating Machines (of any type)

Manufacturer, Model Name & Number: _____

Version Number: _____

Nameplate Output Power Rating: (kW) _____ (kVA) _____

Rated Power Factor: (Underexcited) _____ (Overexcited) _____

Minimum Power Factor: (Underexcited) _____ (Overexcited) _____

Single phase: _____ Three phase: _____ (check one)

List of adjustable set points for the protective equipment or software: _____

_____

Do export controls apply to this machine? Yes:_____ No:_____

RPM Frequency: _____

Neutral Grounding Resistor (If Applicable): _____

List components of the Interconnection Equipment Package that are UL or IEEE Certified:

	Equipment Type	Certifying Entity
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____

Is the prime mover compatible with the Interconnection Equipment Package? ___ Yes ___ No

(e) Synchronous Generators

Direct Axis Synchronous Reactance, Xd:_____ P.U.

Direct Axis Transient Reactance, X' d: _____ P.U.

Direct Axis Subtransient Reactance, X" d: _____ P.U.

Negative Sequence Reactance, X2: _____ P.U.

Zero Sequence Reactance, X0: _____ P.U.

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KVA Base: _____

Field Volts: _____

Field Amperes: _____

For synchronous generators, provide appropriate IEEE model block diagram of excitation system, governor system and power system stabilizer (PSS) in accordance with the regional reliability council criteria. A PSS may be determined to be required by applicable studies. A copy of the manufacturer's block diagram may not be substituted.

(f) Induction Generators

Motoring Power (kW): _____

I^2t or K (Heating Time Constant): _____

Rotor Resistance, Rr: _____ Rotor Reactance, Xr: _____

Stator Resistance, Rs: _____ Stator Reactance, Xs: _____

Magnetizing Reactance, Xm: _____

Short Circuit Reactance, Xd: _____

Exciting Current: _____

Temperature Rise: _____

Frame Size: _____

Design Letter: _____

Reactive Power Required In Vars (No Load): _____

Reactive Power Required In Vars (Full Load): _____

Total Rotating Inertia, H: _____ Per Unit on kVA Base

3. Transformer and Protective Relay Specifications

Will a transformer be used between the generator and the Point of Common Coupling?

_____ Yes _____ No

Will the transformer be provided by the Interconnection Customer? _____ Yes _____ No

(a) Transformer Data: (if applicable, for Interconnection Customer-Owned Transformer)

Is the transformer: ____ single phase _____ three phase (check one) Size: _____ kVA

Transformer Impedance: ____ percent on _____ kVA Base

If Three Phase:

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Transformer Primary: _____ Volts _____ Delta _____ Wye _____ Wye Grounded

Transformer Secondary: _____ Volts _____ Delta _____ Wye _____ Wye Grounded

Transformer Tertiary: _____ Volts _____ Delta _____ Wye _____ Wye Grounded

(b) Transformer Fuse Data: (if applicable, for Interconnection Customer-Owned Fuse)

(Enclose/Attach copy of fuse manufacturer's Minimum Melt and Total Clearing Time-Current Curves)

Manufacturer: _____ Type: _____ Size: _____Speed: _____

(c) Interconnecting Circuit Breaker: (if applicable)

Manufacturer: _____ Type: _____

Load Rating (Amps): _____ Interrupting Rating (Amps): _____ Trip Speed (Cycles): ____

(d) Interconnection Protective Relays: (if applicable)

If Microprocessor-Controlled:

List of Functions and Adjustable Setpoints for the protective equipment or software:

	Setpoint Function	Minimum	Maximum
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____

(e) Discrete Components: (if applicable)

(Enclose/Attach Copy of any Proposed Time-Overcurrent Coordination Curves)

Manufacturer: _____ Type: _____ Style/Catalog No.: _____

Proposed Setting: _____

Manufacturer: _____ Type: _____ Style/Catalog No.: _____

Proposed Setting: _____

Manufacturer: _____ Type: _____ Style/Catalog No.: _____

Proposed Setting: _____

(f) Current Transformer Data: (if applicable)

(Enclose/Attach Copy of Manufacturer's Excitation and Ratio Correction Curves)

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Manufacturer: _____

Type: _____ Accuracy Class: _____ Proposed Ratio Connection: _____

(g) Potential Transformer Data: (if applicable)

Manufacturer: _____

Type: _____ Accuracy Class: _____ Proposed Ratio Connection: _____

4. General Information

Enclose/Attach copy of site electrical one-line diagram showing the configuration of all Generating Facility equipment, current and potential circuits, and protection and control schemes.[4] This one-line diagram must be signed and stamped by a licensed Professional Engineer if the Generating Facility is larger than 200 kW.

Is one-line diagram enclosed? _____ Yes _____ No

Enclose/Attach copy of any site documentation that indicates the precise physical location of the proposed Generating Facility and all protective equipment (e.g., USGS topographic map or other diagram or documentation).

Is site documentation enclosed? _____ Yes _____ No

Enclose/Attach copy of any site documentation that describes and details the operation of the protection and control schemes.

Is available documentation enclosed? _____ Yes _____ No

Enclose/Attach copies of schematic drawings for all protection and control circuits, relay current circuits, relay potential circuits, and alarm/monitoring circuits (if applicable).

Are schematic drawings enclosed? _____ Yes _____ No

5. Applicant Signature (may be electronic)

I designate the individual or company listed as my Representative to serve as my agent for the purpose of coordinating with the Utility on my behalf through the interconnection process (*see* Interconnection Procedures Section IV.F.13). INITIAL: _____

I hereby certify that, to the best of my knowledge, all the information provided in this Interconnection Application is true and correct. I also agree to install a warning label provided by (utility) on or near my service meter location. Generating Facilities must be compliant with IEEE, NEC, ANSI, and UL standards, where applicable. By signing below, the Applicant also

_____

[4] Some states require or encourage utilities to publish sample one-line diagrams that illustrate the expectations for format and detail. Such supporting materials can help the customer and the utility by reducing the number of applications that are deemed incomplete on the first try.

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certifies that the installed generating equipment meets the appropriate preceding requirement(s) and can supply documentation that confirms compliance.

Signature of Applicant: _____

Date: _____

6. Information Required Prior to Physical Interconnection

A Certificate of Completion in the form of Attachment 6 of the Interconnection Procedures must be provided to the Utility prior to interconnected operation. The Certificate of Completion must either be signed by an electrical inspector with the authority to approve the interconnection or be accompanied by the electrical inspector's own form authorizing interconnection of the Generating Facility.

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Attachment 5

Level 2, Level 3, and Level 4 Interconnection Agreement

(Standard Agreement for interconnection of Generating Facilities)

This agreement ("Agreement") is made and entered into this _____ day of _____, _____ ("Effective Date") by and between _____, a _____ organized and existing under the laws of the State of _____, ("Interconnection Customer") and _____, a _____, existing under the laws of the State of _____, ("Utility"). Interconnection Customer and Utility each may be referred to as a "Party," or collectively as the "Parties."

Recitals:

Whereas, Interconnection Customer, as an Applicant, is proposing to develop a Generating Facility, or Generating Capacity addition to an existing Generating Facility, consistent with the Application completed by Interconnection Customer on _____; and

Whereas, Interconnection Customer desires to interconnect the Generating Facility with the Utility's Electric Delivery System;

Now, therefore, in consideration of and subject to the mutual covenants contained herein, the Parties agree as follows:

Article 1. Scope and Limitations of Agreement

1.1 This Agreement shall be used for all approved Level 2, Level 3, and Level 4 Interconnection Applications according to the procedures set forth in the Interconnection Procedures. Capitalized terms in this Agreement if not defined in the Agreement have the meanings set forth in the Interconnection Procedures.

1.2 This Agreement governs the terms and conditions under which the Generating Facility will interconnect to, and operate in parallel with, the Utility's Electric Delivery System.

1.3 This Agreement does not constitute an agreement to purchase or deliver the Interconnection Customer's power.

1.4 Nothing in this Agreement is intended to affect any other agreement between Utility and Interconnection Customer. However, in the event that the provisions of this Agreement are in conflict with the provisions of a Utility tariff, the Utility tariff shall control.

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1.5 Responsibilities of the Parties

1.5.1 The Parties shall perform all obligations of this Agreement in accordance with all applicable laws and regulations, and operating requirements.

1.5.2 The Interconnection Customer shall construct and operate the Generating Facility in the manner specified in the Application. If design or operational changes are made, and agreed upon by the Utility, during the interconnection review process those shall be specified in an Exhibit to this Agreement.

1.5.3 The Interconnection Customer shall arrange for the construction, interconnection, operation and maintenance of the Generating Facility in accordance with the applicable manufacturer's recommended maintenance schedule, in accordance with this Agreement.

1.5.4 The Utility shall construct, own, operate, and maintain its Electric Delivery System and its facilities for interconnection ("Interconnection Facilities") in accordance with this Agreement.

1.5.5 The Interconnection Customer agrees to arrange for the construction of the Generating Facility or systems in accordance with applicable specifications that meet or exceed the National Electrical Code, the American National Standards Institute, IEEE, UL, and any operating requirements.

1.5.6 Each Party shall operate, maintain, repair, and inspect, and shall be fully responsible for the facilities that it now or subsequently may own unless otherwise specified in the Exhibits to this Agreement and shall do so in a manner so as to reasonably minimize the likelihood of a disturbance adversely affecting or impairing the other Party.

1.5.7 Each Party shall be responsible for the safe installation, maintenance, repair and condition of their respective lines and appurtenances on their respective sides of the Point of Common Coupling.

Article 2. Inspection, Testing, Authorization, and Right of Access

2.1 Equipment Testing and Inspection
The Interconnection Customer shall arrange for the testing and inspection of the Generating Facility prior to interconnection in accordance with IEEE Std 1547™ and the Interconnection Procedures.

2.2 Certificate of Completion
Prior to commencing parallel operation, the Interconnection Customer shall provide the Utility with a Certificate of Completion substantially in the form of

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Attachment 6 of the Interconnection Procedures. The Certificate of Completion must either be signed by an electrical inspector with the authority to approve the interconnection or be accompanied by the electrical inspector's own form authorizing interconnection of the Generating Facility.

2.3 Authorization
The Interconnection Customer is authorized to commence parallel operation of the Generating Facility when there are no contingencies noted in this Agreement remaining.

2.4 Parallel Operation Obligations
The Interconnection Customer shall abide by all permissible written rules and procedures developed by the Utility which pertain to the parallel operation of the Generating Facility. In the event of conflicting provisions, the Interconnection Procedures shall take precedence over a Utility's rule or procedure, unless such Utility rule or procedure is contained in an approved tariff, in which case the provisions of the tariff shall apply. Copies of the Utility's rules and procedures for parallel operation are either provided as an exhibit to this Agreement or in an exhibit that provides reference to a website with such material.

2.5 Reactive Power
The Interconnection Customer shall design its Generating Facility to maintain a composite power delivery at continuous rated power output at the Point of Common Coupling at a power factor within the range of 0.95 absorbing to 0.95 injecting.

2.6 Right of Access
At reasonable hours, and upon reasonable notice, or at any time without notice in the event of an emergency or hazardous condition, the Utility shall have reasonable access to the Interconnection Customer's premises for any reasonable purpose in connection with the performance of the obligations imposed on the Utility under this Agreement, or as is necessary to meet a legal obligation to provide service to customers.

Article 3. Effective Date, Term, Termination, and Disconnection

3.1 Effective Date
This Agreement shall become effective upon execution by the Parties.

3.2 Term of Agreement
This Agreement shall remain in effect unless terminated earlier in accordance with Article 3.3 of this Agreement.

3.3 Termination
No termination shall become effective until the Parties have complied with all applicable laws and regulations applicable to such termination.

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3.3.1 The Interconnection Customer may terminate this Agreement at any time by giving the Utility twenty (20) Business Days' written notice.

3.3.2 Either Party may terminate this Agreement pursuant to Article 6.6.

3.3.3 Upon termination of this Agreement, the Generating Facility will be disconnected from the Electric Delivery System. The termination of this Agreement shall not relieve either Party of its liabilities and obligations, owed or continuing at the time of the termination.

3.3.4 The provisions of this Article shall survive termination or expiration of this Agreement.

3.4 Temporary Disconnection

The Utility may temporarily disconnect the Generating Facility from the Electric Delivery System for so long as reasonably necessary in the event one or more of the following conditions or events:

3.4.1 Emergency Conditions: "Emergency Condition" shall mean a condition or situation:

(1) that in the judgment of the Party making the claim is imminently likely to endanger life or property; or

(2) that, in the case of Utility, is imminently likely (as determined in a non-discriminatory manner) to cause a material adverse effect on the security of the Utility's Interconnection Facilities or damage to the Electric Delivery System; or

(3) that, in the case of the Interconnection Customer, is imminently likely (as determined in a non-discriminatory manner) to cause a material adverse effect on the security of, or damage to, the Generating Facility.

Under emergency conditions, the Utility or the Interconnection Customer may immediately suspend interconnection service and temporarily disconnect the Generating Facility. The Utility shall notify the Interconnection Customer promptly when it becomes aware of an Emergency Condition that may reasonably be expected to affect the Interconnection Customer's operation of the Generating Facility. The Interconnection Customer shall notify the Utility promptly when it becomes aware of an Emergency Condition that may reasonably be expected to affect the Utility's Electric Delivery System. To the extent information is known, the notification shall describe the Emergency Condition, the extent of the damage or deficiency, the expected effect on the operation of both Parties' facilities and operations, its anticipated duration, and any necessary corrective action.

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3.4.2 Routine Maintenance, Construction, and Repair: The Utility may interrupt interconnection service or curtail the output of the Generating Facility and temporarily disconnect the Generating Facility from the Electric Delivery System when necessary for routine maintenance, construction, and repairs on the Electric Delivery System. The Utility shall provide the Interconnection Customer with five (5) Business Days notice prior to such interruption. The Utility shall use reasonable efforts to coordinate such repair or temporary disconnection with the Interconnection Customer.

3.4.3 Forced Outages: During any forced outage, the Utility may suspend interconnection service to effect immediate repairs on the Electric Delivery System. The Utility shall use reasonable efforts to provide the Interconnection Customer with prior notice. If prior notice is not given, the Utility shall, upon request, provide the Interconnection Customer written documentation after the fact explaining the circumstances of the disconnection.

3.4.4 Adverse Operating Effects: The Utility shall provide the Interconnection Customer with a written notice of its intention to disconnect the Generating Facility if, based on good utility practice, the Utility determines that operation of the Generating Facility will likely cause unreasonable disruption or deterioration of service to other Utility customers served from the same electric system, or if operating the Generating Facility could cause damage to the Electric Delivery System. Supporting documentation used to reach the decision to disconnect shall be provided to the Interconnection Customer upon request. The Utility may disconnect the Generating Facility if, after receipt of the notice, the Interconnection Customer fails to remedy the adverse operating effect within a reasonable time which shall be at least five (5) Business Days from the date the Interconnection Customer receives the Utility's written notice supporting the decision to disconnect, unless emergency conditions exist in which case the provisions of Article 3.4.1 apply.

3.4.5 Modification of the Generating Facility: The Interconnection Customer must receive written authorization from Utility before making any change to the Generating Facility that may have a material impact on the safety or reliability of the Electric Delivery System. Such authorization shall not be unreasonably withheld. Modifications shall be completed in accordance with good utility practice. Requests for modification and approval of such requests shall be made in accordance with Section I.C.4 of the Interconnection Procedures. If the Interconnection Customer makes such modification without the Utility's prior written authorization, the latter shall have the right to temporarily disconnect the Generating Facility.

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3.4.6 Reconnection: The Parties shall cooperate with each other to restore the Generating Facility, Interconnection Facilities, and the Electric Delivery System to their normal operating state as soon as reasonably practicable following a temporary disconnection.

Article 4. Cost Responsibility for Interconnection Facilities and Distribution Upgrades

4.1 Interconnection Facilities

4.1.1 The Interconnection Customer shall pay for the cost of the interconnection facilities itemized in the Exhibits to this Agreement ("Interconnection Facilities"). If a Facilities Study was performed, the Utility shall identify its Interconnection Facilities necessary to safely interconnect the Generating Facility with the Electric Delivery System, the cost of those facilities, and the time required to build and install those facilities.

4.1.2 The Interconnection Customer shall be responsible for its share of all reasonable expenses, including overheads, associated with (1) owning, operating, maintaining, repairing, and replacing its Interconnection Equipment Package, and (2) operating, maintaining, repairing, and replacing the Utility's Interconnection Facilities as set forth in any exhibits to this Agreement.

4.2 Distribution Upgrades

The Utility shall design, procure, construct, install, and own any Electric Delivery System upgrades ("Utility Upgrades"). The actual cost of the Utility Upgrades, including overheads, shall be directly assigned to the Interconnection Customer.

Article 5. Billing, Payment, Milestones, and Financial Security

5.1 Billing and Payment Procedures and Final Accounting

5.1.1 The Utility shall bill the Interconnection Customer for the design, engineering, construction, and procurement costs of the Utility provided Interconnection Facilities and Utility Upgrades contemplated by this Agreement as set forth in the exhibits to this Agreement, on a monthly basis, or as otherwise agreed by the Parties. The Interconnection Customer shall pay each bill within thirty (30) calendar days of receipt, or as otherwise agreed by the Parties.

5.1.2 Within sixty (60) Calendar Days of completing the construction and installation of the Utility's Interconnection Facilities and Utility Upgrades described in the exhibits to this Agreement, the Utility shall provide the Interconnection Customer with a final accounting report of any difference between (1) the actual cost incurred to complete the construction and installation and the budget estimate provided to the Interconnection

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Customer and (2) the Interconnection Customer's previous deposit and aggregate payments to the Utility for such Interconnection Facilities and Utility Upgrades. The Utility shall provide a written explanation for any actual cost exceeding a budget estimate by 25 percent or more. If the Interconnection Customer's cost responsibility exceeds its previous deposit and aggregate payments, the Utility shall invoice the Interconnection Customer for the amount due and the Interconnection Customer shall make payment to the Utility within thirty (30) calendar days. If the Interconnection Customer's previous deposit and aggregate payments exceed its cost responsibility under this Agreement, the Utility shall refund to the Interconnection Customer an amount equal to the difference within thirty (30) Business Days of the final accounting report.

5.2 Interconnection Customer Deposit

At least twenty (20) Business Days prior to the commencement of the design, procurement, installation, or construction of a discrete portion of the Utility's Interconnection Facilities and Utility Upgrades, the Interconnection Customer shall provide the Utility with a deposit equal to 50 percent of the cost estimated for its Interconnection Facilities prior to its beginning design of such facilities.

Article 6. Assignment, Liability, Indemnity, Force Majeure, Consequential Damages, and Default

6.1 Assignment

This Agreement may be assigned by either Party as provided below upon fifteen (15) Business Days' prior written notice to the other Party.

6.1.1 Either Party may assign this Agreement without the consent of the other Party to any affiliate of the assigning Party and with the legal authority and operational ability to satisfy the obligations of the assigning Party under this Agreement.

6.1.2 The Interconnection Customer shall have the right to assign this Agreement, without the consent of the Utility, for collateral security purposes to aid in providing financing for the Generating Facility.

6.1.3 For a Generating Facility offsetting part or all of the load of a utility customer at a given site, that customer is the Interconnection Customer and that customer may assign its Interconnection Agreement to a subsequent occupant of the site. For a Generating Facility providing energy directly to a Utility, the Interconnection Customer is the owner of the Generating Facility and may assign its Interconnection Agreement to a subsequent owner of the Generating Facility. Assignment is only effective after the assignee provides

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written notice of the assignment to the Utility and agrees to accept the Interconnection Customer's responsibilities under this Interconnection Agreement.

6.1.4 All other assignments shall require the prior written consent of the non-assigning Party, such consent not to be unreasonably withheld.

6.1.5 Any attempted assignment that violates this Article is void and ineffective. Assignment shall not relieve a Party of its obligations, nor shall a Party's obligations be enlarged, in whole or in part, by reason thereof. An assignee is responsible for meeting the same obligations as the Interconnection Customer.

6.2 Limitation of Liability

Each Party's liability to the other Party for any loss, cost, claim, injury, liability, or expense, including reasonable attorney's fees, relating to or arising from any act or omission in its performance of this Agreement, shall be limited to the amount of direct damage actually incurred. In no event shall either Party be liable to the other Party for any indirect, special, consequential, or punitive damages, except as specifically authorized by this Agreement.

6.3 Indemnity

6.3.1 This provision protects each Party from liability incurred to third Parties as a result of carrying out the provisions of this Agreement. Liability under this provision is exempt from the general limitations on liability found in Article 6.2.

6.3.2 Each Party shall at all times indemnify, defend, and hold the other Party harmless from any and all damages, losses, claims, including claims and actions relating to injury to or death of any person or damage to property, demand, suits, recoveries, costs and expenses, court costs, attorney fees, and all other obligations by or to third parties, arising out of or resulting from the indemnified Party's action or failure to meet its obligations under this Agreement on behalf of the indemnifying Party, except in cases of gross negligence or intentional wrongdoing by the indemnified Party.

6.3.3 If an indemnified Party is entitled to indemnification under this Article as a result of a claim by a third party, the indemnifying Party shall, after reasonable notice from the indemnified Party, assume the deference of such claim. If the indemnifying Party fails, after notice and reasonable opportunity to proceed under this Article, to assume the defense of such claim, the indemnified Party may at the expense of the indemnifying Party contest, settle or consent to the entry of any judgment with respect to, or pay in full, such claim.

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6.3.4 If the indemnifying Party is obligated to indemnify and hold the indemnified Party harmless under this Article, the amount owing to the indemnified Party shall be the amount of such indemnified Party's actual loss, net of any insurance or other recovery.

6.3.5 Promptly after receipt of any claim or notice of the commencement of any action or administrative or legal proceeding or investigation as to which the indemnity provided for in this Article may apply, the indemnified Party shall notify the indemnifying Party of such fact. Any failure of or delay in such notification shall not affect a Party's indemnification obligation unless such failure or delay is materially prejudicial to the indemnifying Party.

6.4 Consequential Damages

Neither Party shall be liable under any provision of this Agreement for any losses, damages, costs or expenses for any special, indirect, incidental, consequential, or punitive damages, including but not limited to loss of profit or revenue, loss of the use of equipment, cost of capital, cost of temporary equipment or services, whether based in whole or in part in contract, in tort, including negligence, strict liability, or any other theory of liability; provided, however, that damages for which a Party may be liable to the other Party under another agreement will not be considered to be special, indirect, incidental, or consequential damages hereunder.

6.5 Force Majeure

6.5.1 As used in this Article, a Force Majeure Event shall mean any act of God, labor disturbance, act of the public enemy, war, acts of terrorism, insurrection, riot, fire, storm or flood, explosion, breakage or accident to machinery or equipment, any order, regulation or restriction imposed by governmental, military or lawfully established civilian authorities, or any other cause beyond a Party's control. A Force Majeure Event does not include an act of negligence or intentional wrongdoing.

6.5.2 If a Force Majeure Event prevents a Party from fulfilling any obligations under this Agreement, the Party affected by the Force Majeure Event ("Affected Party") shall promptly notify the other Party of the existence of the Force Majeure Event. The notification must specify in reasonable detail the circumstances of the Force Majeure Event, its expected duration, and the steps that the Affected Party is taking to mitigate the effects of the event on its performance, and if the initial notification was verbal, it should be promptly followed up with a written notification. The Affected Party shall keep the other Party informed on a continuing basis of developments relating to the Force Majeure Event until the event ends. The Affected Party will be entitled to suspend or modify its performance of obligations under this Agreement (other than the obligation to make payments) only to the extent that the effect of the Force Majeure Event

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cannot be reasonably mitigated by the Affected Party. The Affected Party shall use reasonable efforts to resume its performance as soon as possible.

6.6 Default

6.6.1 Default exists where a Party has materially breached any provision of this Agreement, except that no default shall exist where a failure to discharge an obligation (other than the payment of money) is the result of a Force Majeure Event as defined in this Agreement, or the result of an act or omission of the other Party.

6.6.2 Upon a default, the non-defaulting Party shall give written notice of such default to the defaulting Party. Except as provided in Article 6.6.3, the defaulting Party shall have 60 calendar days from receipt of the default notice within which to cure such default; provided however, if such default is not capable of cure within 60 calendar days, the defaulting Party shall commence efforts to cure within 20 calendar days after notice and continuously and diligently pursue such cure within six months from receipt of the default notice; and, if cured within such time, the default specified in such notice shall cease to exist.

6.6.3 If a default is not cured as provided in this Article, or if a default is not capable of being cured within the period provided for herein, the non-defaulting Party shall have the right to terminate this Agreement by written notice at any time until cure occurs, and be relieved of any further obligation hereunder and, whether or not that Party terminates this Agreement, to recover from the defaulting Party all amounts due hereunder, plus all other damages and remedies to which it is entitled at law or in equity. The provisions of this Article will survive termination of this Agreement.

Article 7. Insurance

The Interconnection Customer is not required to provide insurance coverage for utility damages beyond the amounts listed in Section IV.F.6 of the Interconnection Procedures as part of this Agreement, nor is the Interconnection Customer required to carry general liability insurance as part of this Agreement or any other Utility requirement. It is, however, recommended that the Interconnection Customer protect itself with liability insurance.

Article 8. Dispute Resolution

Any dispute arising from or under the terms of this Agreement shall be subject to the dispute resolution procedures contained in the Interconnection Procedures.

Article 9. Miscellaneous

9.1 Governing Law, Regulatory Authority, and Rules

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The validity, interpretation and enforcement of this Agreement and each of its provisions shall be governed by the laws of the State of _____, without regard to its conflicts of law principles (*if left blank, such state shall be the state in which the Generating Facility is located*). This Agreement is subject to all applicable laws and regulations. Each Party expressly reserves the right to seek changes in, appeal, or otherwise contest any laws, orders, or regulations of a governmental authority.

9.2 Amendment

The Parties may only amend this Agreement by a written instrument duly executed by both Parties.

9.3 No Third-Party Beneficiaries

This Agreement is not intended to and does not create rights, remedies, or benefits of any character whatsoever in favor of any persons, corporations, associations, or entities other than the Parties, and the obligations herein assumed are solely for the use and benefit of the Parties, their successors in interest, and, where permitted, their assigns.

9.4 Waiver

9.4.1 The failure of a Party to this Agreement to insist, on any occasion, upon strict performance of any provision of this Agreement will not be considered a waiver of any obligation, right, or duty of, or imposed upon, such Party.

9.4.2 Any waiver at any time by either Party of its rights with respect to this Agreement shall not be deemed a continuing waiver or a waiver with respect to any failure to comply with any other obligation, right, or duty of this Agreement. Termination or default of this Agreement for any reason by the Interconnection Customer shall not constitute a waiver of the Interconnection Customer's legal rights to obtain an interconnection from the Utility. Any waiver of this Agreement shall, if requested, be provided in writing.

9.5 Entire Agreement

This Agreement, including all exhibits, constitutes the entire Agreement between the Parties with reference to the subject matter hereof, and supersedes all prior and contemporaneous understandings or agreements, oral or written, between the Parties with respect to the subject matter of this Agreement. There are no other agreements, representations, warranties, or covenants which constitute any part of the consideration for, or any condition to, either Party's compliance with its obligations under this Agreement.

9.6 Multiple Counterparts

This Agreement may be executed in two or more counterparts, each of which is deemed an original but all of which constitute one and the same Agreement.

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9.7 No Partnership

This Agreement shall not be interpreted or construed to create an association, joint venture, agency relationship, or partnership between the Parties nor to impose any partnership obligation or partnership liability upon either Party. Neither Party shall have any right, power or authority to enter into any agreement or undertaking for, or act on behalf of, or to act as or be an agent or representative of, or to otherwise bind, the other Party.

9.8 Severability

If any provision or portion of this Agreement shall for any reason be held or adjudged to be invalid or illegal or unenforceable by any court of competent jurisdiction or other Governmental Authority, (1) such portion or provision shall be deemed separate and independent, (2) the Parties shall negotiate in good faith to restore, insofar as practicable, the benefits to each Party that were affected by such ruling, and (3) the remainder of this Agreement shall remain in full force and effect.

9.9 Environmental Releases

Each Party shall notify the other Party, first orally and then in writing, of the release any hazardous substances, any asbestos or lead abatement activities, or any type of remediation activities related to the Generating Facility or the Interconnection Facilities, each of which may reasonably be expected to affect the other Party. The notifying Party shall (1) provide the notice as soon as practicable, provided such Party makes a good faith effort to provide the notice no later than 24 hours after such Party becomes aware of the occurrence, and (2) promptly furnish to the other Party copies of any publicly available reports filed with any governmental authorities addressing such events.

9.10 Subcontractors

Nothing in this Agreement shall prevent a Party from utilizing the services of any subcontractor as it deems appropriate to perform its obligations under this Agreement; provided, however, that each Party shall require its subcontractors to comply with all applicable terms and conditions of this Agreement in providing such services and each Party shall remain liable for the performance of such subcontractor.

9.10.1 The creation of any subcontract relationship shall not relieve the hiring Party of any of its obligations under this Agreement. The hiring Party shall be fully responsible to the other Party for the acts or omissions of any subcontractor the hiring Party hires as if no subcontract had been made; provided, however, that in no event shall Utility be liable for the actions or inactions of the Interconnection Customer or its subcontractors with respect to obligations of the Interconnection Customer under this Agreement. Any applicable obligation imposed by this Agreement upon the hiring Party shall be equally binding upon, and shall be construed as having Application to, any subcontractor of such Party.

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9.10.2 The obligations under this Article will not be limited in any way by any limitation of subcontractor's insurance.

Article 10. Notices

10.1 General

Unless otherwise provided in this Agreement, any written notice, demand, or request required or authorized in connection with this Agreement ("Notice") shall be deemed properly given if delivered in person, delivered by recognized national currier service, or sent by first class mail, postage prepaid, to the person specified below:

Interconnection Customer:

_____

Attention: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____

Email: _____

Utility:

Attention: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____

Email: _____

10.2 Billing and Payment

Billings and payments to Interconnection Customer shall be sent to the address provided in Section 10.1 unless an alternative address is provided here:

Interconnection Customer:

_____

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Attention: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____

Email: _____

10.3 Designated Operating Representative

The Parties may also designate operating representatives to conduct the communications which may be necessary or convenient for the administration of this Agreement (*see* Interconnection Procedures Section IV.F.13). This person will also serve as the point of contact with respect to operations and maintenance of the Party's facilities.

Interconnection Customer's operating representative:

_____

Attention: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____

Email: _____

Utility's operating representative:

Attention: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____

Email: _____

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Article 11. Signatures

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by their respective duly authorized representatives.

For the Utility:

Signature: _____ Date: _____

Printed Name: _____

Title: _____

For the Interconnection Customer:

Signature: _____ Date: _____

Printed Name: _____

Title: _____

Exhibits incorporated in this Agreement: *May include:*

a) one-line diagram and site maps

b) Interconnection Facilities to be constructed by the Utility. The interconnection facilities exhibit shall include any milestones for both the Interconnection Customer and the Utility as well as cost responsibility and apportionments if there is more than one Generating Facility interconnecting and sharing in the Distribution Upgrade costs;

c) operational requirements or reference to Utility website with these requirements – this exhibit shall require the Interconnection Customer to operate within the bounds of IEEE Std 1547™ and associated standards;

d) reimbursement of costs (Utility may, in its sole discretion, reimburse Interconnection Customer for Utility Upgrades that benefit future Generating Facilities);

e) operating restrictions (no operating restrictions generally apply to Levels 1, 2 or 3 interconnections but may apply, in the discretion of the Utility, to Generating Facilities approved under Level 4. Design or operating changes or limitations that are different from the application should be identified);

f) copies of, Impact and Facilities Study agreements.

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Attachment 6

Certification of Completion

Installation Information Check if owner-installed ☐

Applicant: _____ Contact Person: _____
Mailing Address: _____
Location of Generating Facility (if different from above): _____
City: _____ State: _____ Zip Code: _____
Telephone (Daytime): _____ (Evening): _____
E-Mail Address: _____

Electrician:

Installing Electrician: _____ Firm: _____

License No.: _____
Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Telephone (Daytime): _____ (Evening): _____
E-Mail Address: _____

Installation Date: _____ Interconnection Date: _____

Electrical Inspection:

The system has been installed and inspected in compliance with the local Building/Electrical Code of _____ (appropriate governmental authority).

Local Electrical Wiring Inspector (***or attach signed electrical inspector's form***):

Signature: _____
Name (printed): _____ Date: _____

The electrical inspector's form may be used in place of this form, so long as it contains substantively the same information and approval.

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Attachment 7

System Impact and Facilities Study Agreements

As noted in the Interconnection Procedures, a Utility may require that a proposed Level 4 Generating Facility be subject to System Impact and Facilities Studies. At the Utility's discretion, any of these studies may be combined or foregone. Also, at the Utility's discretion, for any study, the Applicant may be required to provide information beyond the contents of the Application; but, the Utility shall endeavor to request all information upfront to the greatest extent possible. Sample study agreements are provided on the following pages.

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Attachment 7A

System Impact Study Agreement

This agreement ("Agreement") is made and entered into this _____ day of _____ by and between _____, a_____ organized and existing under the laws of the State of_____, ("Applicant,") and _____, a _____ existing under the laws of the State of _____, ("Utility"). The Applicant and the Utility each may be referred to as a "Party," or collectively as the "Parties."

Recitals:

Whereas, Applicant is proposing to develop a Generating Facility or Generating Capacity addition to an existing Generating Facility consistent with the Application completed by Applicant on and;
Whereas, Applicant desires to interconnect the Generating Facility with the Utility's Electric Delivery System;
Whereas, Applicant has requested the Utility perform a System Impact Study to assess the impact of interconnecting the Generating Facility to the Utility's Electric Delivery System;
Now, therefore, in consideration of and subject to the mutual covenants contained herein the Parties agree as follows:

1. When used in this Agreement, Capitalized terms shall have the meanings indicated. Capitalized terms not defined in this Agreement shall have the meanings specified in the Interconnection Procedures.
2. Applicant elects and the Utility shall cause to be performed a System Impact Study consistent with Section III.F.4 of the Interconnection Procedures.
3. The scope of the System Impact Study shall be based on information supplied in the Application, any prior study of the Generating Facility completed by the Utility, and any other information or assumptions set forth in any attachment to this Agreement.
4. The Utility reserves the right to request additional technical information from Applicant as may reasonably become necessary consistent with good utility practice during the course of the System Impact Study. If after signing this Agreement, Applicant modifies its Application or any of the information or assumptions in any attachment to this Agreement, the time to complete the System Impact Study may be extended.
5. The System Impact Study shall provide the following information:
    - 5.1. Identification of any circuit breaker short circuit capability limits exceeded as a result of the interconnection,
    - 5.2. Identification of any thermal overload or voltage limit violations resulting from the interconnection,
    - 5.3. Identification of any instability or inadequately damped response to system disturbances resulting from the interconnection and
    - 5.4. Description and non-binding, good faith estimated cost of facilities required to interconnect the Generating Facility to the Electric Delivery System and to address the identified short circuit, instability, and power flow issues.

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6. The Utility may require a study deposit of the lesser of 50 percent of estimated non-binding good faith study costs or $3,000. If required, this shall be provided by the Applicant at the time it returns this Agreement.
7. The System Impact Study shall be completed and the results transmitted to Applicant within forty (40) Business Days after this Agreement is signed by the Parties, unless the proposed Generating Facility will impact other proposed generating facilities.
8. Study fees shall be based on actual costs and will be invoiced to Applicant after the study is transmitted to Applicant. The invoice shall include an itemized listing of employee time and costs expended on the study.
9. Applicant shall pay any actual study costs that exceed the deposit without interest within thirty (30) calendar days on receipt of the invoice. The Utility shall refund any excess amount without interest within thirty (30) calendar days of the invoice.

In witness thereof, the Parties have caused this Agreement to be duly executed by their duly authorized officers or agents on the day and year first above written.

For the Utility

Signature: _____ Date: _____

Printed Name: _____

Title: _____

Date: _____

For the Applicant

Signature: _____ Date: _____

Printed Name: _____

Title: _____

Are attachments included to supplement or modify information contained in the Application?

_____ Yes _____ No

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Attachment 7B

Interconnection Facilities Study Agreement

This agreement ("Agreement") is made and entered into this _____ day of _____ by and between _____, a _____ organized and existing under the laws of the State of _____, ("Applicant,") and _____, a _____existing under the laws of the State of _____, ("Utility"). The Applicant and the Utility each may be referred to as a "Party," or collectively as the "Parties."

Recitals:

Whereas, Applicant is proposing to develop a Generating Facility or Generating Capacity addition to an existing Generating Facility consistent with the Application completed by Applicant; and

Whereas, Applicant desires to interconnect the Generating Facility with the Utility's Electric Delivery System;

Whereas, the Utility has completed or waived an System Impact Study and provided the results of said studies to Applicant; and

Whereas, Applicant has requested that Utility perform a Facilities Study to specify and estimate the cost of the engineering, procurement and construction work needed to physically and electrically connect the Generating Facility to the Electric Delivery System in accordance with good utility practice.

Now, therefore, in consideration of and subject to the mutual covenants contained herein the Parties agree as follows:

1. When used in this agreement, capitalized terms shall have the meanings indicated. Capitalized terms not defined in this agreement shall have the meanings specified in the Interconnection Procedures.
2. Applicant elects and the Utility shall cause to be performed a Facilities Study consistent with Section III.F.5 of the Interconnection Procedures.
3. The scope of the Facilities Study shall be subject to information supplied in the Application, and any feasibility study or System Impact Study performed by the Utility for the Generating Facility and any other information or assumptions set forth in any attachment to this agreement.
4. The Utility reserves the right to request additional technical information from Applicant as may reasonably become necessary consistent with good utility practice during the course of the Facilities Study.
5. A Facilities Study report (1) shall provide a detailed and itemized description of all required facilities to interconnect the Generating Facility to the Electric Delivery System, the estimated costs of those facilities, and schedule for their construction and (2) shall address the short circuit, instability, and power flow issues identified in the System Impact Study.
6. The Utility may require a study deposit of the lesser of 50 percent of estimated non-binding good faith study costs or $5,000. If required, this shall be provided by the Applicant at the time it returns this Agreement.

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7. The Facilities Study shall be completed and the results shall be transmitted to Applicant within sixty (60) Business Days after this agreement is signed by the Parties.
8. Study fees shall be based on actual costs and will be invoiced to Applicant after the study is transmitted to Applicant. The invoice shall include an itemized listing of employee time and costs expended on the study.
9. Applicant shall pay any actual study costs that exceed the deposit without interest within thirty (30) calendar days on receipt of the invoice. The Utility shall refund any excess amount without interest within thirty (30) calendar days of the invoice.

In witness whereof, the Parties have caused this agreement to be duly executed by their duly authorized officers or agents on the day and year first above written.

For the Utility

Signature: _____ Date: _____

Printed Name: _____

Title: _____

Date: _____

For the Applicant

Signature: _____ Date: _____

Printed Name: _____

Title: _____

Are attachments included to supplement or modify information contained in the Application and the System Impact Study (if performed)?

_____ Yes _____ No

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Attachment 8

Public Queue Requirements

Each utility shall maintain a public interconnection queue, pursuant to Interconnection Procedures Section I.C.3, available in a sortable spreadsheet format on its website, which it shall update on at least a monthly basis. The date of the most recent update shall be clearly indicated.

The public queue should include, at a minimum, the following information about each interconnection application.

1. Queue number
2. Facility capacity (kW)
3. Primary fuel type (e.g., solar, wind, bio-gas, etc.)
4. Secondary fuel type (if applicable)
5. Exporting or Non-Exporting
6. City
7. Zip code
8. Substation
9. Feeder
10. Status (active, withdrawn, interconnected, etc.)
11. Date application deemed complete
12. Date of notification of Level 2 screen results, for projects undergoing review under Levels 1, 2, or 3 (if applicable)
13. Level 2 Screen results, for projects undergoing review under Levels 1, 2, or 3 (pass or fail, and if fail, identify the screens failed)
14. Date of notification of Supplemental Review results (if applicable)
15. Supplemental Review Results (pass or fail, and if fail, identify the screens failed)
16. Date of notification of System Impact Study results (if applicable)
17. Date of notification of Facilities Study results and/or construction estimates (if applicable)

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18. Date final Interconnection Agreement is provided to Customer

19. Date Interconnection Agreement is signed by both parties

20. Date of grant of permission to operate

21. Final interconnection cost paid to utility

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Attachment 9

Reporting Requirements

Each Utility shall submit to the Commission make available to the public on its website an interconnection report the following information, as required by Section IV.D. The report shall contain information in the following areas, including relevant totals for both the year and the most recent reporting period.

1. Pre-Application Reports
    a. Total number of reports requested
    b. Total number of reports in process
    c. Total number of reports issued
    d. Total number of requests withdrawn
    e. Maximum, mean, and median processing times from receipt of request to issuance of report
    f. Number of reports processed in more than the ten (10) Business Days allowed in Section II.B.1

2. Interconnection Applications:

    a. Total number received, broken down by:
        i. Primary fuel type (e.g., solar, wind, bio-gas, etc.)
        ii. System size (e.g., <20 kW, <1 MW, <5MW, >5MW)

    b. Level 1 Review Process
        i. Total number of applications processed
        ii. Maximum, mean, and median processing times from receipt of complete Application to provision of counter-signed Interconnection Agreement

    c. Level 2 Review Process
        i. Total number of applications that passed the screens in Section III.B.2
        ii. Total number of applications that failed the screens in Section III.B.2[1]
        Maximum, mean, and median processing times from receipt of complete Application to issuance of Interconnection Agreement

[1] If the specific screens failed are not tracked in the public queue, or a queue is not published for smaller projects, then the utilities should be required to report on the number of projects that are failing each screen and in what size categories. Failure of specific screens is an important indication of whether penetrations are reaching high levels or whether other issues exist that may require a broader policy or technical solution.

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d. Level 3 Review Process
   i. Total number of applications that passed the screens in Section III.B.2
   ii. Total number of applications that failed the screens in Section III.B.2
   iii. Maximum, mean, and median processing times from receipt of complete Application to issuance of Interconnection Agreement

e. Supplemental Review
   i. Total number of applications that passed the screens in Section III.D.1
   ii. Total number of applications that failed the screens in Section III.D.1
   iii. Maximum, mean, and median processing times from receipt of complete Application to issuance of Interconnection Agreement

f. Level 4 Review Process
   i. System Impact Studies
   ii. Total number of System Impact Studies completed under Section III.F.4
   iii. Maximum, mean, and median processing times from receipt of signed Interconnection System Impact Study Agreement to provision of study results

g. Facilities Studies
   i. Total number of Facilities Studies completed under Section III.F.5
   ii. Maximum, mean, and median processing times from receipt of signed Interconnection Facilities Study Agreement to provision of study results
   iii. Maximum, mean, and median processing times for projects undergoing the study process from receipt of complete Application to issuance of Interconnection Agreement

h. Construction: Number of projects where final construction milestone was not reached by time specified in the Interconnection Agreement

i. Number of Projects that achieved Commercial Operation, by:
   i. Primary fuel type (e.g., solar, wind, bio-gas, etc.)
   ii. System size (e.g., <20 kW, <1 MW, <5MW, >5MW)

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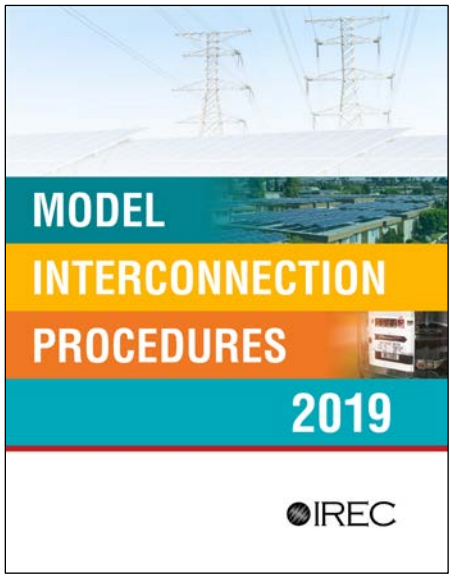

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