

UNITED POWER INTERCONNECTION PROCEDURES FOR GENERATION FACILITIES

I. INTRODUCTION

This document has been prepared to explain the procedures established by United Power (the “Cooperative”) to interconnect a Qualifying Generation Facility with the Cooperative Distribution System. These procedures are designed to provide an expeditious interconnection to the Cooperative Distribution System that is both safe and reliable. This document outlines the interconnection process, requirements, and agreements used for all types of Generation Facilities which:

- 1) Have a total aggregate Nameplate Capacity of 10 MW or less;
- 2) Are planned for interconnection and parallel operation with the Cooperative Distribution System;
- 3) Are not intended for wholesale transactions;
- 4) Are not anticipated to affect the transmission system.

As a practical matter, if the Generation Facility Nameplate Capacity is not greater in size than the minimum expected load on the distribution substation that is feeding the proposed Generation Facility, and the Generation Facility’s energy is not being sold on the wholesale market, then that installation may be considered as not “affecting” the transmission system and the interconnection may be considered as governed by these procedures. However, the Transmission Owner and Transmission Provider shall make the final determination on whether the transmission system may be affected by interconnection of the Generation Facility. If the Generation Facility will be selling energy on the wholesale market or the Generation Facility’s total Nameplate Capacity is greater than the expected distribution substation minimum load, then the Applicant shall also contact the Transmission Owner and Transmission Provider and follow their procedures. Further, an interconnection request as provided by these procedures does not constitute a request for transmission service.

To interconnect a Generation Facility with the Cooperative Distribution System, there are several steps that must be followed. This document outlines those steps and the Parties’ responsibilities. At any point in the process, if there are questions, please contact the Generation Interconnection Coordinator at the Cooperative. Since this document has been developed to provide an interconnection process which covers a very diverse range of Generation Facilities, the process appears to be very involved and cumbersome. For many Generation Facilities the process is streamlined and provides an easy path for interconnection (for example, certified Inverter-based Generation Facilities that are ≤ 10 kW may qualify for the abbreviated “10 kW Inverter Process” included in Appendix I). A flowchart summarizing the interconnection process is included in Appendix A.

If the Interconnection Request is for an increase in capacity for an existing Generation Facility, the Interconnection Request shall be evaluated on the basis of the new total capacity of the Generation Facility.

II. GENERAL INFORMATION

A. Definitions

- 1) “Applicant” is defined as the person or entity whom is requesting the interconnection of the Generation Facility with the Cooperative Distribution System and is responsible for ensuring that the Generation Facility is designed, operated and maintained in compliance with the Technical Requirements.
- 2) “Business Day” is defined as Monday through Friday, excluding Federal Holidays.
- 3) “Cooperative Distribution System” is all electric distribution facilities owned or controlled by the Cooperative on the Cooperative’s side of the Point of Interconnection, including, without limitation, Cooperative’s Interconnection Facilities.
- 4) “Generation” is defined as any device producing electrical energy, i.e., rotating generators driven by wind, steam turbines, internal combustion engines, hydraulic turbines, solar, fuel cells, etc.; or any other electric producing device, including energy storage technologies.
- 5) “Generation Interconnection Coordinator” is the person or persons designated by the Cooperative to provide a single point of coordination with the Applicant for the generation interconnection process.
- 6) “Generation Facility” is the interconnected generator(s), controls, relays, switches, breakers, transformers, inverters and associated wiring and cables, up to the Point of Interconnection. The Generation Facility is required to be a certified qualifying cogeneration or small power production facility under the Public Utility Regulatory Policies Act of 1978, as amended, and all governmental regulations lawfully promulgated thereunder (“PURPA”).
- 7) “Interconnection Customer” is the party or parties who will own/operate the Generation System and are responsible for meeting the requirements of the agreements and Technical Requirements. This could be the Generation Facility Applicant, installer, owner, designer, or operator.
- 8) “Interconnection Facilities” are the facilities of both the Cooperative and the Interconnection Customer presently proposed to be installed, or facilities which are later installed, in order to interconnect the Generation Facility to the Cooperative Distribution System, including System Protection Facilities. Interconnection Facilities are sole use facilities dedicated to the interconnection of the Generation Facility.

- 9) “Nameplate Capacity” is the total nameplate capacity rating of all the Generation included in the Generation Facility. For this definition the “standby” and/or maximum rated kW capacity on the nameplate shall be used.
- 10) “Point of Interconnection” is the point or points where the Interconnection Customer’s Interconnection Facilities interconnect with the Cooperative Distribution System.
- 11) “System Protection Facilities” are the equipment required to protect:
 - a) The Cooperative Distribution System, the systems of others directly or indirectly connected to the Cooperative Distribution System, including, without limitation, the Cooperative’s customers from faults or other electrical disturbances occurring at the Generation Facility or otherwise on Interconnection Customer’s side of the Point of Interconnection, and
 - b) The Generation Facility from faults or other electrical disturbances occurring on the Cooperative Distribution System or on the systems of others to which the Cooperative Distribution System is directly or indirectly connected.
- 12) “Technical Requirements” are the Cooperative’s Generation Interconnection Technical Requirements (Appendix D).
- 13) “Transmission Owner” shall mean the entity owning transmission facilities to which the Cooperative Distribution System is interconnected, and its successors and assigns.
- 14) “Transmission Provider” shall mean the entity providing transmission service through facilities owned by Transmission Owner, and its successors and assigns.

B. Cooperative Generation Interconnection Coordinator

The Cooperative shall designate a Generation Interconnection Coordinator(s) and this person or persons shall provide a single point of contact for an Applicant’s questions on this generation interconnection process. The Cooperative may have several Generation Interconnection Coordinators assigned, due to the geographical size of their electrical service territory or the amount of interconnection applications. This Generation Interconnection Coordinator will typically not be able to directly answer or resolve all of the issues involved in the review and implementation of the interconnection process and standards, but shall be available to provide coordination assistance with the Applicant. Contact information for the Cooperative’s Generation Interconnection Coordinator is:

[NAME] [TITLE]
[PHONE]
[ADDRESS]
[EMAIL]

C. Engineering Studies

During the design process of a generation system interconnection between a Generation Facility and the Cooperative Distribution System, there are several studies which may be required. The addition of the Generation Facility may affect the Cooperative Distribution System and special engineering studies may need to be undertaken to evaluate the Cooperative Distribution System with the Generation Facility included. Appendix F, lists some of the issues that may need to receive further analysis for the generation system interconnection.

While, it is not a straightforward process to identify which engineering studies are required, an initial review using screening criteria can be used to identify which Generation Facilities may require further analysis. The following is the basic screening criteria to be used in these interconnection procedures:

- 1) For interconnection of a proposed Generation Facility to a radial distribution circuit, the aggregated generation, including the proposed Generation Facility, on the circuit does not exceed 15% of the line section's annual peak load as most recently measured at the substation or calculated for the line segment. A line section is that portion of the Cooperative's Distribution System connected to a customer bounded by automatic sectionalizing devices or the end of the distribution line.
- 2) The proposed Generation Facility, in aggregation with other generation on the distribution circuit, does not contribute more than 10% to the distribution circuit's maximum fault current on the distribution feeder voltage (primary) level nearest the proposed Point of Interconnection.
- 3) The proposed Generation Facility, in aggregate with other generation on the distribution circuit, does not cause any distribution protective devices and equipment (including, but not limited to, substation breakers, fuse cutouts, and line reclosers), or Interconnection Customer equipment on the system to exceed 87.5% of the short circuit interrupting capability.
- 4) Using the table below, determine the type of interconnection to a primary distribution line. This screen includes a review of the type of electrical service provided to the Interconnection Customer, including line configuration and the transformer connection to limit the potential for creating over-voltages on the Cooperative's Distribution System due to a loss of ground during the operating time of any anti-islanding function.

Primary Distribution Line Type	Type of Interconnection to Primary Distribution Line	Result/Criteria
Three-phase, three wire	Three-phase or single phase, phase-to-phase	Pass screen
Three-phase, four wire	Effectively grounded three-phase or single-phase, line-to-neutral	Pass Screen

- 5) If the proposed Generation Facility is to be interconnected on single-phase shared secondary, the aggregate generation Nameplate Capacity on the shared secondary, including the proposed Generation Facility, does not exceed 20 kW.
- 6) If the proposed Small Generation Facility is single-phase and is to be interconnected on a center tap neutral of a 240 volt service, its addition does not create an imbalance between the two sides of the 240 volt service of more than 20% of the nameplate rating of the service transformer.
- 7) No construction of facilities by the Cooperative on the Cooperative Distribution System shall be required to accommodate the interconnection of the Generation Facility.
- 8) Interconnections to Distribution Networks
 - a) For interconnection of a proposed Generation Facility to the load side for spot network protectors serving more than a single customer, the proposed Generation Facility utilizes an inverter-based equipment package and, together with the aggregated other inverter-based generation, does not exceed the smaller of 5% of a spot network's maximum load or 300 kW. For spot networks serving a single customer, the Generation Facility uses an inverter-based equipment package and either meet the requirements above or uses a protection scheme or operates the generator so as not to exceed on-site load or otherwise prevent nuisance operation of the spot network protectors.
 - b) For interconnection of a proposed Generation Facility to the load side of area network protectors, the proposed Generation Facility utilizes an inverter-based equipment package and, together with the aggregated other inverter-based generation, does not exceed the smaller of 10% of an area network's minimum load or 500 kW.
 - c) Notwithstanding sub-sections (a) or (b) above, the Cooperative may incorporate into its interconnection standards, any change in interconnection guidelines related to networks pursuant to standards developed under IEEE 1547 for interconnections to networks. To the extent the new IEEE standards conflict with these existing guidelines, the new standards shall apply. In addition, and with the consent of the Cooperative, a Generation Facility may be interconnected to a spot or area network provided the Generation Facility utilizes a protection scheme that will prevent any power export from the Interconnection Customer's site including inadvertent export under fault conditions or otherwise prevent nuisance operation of the network protectors.

D. Certification

The most important part of the process to interconnect generation with the Cooperative Distribution System is safety. One of the key components of ensuring the safety of the public and Cooperative employees is to ensure that the design and implementation of the elements connected to the Cooperative Distribution System operate as required. Since Generation Facilities have tended to be uniquely designed for each installation, they have been designed and approved by Professional Engineers. These interconnection procedures have been set up to be able to accommodate these uniquely designed systems. As the number of Generation Facilities installed increases, vendors are working towards creating equipment packages which can be tested in the factory and will then only require limited field testing. This will allow the industry to move towards “plug and play” installations. For this reason, these interconnection procedures recognize the efficiency of “certification” of Generation Facility equipment packages that will help streamline the design and installation process.

Generation Facility equipment proposed for use separately or packaged with other equipment in an interconnection system shall be considered certified for interconnected operation if all of the following conditions are met:

- 1) It has been tested in accordance with industry standards for continuous utility interactive operation in compliance with the appropriate codes and standards referenced below by any Nationally Recognized Testing Laboratory (NRTL) recognized by the United States Occupational Safety and Health Administration to test and certify interconnection equipment pursuant to the relevant codes and standards listed in Appendix G;
- 2) It has been labeled and is publicly listed by such NRTL at the time of the Interconnection Application; and
- 3) Such NRTL makes readily available for verification all test standards and procedures it utilized in performing such equipment certification, and, with consumer approval, the test data itself. The NRTL may make such information available on its website and by encouraging such information to be included in the manufacturer’s literature accompanying the equipment.

Additional requirements related to Certification include:

- 1) The Interconnection Customer must verify that the intended use of the equipment falls within the use or uses for which the equipment was tested, labeled, and listed by the NRTL.
- 2) Certified equipment shall not require further type-test review, testing, or additional equipment to meet the requirements of this interconnection procedure; however, nothing herein shall preclude the need for on-site

commissioning and acceptance testing by the parties to the interconnection nor follow-up production testing by the NRTL.

- 3) If the certified equipment package includes only interface components (switchgear, inverters, or other interface devices), then an Interconnection Customer must show that the generator or other electric source being utilized with the equipment package is compatible with the equipment package and is consistent with the testing and listing specified for this type of interconnection equipment.
- 4) Provided the generator or electric source, when combined with the equipment package, is within the range of capabilities for which it was tested by the NRTL, and does not violate the interface components' labeling and listing performed by the NRTL, no further design review, testing, or additional equipment on the customer side of the Point of Interconnection shall be required to meet the requirements of this interconnection procedure.
- 5) An equipment package does not include equipment provided by the Cooperative.

The use of Certified equipment does not automatically qualify the Interconnection Customer to be interconnected to the Cooperative Distribution System. An application will still need to be submitted and an interconnection review may still need to be performed, to determine the compatibility of the Generation Facility with the Cooperative Distribution System.

E. Comparability

The Cooperative shall receive, process, and analyze all Interconnection Applications in a timely manner as set forth in this document. The Cooperative shall use the same reasonable efforts in processing and analyzing Interconnection Applications from all Interconnection Customers, whether the Generation Facility is owned or operated by the Cooperative, its subsidiaries or affiliates, or others.

F. Reasonable Efforts

The Cooperative shall make reasonable efforts to meet all time frames provided in these procedures unless the Cooperative and the Applicant agree to a different schedule. If the Cooperative cannot meet a deadline provided herein, it shall notify the Applicant, explain the reason for the failure to meet the deadline, and provide an estimated time by which it will complete the applicable interconnection procedure in the process.

G. Dispute Resolution

The following is the dispute resolution process to be followed for problems that occur with the implementation of these procedures.

- 1) Each Party agrees to attempt to resolve all disputes arising hereunder promptly, equitably and in a good faith manner.
- 2) In the event a dispute arises under this process, and if it cannot be resolved by the Parties within five (5) business days after receipt of written notice of the dispute to the other Party, either Party may submit the dispute to a mutually acceptable third party dispute resolution service, in a mutually convenient location in the State of Colorado, for assistance in resolving the dispute.
- 3) The dispute resolution service will assist the Parties in either resolving their dispute or in selecting an appropriate venue (e.g. mediation, settlement judge, early neutral evaluation, or technical expert) to assist the parties in resolving their dispute.
- 4) If neither Party elects to seek assistance from the dispute resolution service, 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 the agreements between the Parties or it may seek resolution at the Colorado Public Utilities Commission.

H. Confidential Information

Each Party shall hold in confidence and shall not disclose confidential information, to any person (except employees, officers, representatives and agents, who agree to be bound by this section). Confidential information shall be clearly marked as such on each page or otherwise affirmatively identified as such. All design, operating specifications, and metering data provided by the Applicant shall be deemed confidential information regardless of whether it is clearly marked or otherwise affirmatively identified as such. If a court, government agency or entity with the right, power, and authority to do so, requests or requires either Party, by subpoena, oral disposition, interrogatories, requests for production of documents, administrative order, or otherwise, to disclose Confidential Information, that Party shall provide the other Party with prompt notice of such request(s) or requirements(s) so that the other Party may seek an appropriate protective order or waive compliance with the terms above. In the absence of a protective order or waiver the Party shall disclose such confidential information which, in the opinion of its counsel, the party is legally compelled to disclose. Each Party will use reasonable efforts to obtain reliable assurance that confidential treatment will be accorded any confidential information so furnished.

Process for Interconnection

Step 1 Application (By Applicant)

Once a decision has been made by the Applicant, that they would like to interconnect a Generation Facility with the Cooperative Distribution System, the Applicant shall supply the Cooperative with the following information:

- 1) Completed Generation Interconnection Application (Appendix B), including;
 - a) One-line diagram showing;
 - i) Protective relaying.
 - ii) Point of Interconnection.
 - b) Site plan of the proposed installation.
 - c) Site control documentation.
 - d) Proposed schedule of the installation.
- 2) Payment of the application fee, according to the following sliding scale.

Generation Facility Nameplate Capacity	Application Fee
$\leq 25\text{kW}$	\$100
$> 25\text{kW and } \leq 2,000\text{kW}$	\$500
$> 2,000\text{kW}$	\$1000

This application fee is to contribute to the Cooperative's labor costs for administration, review of the design concept and preliminary engineering screening of the proposed Generation Facility interconnection.

The Interconnection Application will be date and time-stamped upon receipt. The original date and time-stamp applied to the Interconnection Application at the time of its original submission will determine the queue position of the request and be accepted as the qualifying date and time-stamp for the purpose of any timetables in the interconnection process.

The Cooperative will notify the Applicant of receipt of the Interconnection Application within three Business Days of receiving the Interconnection Application. The Cooperative will notify the Applicant within ten Business Days of the receipt of the Interconnection Application as to whether the Interconnection Application is complete or incomplete. If the Interconnection Application is incomplete, the Cooperative will provide, along with the notice that the Interconnection Application is incomplete, a written list detailing all information that must be provided to complete the Interconnection Application. The Applicant will have ten Business Days after receipt of the notice to submit the listed information or to request an extension of time to provide such information. If the Applicant does not provide the listed information or a request for an extension of time within the deadline, the Interconnection Application will be deemed withdrawn. An Interconnection Application will be deemed complete upon submission of all the listed information to the Cooperative.

Step 2 Initial Review (By Cooperative) and/or Scoping Meeting

For proposed Generation Facilities that have a total Nameplate Capacity of less than 2 MW and are certified according to the requirements listed in the Certification section of this document, the Cooperative will notify the Applicant within 15 Business Days that it has received a completed Interconnection Application, the Cooperative will perform an initial review using the screening criteria listed in the General Information section of this document and notify the Applicant of the results, and include with the notification copies of the analysis and data underlying the Cooperative's determinations under the screens.

- 1) If the proposed interconnection passes the screens, the Interconnection Application will be approved and the Cooperative will provide the Interconnection Customer an executable Interconnection and Operating Agreement (Appendix H) within five Business Days after the determination.
- 2) If the proposed interconnection fails the screens, but the Cooperative determines that the Generation Facility may nevertheless be interconnected consistent with safety, reliability, and power quality standards, the Cooperative will provide the Interconnection Customer an executable Interconnection and Operating Agreement within five Business Days after the determination.
- 3) If the proposed interconnection fails the screens and the Cooperative does not or cannot determine from the initial review that the Generation Facility may nevertheless be interconnected consistent with safety, reliability, and power quality standards unless the Applicant is willing to consider minor modifications or further study, the Cooperative will provide the Applicant with the opportunity to attend a Customer Options Meeting.
- 4) Customer Options Meeting – If the Cooperative determines the Interconnection Application cannot be approved without Cooperative Distribution System or Generation Facility modifications, or without completing additional Engineering Studies or other actions to address safety, reliability, or power quality problems, within five Business Days after the determination, the Cooperative will notify the Applicant and provide copies of the data and analyses underlying its conclusion. Within ten Business Days of the Cooperative's determination, the Cooperative will offer to convene a Customer Options Meeting to review the screen analysis and related results and to discuss what further steps and/or engineering studies are needed to permit the Generation Facility to be connected safely and reliably.

For proposed Generation Facilities that have either a total Nameplate Capacity greater than 2 MW or are not certified, the Cooperative will offer to hold a Scoping Meeting within ten Business Days after the Interconnection Application is deemed complete, or as otherwise mutually agreed to by the Parties. The Cooperative and the Applicant will bring to the meeting personnel, including system engineers and other resources as may be reasonably required to accomplish the purpose of the meeting (to discuss the Interconnection Application and the need for any engineering studies).

If additional specialized engineering studies are required for the proposed interconnection, the following information will be provided to the Applicant:

- 1) General scope of the engineering studies required.
- 2) Estimated cost of the engineering studies.
- 3) Estimated duration of the engineering studies.
- 4) Listing of additional information required to allow the completion of the engineering studies.
- 5) Study Authorization Agreement (Appendix C).

Typical engineering studies are outlined in Appendix F. The Applicant shall be responsible for the Cooperative's actual costs for conducting the engineering studies, unless otherwise agreed to by the Cooperative.

Step 3 Go-No Go Decision for Engineering Studies (By Applicant)

In this step, the Applicant will decide whether or not to proceed with the required engineering studies for the proposed generation interconnection. If no specialized engineering studies are required by the Cooperative, the Cooperative and the Applicant will automatically skip this step.

If the Applicant decides NOT to proceed with the engineering studies, the Applicant shall notify the Cooperative within 15 Business Days after all of the information relating to engineering studies that is listed in Step 2 is provided to the Applicant, so other generation interconnection requests in the queue are not adversely impacted. Should the Applicant decide to proceed, the Applicant must return the executed Study Authorization Agreement or a request for an extension of time within 15 Business Days after receipt and shall provide the following to the Cooperative:

- 1) Payment required by the Cooperative for the specialized engineering studies.
- 2) Additional information requested by the Cooperative to allow completion of the engineering studies.

Step 4 Engineering Studies (By Cooperative)

In this step, the Cooperative will complete any needed engineering studies for the proposed generation interconnection, as outlined in Step 2. The Cooperative shall make all reasonable efforts to complete the engineering studies within the time frames shown below. If additional time is required to complete the engineering studies the Cooperative shall notify the Applicant and provide the reasons for the time extension. Upon receipt of written notice to proceed, payment of applicable fee, and receipt of all engineering study information requested by the Cooperative in Step 2, the Cooperative shall initiate the engineering studies.

Generation Facility Nameplate Capacity	Engineering Study Completion
≤ 25kW	20 Business Days
> 25kW and ≤ 250kW	30 Business Days
> 250kW and ≤ 1MW	40 Business Days
> 1MW	90 Business Days

If applicable, once it is known by the Cooperative that the actual costs for the engineering studies will exceed the estimated amount by more than 25%, the Applicant shall be notified. The Cooperative shall then provide the reason(s) for the studies needing to exceed the original estimated amount and provide an updated estimate of the total cost for the engineering studies. The Applicant shall be given the option of either withdrawing the Interconnection Application, or paying the additional estimated amount to continue with the engineering studies.

Step 5 Study Results and Construction Estimates (By Cooperative)

Upon completion of the specialized engineering studies, or if none was necessary, the following information will be provided to the Applicant.

- 1) Results of the engineering studies, if applicable.
- 2) Monitoring & control requirements for the proposed Generation Facility.
- 3) Special protection requirements for the Generation Facility interconnection.
- 4) Comments on the schedule proposed by the Applicant.
- 5) Interconnection and Operating Agreement (Appendix H).
- 6) Cost estimate and payment schedule for required Cooperative work, including, but not limited to;
 - a) Labor costs related to the final design review.
 - b) Labor & expense costs for attending meetings
 - c) Required Interconnection Facilities and other Cooperative modification(s).
 - d) Final acceptance testing costs.

Step 6 Final Go-No Go Decision (By Applicant)

In this step, the Applicant shall again have the opportunity to indicate whether or not they want to proceed with the proposed generation interconnection. If the decision is NOT to proceed, the Applicant will notify the Cooperative, so that other generation interconnections in the queue are not adversely impacted. Should the Applicant decide to proceed, a more detailed design, if not already completed by the Applicant, must be done, and the following shall be supplied to the Cooperative:

- 1) Applicable up-front payment required by the Cooperative, per Payment Schedule, provided in Step 5. (if applicable)
- 2) Signed Interconnection and Operating Agreement.
- 3) Final proposed schedule, incorporating the Cooperative comments. The schedule of the project should include such milestones as foundations poured, equipment delivery dates, all conduit installed, cutover (energizing of the new switchgear/transfer switch), Cooperative work, relays set and tested, preliminary vendor testing, final Cooperative acceptance testing, and any other major milestones.
- 4) Submit completed and signed final design Engineering Data Submittal Form (Appendix E).
 - a) Detailed one-line diagram of the Generation Facility, including the generator, transfer switch/switchgear, service entrance, lockable and visible disconnect, metering, protection and metering CT's / VT's, protective relaying and generator control system.
 - b) Detailed information on the proposed equipment, including wiring diagrams, models and types.
 - c) Proposed relay settings for all interconnection required relays.
 - d) Detailed site plan of the Generation Facility.
 - e) Drawing(s) showing the monitoring system, including a drawing which shows the interface terminal block with the Cooperative monitoring system (if applicable).
- 5) Proposed testing schedule and initial procedure, including;
 - a) Time of day (after-hours testing required?).
 - b) Days required.
 - c) Testing steps proposed.

Step 7 Final Design Review (By Cooperative)

Within 15 Business Days of receipt of the information required in Step 6, The Cooperative will provide the Applicant with an estimated time table for final review. If the information required in Step 6 is not complete, the Applicant will be notified, within 10 Business Days of what information is missing. No further review may be completed until the missing information is submitted. The 15-Business Day clock will restart with the new submittal. This final design review shall not take longer then 15 additional business days to complete, for a total of 30 business days.

During this step, the Cooperative shall complete the review of the final Generation Facility design. If the final design has significant changes from the Generation Facility proposed on the original Application which invalidates the engineering studies or the preliminary engineering screening, the Generation Facility Interconnection Application request may be rejected by the Cooperative and the Applicant may be requested to reapply with the revised design.

Upon completion of this step, the Cooperative shall supply the following information to the Applicant.

- 1) Requested modifications or corrections of the detailed drawings provided by the Applicant.
- 2) Approval of and agreement with the Project Schedule. (This may need to be interactively discussed between the Parties, during this Step)
- 3) Initial testing procedure review comments. (Additional work on the testing process will occur during Step 8, once the actual equipment is identified).

Step 8 Order Equipment and Construction (By Both Parties)

The following activities shall be completed during this step. For larger installations this step could potentially involve a significant amount of interaction between the Parties. It is typical for approval drawings to be supplied by the Applicant to the Cooperative for review and comments. It is also typical for the Cooperative to require review and approval of the drawings that cover the interconnection equipment and System Protection Facilities. If the Cooperative also requires remote control and/or monitoring, those drawings are also exchanged for review and comment.

Responsibilities of the Applicant's personnel:

- 1) Ordering of Generation Facility equipment.
- 2) Installing Generation Facility.
- 3) Submit approval drawings for interconnection equipment and protection systems, as required by the Cooperative.
- 4) Provide final relay settings to the Cooperative.

- 5) Submit proof of insurance, as required by the Cooperative tariff(s) or Interconnection and Operating Agreements.
- 6) Submit required State of Colorado and any required local electrical inspection forms with appropriate signatures.
- 7) Inspecting and functional testing of Generation Facility components.
- 8) Work with the Cooperative personnel and equipment vendor(s) to finalize the installation testing procedure.

Responsibilities of the Cooperative's personnel:

- 1) Ordering any necessary Cooperative equipment.
- 2) Installing and testing any required equipment.
 - a) Monitoring Facilities.
 - b) Interconnection Facilities.
- 3) Assisting Applicant's personnel with interconnection installation coordination issues.
- 4) Providing review and input for testing procedures.

Step 9 Final Tests (By Cooperative / Applicant)

(Due to equipment lead times and construction, a significant amount of time may take place between the execution of Step 8 and Step 9.) During this time the final test steps are developed and the construction of the facilities are completed. Final acceptance testing shall be performed pursuant to applicable codes and standards, including but not limited to IEEE 1547.

Final acceptance testing will commence when all equipment has been installed, all contractor preliminary testing has been accomplished and all Cooperative preliminary testing of the monitoring and Interconnection Facilities is completed. One to three weeks prior to the start of the acceptance testing of the generation interconnection the Applicant shall provide, a report stating;

- 1) That the Generation Facility meets all interconnection requirements.
- 2) All contractor preliminary testing has been completed.
- 3) The protective systems are functionally tested and ready, and
- 4) A proposed date that the Generation Facility will be ready to be energized and acceptance tested.

For non-type certified systems a Professional Electrical Engineer registered in the State of Colorado is required to provide this formal report.

For smaller systems, scheduling of this testing may be more flexible, as less testing time is required than for larger systems.

In many cases, final acceptance testing is done after hours to ensure no typical business-hour load is disturbed. If acceptance testing occurs after hours, the Cooperative's labor may be billed at overtime wages. During this testing, the Cooperative will typically run various tests. These tests can differ depending on which type of communication / monitoring system(s) the Cooperative needs to install at the site.

For problems created by the Cooperative or any Cooperative equipment that arise during testing, the Cooperative will fix the problem as soon as reasonably possible. If problems arise during testing which are caused by the Applicant or Applicant's vendor or any vendor supplied or installed equipment, the Cooperative will leave the project until the problem is resolved. Resuming of testing will then be subject to Cooperative personnel time and availability.

Step 10 (By Cooperative)

After all Cooperative acceptance testing has been accomplished and all requirements are met, the Cooperative shall provide written approval for normal operation of the Generation Facility interconnection, within 3 Business Days of successful completion of the acceptance tests.

Step 11 (By Applicant)

Within 2 months of interconnection, the Applicant shall provide the Cooperative with updated drawings and prints showing the Generation Facility as it were when approved for normal operation by the Cooperative. The drawings shall include all changes which were made during construction and the testing process.

Attachments:

Attached, as follows, are several documents which may be required for the interconnection process.

Appendix A:

Flow chart showing summary of the interconnection process.

Appendix B:

Generation Interconnection Application Form.

Appendix C:

Study Authorization Agreement.

Appendix D:

Generation Interconnection Technical Requirements.

Appendix E:

Final Design Engineering Data Submittal Form.

Appendix F:

Engineering Studies: Brief description of the types of possible Engineering Studies that may be required for the review of the Generation System interconnection.

Appendix G:

Certification Codes and Standards

Appendix H:

Agreement for Interconnection and Parallel Operation of Qualifying Generation Facilities with United Power

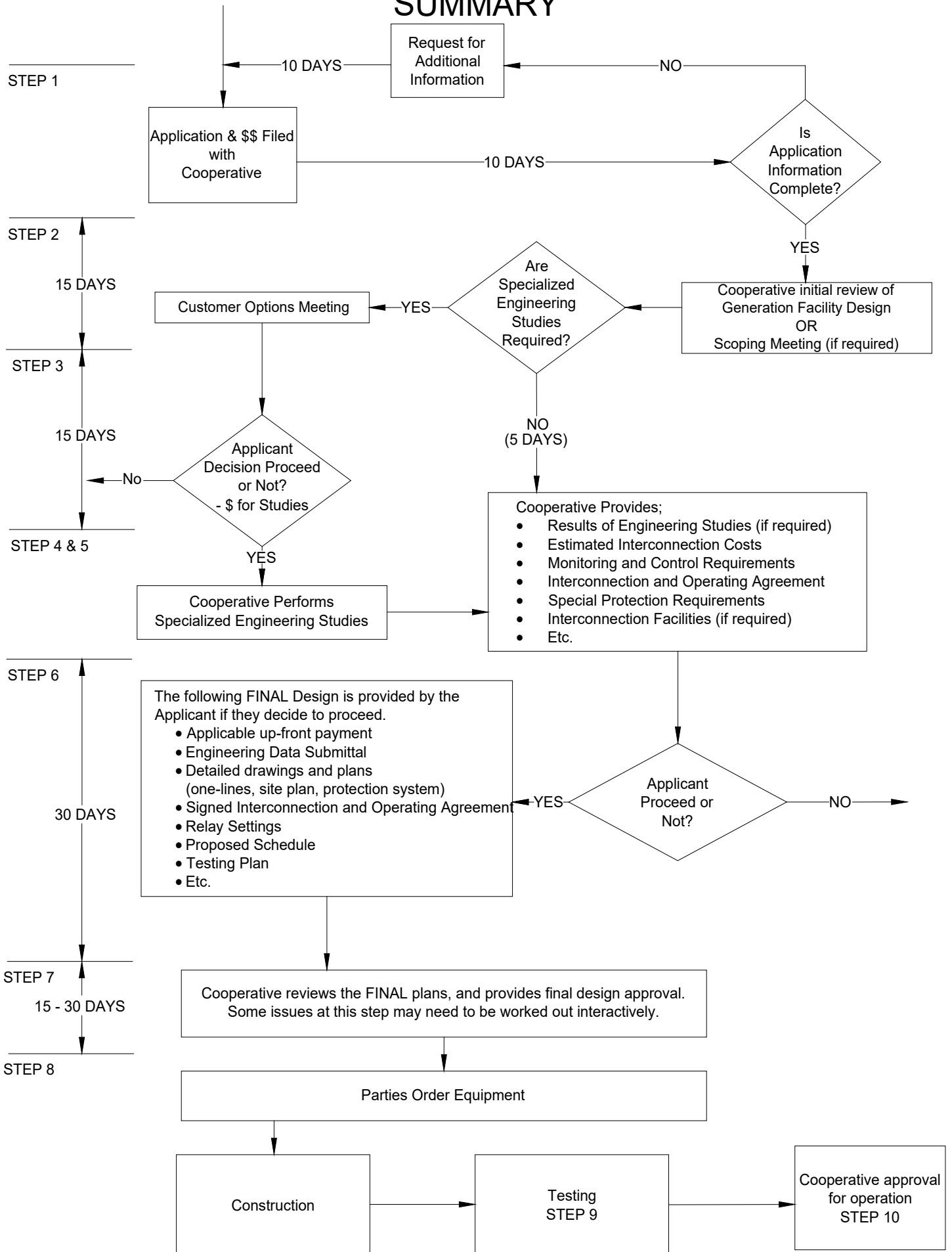
Appendix I

Application, Procedures, and Terms and Conditions for Interconnecting a Certified Inverter-Based Generation Facility No Larger than 10 kW ("10 kW Inverter Process")

APPENDIX A

FLOW CHART OF INTERCONNECTION PROCESS

GENERATION FACILITY INTERCONNECTION PROCESS SUMMARY



APPENDIX B

GENERATION INTERCONNECTION APPLICATION FORM

APPENDIX C

STUDY

AUTHORIZATION

AGREEMENT

United Power

[Project]

Study Authorization Agreement

This Agreement is made and entered into this _____ day of _____, 20_____, by United Power, a Colorado nonprofit corporation (the “Cooperative”), and _____ (the “Applicant”), each hereinafter sometimes referred to individually as “Party” or both referred to collectively as the “Parties”.

RECITALS

WHEREAS, proposals to construct or upgrade a Generation Facility which will be operated in parallel with and interconnected with the Cooperative Distribution System must be reviewed by the Cooperative to determine how it will impact the Cooperative Distribution System; and

WHEREAS, on _____, the Cooperative received from the Applicant a Generator Interconnection Application for the interconnection of a Generation Facility to the Cooperative Distribution System; and

WHEREAS, Cooperative has determined that one or more specialized Engineering Studies are necessary to determine whether the Cooperative Distribution System can accommodate the requested interconnection.

NOW, THEREFORE, in consideration of the mutual covenants and agreements herein set forth, the Cooperative and the Applicant agree as follows:

1. When used in this Agreement, with initial capitalization, the terms specified shall have the meanings indicated or the meanings specified in the Cooperative Generation Facility Interconnection Procedures document.

2. The Cooperative shall complete one or more specialized Engineering Studies (the scope(s) of which are included in Attachment A to this Agreement) in accordance with the Cooperative Generation Facility Interconnection Procedures and this Agreement.
3. The Engineering Study or Studies, as applicable, shall be based on the technical information provided by the Applicant in the Interconnection Application, as may be modified as the result of the customer options meeting or scoping meeting. The Cooperative reserves the right to request additional technical information from the Applicant as may reasonably become necessary consistent with Good Utility Practice during the course of any Engineering Study and as designated in accordance with the Cooperative Generation Facility Interconnection Procedures. If the Applicant modifies its Interconnection Application, the time to complete any Engineering Studies may be extended by agreement of the Parties.
4. A deposit of the good faith estimated cost to complete the Engineering Study or Studies, as applicable, may be required from the Applicant.
5. The Applicant shall be responsible for the Cooperative's actual costs for conducting all Engineering Studies related to the interconnection of a Generation Facility to the Cooperative Distribution System. The Cooperative will invoice the Applicant after the study is completed and delivered and will include a summary of professional time.
6. The Applicant must pay any Engineering Study costs that exceed the deposit without interest within 30 calendar days on receipt of the invoice or resolution of any dispute. If the deposit exceeds the invoiced fees, the Cooperative shall refund the excess within 30 calendar days of the invoice without interest.
7. The Applicant is to return this executed Study Authorization Agreement to the Cooperative as soon as possible. The interconnection process will not proceed until the fully executed Study Authorization Agreement is received.
8. The Cooperative shall supply a copy of all completed Engineering Studies to the Applicant.
9. Governing Law, Regulatory Authority, and Rules
This Agreement shall be interpreted, governed and construed under the laws of the State of Colorado as if executed and to be performed wholly within the State of Colorado without giving effect to choice of law provisions that might apply to the law of a different jurisdiction.
10. Amendment and Modification
This Agreement can only be amended or modified by a writing signed by both Parties.
11. Non-Waiver

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

12. No Partnership

This Agreement shall not be interpreted or construed to create an association, joint venture, agency relationship, or partnership between the Parties or 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.

13. Any notice or request made to or by either Party regarding this Agreement shall be made to the representative of the other Party, or its designated agent, as indicated below.

United Power

Applicant

Name _____

Company _____

Address 1 _____

Address 2 _____

Phone _____

IN WITNESS WHEREOF, the Parties have caused this Study Authorization Agreement to be executed by their respective authorized officials.

By:

By:

(Signature)

(Signature)

(Typewritten or Printed Name)

(Typewritten or Printed Name)

Title

Title

Date

Date

APPENDIX D

GENERATION INTERCONNECTION TECHNICAL REQUIREMENTS

APPENDIX E

FINAL DESIGN

ENGINEERING

DATA

SUBMITTAL

FORM

APPENDIX F

ENGINEERING

STUDIES

DESCRIPTIONS

Engineering Studies

There are typically three main questions that are being addressed in engineering studies conducted in conjunction with an Interconnection Application:

- 1) Are there any potential adverse impacts that would result from the interconnection of the Generation Facility? (Typically addressed with a “Feasibility Study”)
- 2) What exactly are the Distribution system impacts that would result if the proposed Generation Facility were interconnected without any system modifications, including impacts on reliability of the Distribution System? (Typically addressed with a “System Impact Study”)
- 3) What is the cost of the equipment, engineering, procurement, and construction work needed to implement identified solutions to any adverse impacts to the Distribution System. (Typically addressed with a “Facilities Study”)

The first question is relatively straightforward to determine as the Cooperative Engineer reviews the proposed installation. The second question, however, typically includes reviewing multiple alternatives and can turn into an extensive review that can become quite large for more complex generation installations. For the Engineer there is no “cook book” solution which can be applied. The final question can be answered only after the optimal solution is determined.

For some of the large generation installations and/or the more complex interconnections the Cooperative may suggest answering each of these questions individually instead of attempting to tackle them all at once. By first identifying the scope of any problem(s), the Applicant has the ability to withdraw the Interconnection Application if the problems appear to be too large and expensive to resolve. This obviously would then save the additional costs to the Applicant for the more expensive engineering studies required to identify solutions to actually resolve the problem(s).

This appendix provides an overview of some of the main issues that are reviewed during the engineering study process. Every interconnection has its unique issues, such as relative strength of the Distribution System, ratio of the generation size to the existing area loads, etc. Thus many of the generation interconnections will require further review of one or several of the issues listed.

- 1) Short circuit analysis – the Distribution System is studied to make sure that the addition of the generation will not overstress any of the Cooperative equipment, and that the Cooperative equipment will still be able to operate normally during a fault. It is expected that the Applicant will complete their own short circuit analysis on their equipment to ensure that the addition of the Generation Facility does not overstress any of the Applicant’s electrical equipment.

- 2) Power Flow and Voltage Drop Analysis
 - Reviews potential islanding of the generation
 - Will Cooperative Equipment become overloaded
 - Under normal operation?
 - Under contingency operation? With backfeeds?
- Flicker Analysis
 - Will the operation of the generation cause voltage swings?
 - When it loads up?
 - When it off loads?
 - How will the generation interact with Cooperative voltage regulation?
 - Will Cooperative capacitor switching affect the generation while on-line?
- Protection and Coordination
 - Reclosing issues – such as where the reclosing operations on the Distribution System are analyzed to determine if the Generation Facility protection can be configured and programmed to ensure that it will separate from the Distribution System before the feeder is reenergized. (Is voltage supervision of reclosing needed?)
 - Is transfer-trip required?
 - Does the Cooperative need to modify the existing protection systems or existing settings?
 - At which points on the Distribution System does the Cooperative need to install “out of sync” protection?
 - Is the proposed interconnection protection system sufficient to sense a problem on the Cooperative Distribution System?
 - Are there protection issues created by the Generation Facility step-up transformer?
- Grounding Reviews
 - Does the proposed grounding system for the Generation Facility meet the code requirements of the NEC (“National Electric Code”) and NESC (“National Electrical Safety Code”)?
- System Operation Impact.
 - Are special operating procedures needed with the addition of the generation?
 - Reclosing and out of sync operation of facilities?
 - What limitations need to be placed on the operation of the generation?
 - Operational Var requirements?

APPENDIX G

CERTIFICATION

CODES

AND

STANDARDS

Certification Codes and Standards

When the stated version of the following codes and standards is superseded by an approved revision, then that revision shall apply.

IEEE1547 Standard for Interconnecting Distributed Resources with Electric Power Systems (including use of IEEE 1547.1 testing protocols to establish conformity)

UL 1741 Inverters, Converters, and Controllers for Use in Independent Power Systems

IEEE Std 929-2000 IEEE Recommended Practice for Utility Interface of Photovoltaic (PV) Systems

NFPA 70 (2005), National Electrical Code

ANSI C2-2007 National Electric Safety Code, published by IEEE

IEEE Std C37.90.1-1989 (R1994), IEEE Standard Surge Withstand Capability (SWC) Tests for Protective Relays and Relay Systems

IEEE Std C37.90.2 (1995), IEEE Standard Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers

IEEE Std C37.108-1989 (R2002), IEEE Guide for the Protection of Network Transformers

IEEE Std C57.12.44-2000, IEEE Standard Requirements for Secondary Network Protectors

IEEE Std C62.41.2-2002, IEEE Recommended Practice on Characterization of Surges in Low Voltage (1000V and Less) AC Power Circuits

IEEE Std C62.45-1992 (R2002), IEEE Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000V and Less) AC Power Circuits

ANSI C84.1-1995 Electric Power Systems and Equipment – Voltage Ratings (60 Hertz)

IEEE Std 100-2000, IEEE Standard Dictionary of Electrical and Electronic Terms

NEMA MG 1-1998, Motors and Small Resources, Revision 3

IEEE Std 519-1992, IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems

NEMA MG 1-2003 (Rev 2004), Motors and Generators, Revision 1

APPENDIX H

AGREEMENT FOR INTERCONNECTION AND PARALLEL
OPERATION OF QUALIFYING GENERATION FACILITIES

WITH

UNITED POWER

APPENDIX I

**APPLICATIONS, PROCEDURES, AND TERMS AND
CONDITIONS FOR INTERCONNECTING A CERTIFIED
INVERTER-BASED GENERATION FACILITY NO LARGER
THAN 10 KW (“10 KW INVERTER PROCESS”)**