Blue Ridge Energy

Distributed Generation Resource

Interconnection Procedure

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Related Documents

Procedure 5-1-5-O-2 - Application for Operation of Member-Owned Generation

Procedure 5-1-5-O-3 - Interconnect Application for Inverter-Based Distributed Generation Resource No Larger Than 25 kW Single Phase or 100 kW Three Phase

Procedure 5-1-5-O-4 - Interconnection Agreement – Non-Inverter Based Systems No Larger than 100 kW

Procedure 5-1-5-O-5- Interconnect Agreement – Systems Larger than 100 kW

Section 1. Overview

Blue Ridge Energy (the "Cooperative") seeks to provide its members with the best electric service possible, and at the lowest cost consistent with sound economy and good management. In some cases, cooperative members may be interested in installing their own electric power generation equipment. This Operational Policy describes Blue Ridge Energy's ("Blue Ridge") Distributed Generation Interconnection Requirements and provides the requirements for interconnection of member owned generation facilities planned for interconnection with Blue Ridge Transmission and Distribution facilities.

These requirements do not replace the need for an accurate and detailed design, in most cases, completed by a licensed and professional engineering consultant that is selected by the Interconnecting Member ("IM"). Nor do the requirements for interconnection replace the need for a detailed engineering review by Blue Ridge to ensure protection of its Transmission and Distribution system.

Each specific interconnection request will be analyzed at the time of request using the most current electrical system characteristics and conditions, regulatory requirements, laws, and industry standards.

These requirements apply to all Distributed Generation Resources ("DGR") proposed by the Member regardless of size, duration, or mode of interconnection. These requirements shall be followed by the Member regardless of the intended use by the IM, including, but not limited to self-generation for operational concerns, generation for net metering, and generation for peak shaving.

The Blue Ridge Distributed Resource Interconnection Requirements cites standards, regulations, and other requirements. Regardless, the most recent standard, or regulation shall be applicable.

Engineering review by Blue Ridge is for the sole purpose of protecting the Blue Ridge Transmission and Distribution system from failure of the DGR interconnected by the Member. The Member shall not rely on the Blue Ridge engineering review, and shall complete its own independent design and review by licensed engineering firms to ensure accurate, safe, and proper operation and protection of its DGR installation. The applicable Interconnection Agreement shall prevail for matters of IM liability in the event of disoperation or failure of the DGR.

Parties interested in interconnecting DGR with the Blue Ridge Transmission and Distribution system shall complete the appropriate application for interconnection. Each application contains basic information for the specific site that will allow preliminary discussions with Blue Ridge to begin its review. Applications correspond to the operational intent listed later in this document and can be found in Procedure 5-1-5-O-2.

Blue Ridge is available to discuss matters of interconnection should the Member desire general information for the purpose of considering the installation and interconnection of a DGR project with the Cooperative's electric system. Once the Member decides to proceed with an installation, an application shall be submitted to Blue Ridge. The basic information contained in the form will allow Blue Ridge to determine the steps necessary for the interconnection process.

Interconnection will be evaluated against electric circuit conditions at the requested interconnection point on the Blue Ridge Transmission and Distribution system. Other considerations include, but are not limited to neighboring or existing interconnections, known loads within the proximity of the interconnection, and other conditions impacting the electrical characteristics of the Blue Ridge transmission or distribution circuit.

The complexity of the review is dependent on the size of the interconnecting DGR. The application procedures are categorized into three groups:

- DGR up to 100 kW (simplified procedures are available for inverter based systems)
- DGR greater than 100 kW up to 5 MW
- DGR greater than 5 MW

Table 1 summarizes the documents required from a member installing distributed generation.

Table 1
Documents Required When Installing Distributed Generation

Distributed Generation Information				Information Required from Member				
Size	Interconnect With Cooperative?[1]	Inverter Based?	Power Export?	100 kW Inverter Based Process (5-1-5-O-3)	Application (5-1-5-O-2)		Interconnect Agreement	
					Part I	Part 2	5-1-5-O-4	5-1-5-O-5
Up to 100 kW	No		No		Inform the Cooperative			
	Yes	No			x		x	
		Yes	Yes	x				
Larger than 100 kW - 5 MW	No		No		Inform the Cooperative			
	Yes		No		x			x
			Yes		x	x		x
Larger than 5 MW	No		No		Inform the Cooperative			
	Yes				x	x		x
					x	x		x

[1] Backup generation that uses an automatic transfer switch is not interconnected with the Cooperative.

The remainder of this procedure details specific information required for different sizes and applications of member-owned distributed generation and outlines the steps for interconnecting DGR with the Blue Ridge Transmission and Distribution system.

Blue Ridge Contact Information

Applications or any inquiries concerning the interconnection of distributed generation resources should be submitted to:

Blue Ridge Energy
Attention: Energy Solutions Manager
Address: P.O. Box 112,
Lenoir, NC 28645-0112
Telephone Number: 1-800-451-5474
Fax: (828) 758-2699
E-Mail Address: renewables@myblueridgeenergy.com

Section 2. Technical Requirements for Interconnection

Blue Ridge's primary distribution system voltages is nominally 7.2/12.47 kV Grounded "Wye". Blue Ridge operates transmission voltages at 46 kV, 100 kV, and 230 kV. The 230 kV network is not available for interconnection.

Blue Ridge's protection practices include reclosing on distribution circuits as well as transmission lines. This reclosing can occur in a three-phase simultaneous trip as well as single-phase, individual trips all the way to a device lock out. Blue Ridge utilizes reclosing devices for distribution lines and circuit breakers for subtransmission and transmission lines. Blue Ridge will consider changes to existing protection schemes to accommodate DGR, but reserves the right to cancel such measures to avoid the possibility of adverse effects on service continuity and problems to neighboring members. (Any and all allowable changes shall be done so at the full cost to the IM.) Changes to the protection scheme are non-negotiable and at full discretion of Blue Ridge.

Blue Ridge's distribution circuits vary greatly in available capacity, short circuit current, equipment sizing, equipment capabilities, and many other characteristics. These variables create the need for specific and thorough reviews of each interconnection location.

Blue Ridge's substations were designed to meet current standards and codes at the time of construction given the conditions at the time of design with reasonable growth in the future. Therefore, equipment was sized, protected, and arranged in a manner appropriate prior to the proposed DGR. Items such as ground grid, breaker sizing, and protection settings may need to be increased, updated, and improved to allow interconnection of the DGR. Any and all electrical system reconfigurations and/or improvement costs required for interconnection of the DGR shall be paid by the IM.

It is the policy of Blue Ridge to allow any member to operate their DGR in parallel format with the Blue Ridge systems providing this operation can be performed without adverse effects to the public, Blue Ridge systems, or to upstream power providing systems (e.g. transmission facilities). Blue Ridge accepts the interconnection of any and all forms of generation (e.g. solar, wind, hydro, fossil fuels, etc.). Whichever generation source is selected for interconnection, the IM must provide a 60 Hertz, alternating current, sine wave at a voltage compatible with Blue Ridge at the point of interconnection. Further details are provided later in this document.

The Point of Common Coupling (PCC) shall be clearly delineated and defined. An overcurrent device rated to interrupt available fault current shall be located at the PCC as well as a manual disconnect device which can be opened and locked open for necessary safety precautions. The manual disconnecting device must have contacts that are visually able to be identified as open as well as provisions for lockout/tagout. This device shall be accessible to Blue Ridge personnel at all times and be labeled as the disconnecting point.

Specifics of the interconnection of IM shall be dictated by the latest version of IEEE-1547 – Standard for Interconnecting Distributed Resources with Electric Power systems. The DGR installation and interconnection shall meet all requirements as set forth in IEEE-1547. In addition, the DGR shall also meet all applicable national, state, and local construction and safety codes in addition to all applicable UL, ANSI, and IEEE standards and guidelines.

The DGR shall be interconnected in such a manner as to not disrupt the operational strategies of Blue Ridge and shall be appropriately metered per the Cooperative's standards.

Requests to interconnect to Blue Ridge's 12 kV distribution electric system shall use a four-wire, multi-grounded neutral distribution circuit to limit possible dangerous overvoltage conditions. Transformers installed by IM shall be connected in a Grounded Wye-Grounded Wye configuration and shall be approved as step-up transformers by the manufacturer.

Blue Ridge requires that the generation source by effectively grounded per IEEE standards.

Any and all operation of DGR facilities shall cause no impact, reduction in quality, or other adverse conditions to other Blue Ridge members. Conditions here include but are not limited to, harmonics, voltage disturbances, frequency fluctuations, or power outages. If complaints are received and the source is suspected to be the interconnected DGR, generating activities shall cease immediately and be prohibited from resuming until conditions are addressed.

The DGR shall discontinue parallel operation when requested by Blue Ridge. Requests for this interruption may be made on the grounds of maintenance activities, emergencies, suspected DGR interference, safety, or temporary operating parameters. Blue Ridge shall not be responsible for unrealized gains or incurred expenses due to parallel operation shutdown.

In addition to local, state, and federal laws pertaining to distribution and transmission grid interconnections, Blue Ridge retains standards for acceptable interconnection. The intent of these requirements is to maintain the integrity of specific qualities and quantities associated with Blue Ridge's electric distribution and transmission systems, preserve qualities and quantities for the interconnecting member and surrounding neighbors, and, most importantly, protect the safety of employees and general public.

Electric System Parameters

Voltage

Blue Ridge maintains a supply voltage of +/- 5.0% of nominal. IM shall not regulate nor impact supply voltage as outlined in the following standards:

Voltage Imbalance:	ANSI C84.1
Voltage Flicker:	IEEE 1453
Voltage Fluctuation:	IEEE 1250
Voltage Harmonic Distortion:	IEEE 519
Voltage Distortions:	IEEE C62.41 and IEEE-1547

If, after operation of DGR, Blue Ridge determines that IM is causing unanticipated impacts outside of the bounds of any of the above mentioned standards, Blue Ridge will require that the DGR be de-activated until impacts can be resolved by the IM. The IM shall install three Potential Transformers at the PCC.

Current

Blue Ridge maintains its system capacity using guidelines specific to individual circuits and substations. Furthermore, Blue Ridge's contingency planning often dictates certain amounts of reserve capacity be available in circuits to help with power restoration during events.

Blue Ridge's system is analyzed using forecasted values from historical data which is grown in manner consistent with load forecasting studies. Loading is determined based from each circuit's non-coincident peak load. These peak loads are then analyzed individually for normal operation and then together for contingency analysis.

The IM shall not cause a decrease in available capacity of Blue Ridge facilities. Any decrease in available capacity shall be remedied to available capacity prior to interconnection. This remedy shall be paid at full cost by the IM.

IM equipment shall be rated to full load current as well as full generation current (not the net of the two). The IM shall interconnect with Blue Ridge facilities and meet the following standards as related to current.

Current Harmonic Distortion: IEEE 519

Power Factor

Blue Ridge maintains a power factor between 0.95 lagging and unity. The IM shall be capable of providing kVAR and absorbing kVAR to maintain a power factor between 0.95 lagging and 0.95 leading.

Considerations for power factor must take into account the type of generation to be interconnected. Synchronous generators shall have reactive power capabilities activated to respond to DGR kVAR needs as well as DGR voltage needs. Induction generators shall maintain voltage at required levels.

Frequency

Blue Ridge maintains a system AC, sine wave frequency of 60 Hz. The IM shall not drive system frequency. The IM must be capable of receiving and reacting appropriately to any frequency fluctuations. The IM shall interconnect with Blue Ridge facilities and meet the following standards as related to frequency.

Operating Frequency: ANSI C84.1

System Protection

Blue Ridge maintains adequate protection on Distribution and Transmission systems to prevent overcurrent (fault) conditions from causing public safety concerns and/or detrimental impacts to equipment.

IM contribution to overcurrent conditions shall minimize any impacts to Blue Ridge's existing system and protect the general public. Any and all costs incurred by Blue Ridge to maintain this level of protection and positive coordination shall be paid by the IM at full cost. The IM is responsible for protecting its own equipment, Blue Ridge's equipment, and the general public from electrical disturbances.

IM protection shall be positively coordinated with Blue Ridge protection systems. The IM shall design the system to protect the DGR. The Blue Ridge analysis of the IM protection scheme is solely to ensure protection of the Blue Ridge Transmission and Distribution system, and not for protecting the DGR.

The IM shall comply with IEEE-1547, Interconnection Standard. The IM shall meet IEEE-1547 requirements in a manner of its choice. Common relaying schemes include the following relays. (The IM shall use "Utility Grade" relays.)

Basic Relaying:

- Overcurrent (Instantaneous and Time Delay)
- Directional current
- Over/Under voltage
- Over/Under Frequency
- Reverse power
- Forward Under power
- Synchronization check and permissive
- Additional Relaying: Primary and Backup protection required

Blue Ridge does not provide transfer trip to IM facilities.

Electric System Equipment

Overcurrent - Fault Conditions
The IM is responsible for rating equipment capable of interrupting available fault current at PCC. All possible contributors of fault current shall be accounted for when rating equipment. For example, a generator installation with dual source feeds from Blue Ridge would require the fault current contributions from both Blue Ridge sources and the generator contribution to be summed to determine the total available fault current.

Blue Ridge will provide available fault current to the IM. The IM shall be responsible for all calculations and sizing of IM equipment. (Note: The IM shall notify Blue Ridge if changes to equipment have or will occur. The IM is responsible for any and all costs associated with necessary upgrades to accommodate these changes.)

Basic Construction of Facilities
IM facilities shall meet standards associated with the most current revision of ANSI/IEEE C.2. This includes but is not limited to:

Overvoltage – Surge Conditions: Infrastructure and facilities must be adequately arrested for overvoltage conditions consistent with local area.

Insulation: Insulators for all energized equipment shall meet Basic Insulation Levels per the NESC.

Shielding: Above ground facilities shall be adequately shielded from lightning using masts or shield wires.

Grounding: DGR shall be adequately grounded to meet ANSI-IEEE-80 and ANSI/IEEE C.2.

Facilities must be designed to accommodate total available fault current as described above.

If the IM's facilities are adjacent to Blue Ridge facilities, grounding grids of Blue Ridge and DGR shall be connected. Ground grid shall use exothermic welds, or compression connections subgrade and mechanical connections above grade. If the DGR is fenced the ground grid shall extend five (5) feet outside of fence for public safety.

Metering

Blue Ridge requires appropriate metering installed between the IM and Blue Ridge facilities. This metering shall be located as near PCC as possible. All metering costs due to IM design shall be paid at full cost by the IM. Instrument transformers used in metering shall conform to IEEE C57.13 and must be rated to record power (kW, kVA, kVAR) flow in either direction at full load, full capacity, and minimum loads at revenue grade accuracy. Meters used shall be four quadrant meters capable of storing 45 days of historical data.

Operational Requirements

The IM must recognize that DGR design may create a need for Blue Ridge facility upgrades. These upgrades shall use standard Blue Ridge design, construction, and material. The IM does not have any influence over the choice of manufacturer, types, sizes, designs, or intended operations of Blue Ridge facilities in existence nor future facilities that may be necessary to interconnect IM facilities. The IM shall pay full cost of Blue Ridge facilities necessary to interconnect.

IM facilities shall not cause negative impact to Blue Ridge facilities. Locations and layouts shall be chosen so as to not impede access or hinder restoration efforts.

IM facilities shall be designed to promote positive electrical synchronization with Blue Ridge facilities. Programmatic intelligence shall be used to automate frequency, voltage, and current synchronization between generation output and Utility supply. This intelligence shall create safety measures, checks, and limits to counteract human error. (e.g. solid state relaying shall recognize out-of-synch conditions and disable manual closing of interconnection tie breakers.)

Blue Ridge recognizes the need for facility maintenance based on good operating protocols. The IM must accept that there will be periods of necessary maintenance and pre-arranged down-time of generating facilities. These down-times shall be coordinated and minimized to the best of both parties' ability. Blue Ridge requests at least thirty (30) days notification of planned maintenance activities. This is to prepare for needs of the requesting member as well as to combine any Blue Ridge maintenance needs to the down-time to further reduce future impacts to the member.

Blue Ridge reserves the right, at any time and without any notice, to disconnect the IM DGR from the Blue Ridge distribution or transmission grid if Blue Ridge deems, in its sole discretion, that safety or equipment are in jeopardy.

Operating Requirements

IMs are permitted to operate their generation in a long-term parallel format, short-term parallel format, or isolation format provided that the interconnection is synchronized and protected as described earlier in this document and consistent with the interconnect agreement. Parallel formats include import or export of power from the IMs generating facilities.

Operating Electrical Format:

<u>Long Term Parallel Operation (time paralleled > 60 seconds)</u>
Long term parallel operation of DGR is generally limited to net metering (solar, hydro, wind), peak shaving, or power production for market sale.

For facilities intended to operate a distributed resource in parallel with the Utility system for greater than 60 seconds, a closed transition (make before break) may occur provided the interconnecting facilities meet requirements set forth earlier in this document.

<u>Short Term Parallel (time paralleled < 60 seconds)</u>
Short term parallel operation of DGR is usually related to facility maintenance and operations.

For facilities intended to operate a distributed resource in parallel with the Utility system for less than 60 seconds, a closed transition (make before break) may occur provided the interconnecting facilities meet requirements set forth later in this document.

<u>Isolated System</u>
An isolated system is a non-interconnected DGR such as an emergency backup generator.

For facilities intended to operate a distributed resource as an emergency back-up only, an Open Transition (break before make) transition is required. This provides that no paralleling occurs between the Utility and the IM's systems. This can be accomplished by any type of properly rated switching device that inhibits both switches in the closed position simultaneously.

Section 3. Application Process for Generators of 100 kW or less

The Cooperative has a special streamlined process for small scale photovoltaic (PV) or other generation no larger than 100 kilowatts (kW) in a residential or small commercial application.

Inverter-Based

If the generator utilizes an inverter, the following process may be used along with the Application for Operation of Member Owned Generation (Procedure 5-1-5-O-2). The Interconnection Member (IM) will complete the Application for Inverter-Based Distributed Generation Resource No Larger Than 24 kW Single Phase or 100 kW Three Phase (Procedure 5-1-5-O-3) and submit it to the Cooperative. The Cooperative will acknowledge to the Member or contractor receipt of the Application within three Business Days of receipt.

The Cooperative will evaluate the Application for completeness and notify the Member within 10 Business Days of receipt that the Application is or is not complete and, if not, advise what material is missing.

The Cooperative will verify the Distributed Generation Resource (DGR) can be interconnected safely and reliably using the screening criteria described below. The Cooperative has 15 Business Days to complete this process. Unless the Cooperative determines and demonstrates that the DGR cannot be interconnected safely and reliably, the Cooperative approves the Application and returns it to the Member.

After installation, the Member ensures the Certificate of Completion and Procedure 5-1-5-O-3 – Exhibit D are returned to the Cooperative. Prior to parallel operation, the Cooperative will inspect the DGR for compliance with standards, which may include a witness test and may schedule appropriate metering replacement, if necessary.

The Cooperative will notify the Member in writing that interconnection of the DGR is authorized. If the witness test is not satisfactory, the Cooperative has the right to disconnect the DGR. The Member has no right to operate in parallel until a witness test has been performed or previously waived on the Application. The Cooperative is obligated to complete this witness test within 10 Business Days of the receipt of the Certificate of Completion. If the Cooperative does not inspect within 10 Business Days, or by mutual agreement of the Parties, the witness test is deemed waived.

The Member must provide the contact information for the legal applicant (i.e., the Interconnection Member). If another entity is responsible for interfacing with the Cooperative, that contact information must be provided on the Application as well. Enter the legal names of the owner(s) of the DGR. Include the percentage ownership (if any) by any utility or public utility holding company or by any entity owned by either. To use this process the inverter equipment must be IEEE-1547 compliant and UL1741 Listed and a manual disconnect switch must be mounted within ten (10) feet of meter base.

Screening Criteria

To qualify for interconnection using the 100 kW Inverter Process, the proposed DGR must pass the following screens:

- For interconnection of a proposed DGR to a radial distribution circuit, the aggregated generation, including the proposed DGR, on the circuit does not exceed 15% of the line section's annual peak load as most recently measured or calculated for the line section. A line section is that portion of the Cooperative's Distribution System connected to a Member, bounded by automatic sectionalizing devices or the end of the distribution line.

- The proposed DGR, 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.

- The proposed DGR, 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 Member equipment on the system to exceed 87.5% of the short circuit interrupting capability.

- If the proposed Small DGR 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.

- No construction of facilities by the Cooperative on the Cooperative Distribution System shall be required to accommodate the interconnection of the DGR.

Non-Inverter Based Systems

For non-inverter based system interconnections to the Blue Ridge Energy system the generator the member will only need to complete Part 1 of the Application (Procedure 5-1-5-O-2). A minimal application fee also is required (see the Service Rules and Regulations, Section 207, Appendix A for the Fee Schedule). The <u>Interconnect Agreement – Non Inverter Based Systems No Larger than 100 kW</u> (Procedure 5-1-5-O-4) will also need to be completed.

Non-interconnected Systems

If the small generator will not be interconnected with the Blue Ridge system, the member should inform the Cooperative and provide the electrical capacity, manufacturer, and name of the electrical installer. The Cooperative may ask for a copy of the manufacturer's information. No formal application or fee is required.

Section 4. Generators Greater than 100 kW and up to 5 MW

When installing a generator to interconnect with the Cooperative's electric system, the Cooperative must review the Member's plans to ensure that personnel safety and system reliability will not be compromised.

The Member must complete the application form (Procedure 5-1-5-O-2) and pay the application fee. For systems larger than 100 kW, both Parts 1 and 2 of the application must be completed and IM will also need to complete the <u>Interconnect Agreement – Systems Larger than 100 kW</u> (Procedure 5-1-5-O-5). A check made out to the Cooperative in the amount of the proper fee must accompany the application. Fees are listed in the Cooperative's Service Rules and Regulations, Appendix A, Section 207. The member will submit their application to the Cooperative's representative as indicated below.

Once the Cooperative receives the application, it will review the proposed generator installation. If the application is approved, the Cooperative will notify the member if there are special steps the member needs to take during the generator installation process. The Cooperative may request additional information regarding the planned installation request.

As part of our application review process, the Cooperative will examine the ability of the cooperative's electric distribution system to accept the new power generation unit. On certain parts of the system, the Cooperative may need to replace existing equipment or add some new equipment to accommodate member generation. The Cooperative and the member will be required to pay for the upgrades prior to beginning construction.

System Studies

There are potentially three studies that may be required prior to interconnection and they are:

1. Feasibility Study
2. System Impact Study
3. Interconnection Study

Evaluating the DGR in progressive steps will minimize the Member's expense if the project does not proceed.

<u>Feasibility Study:</u>
A Feasibility Study is a preliminary review of intended interconnection. In this process the IM must provide a one line drawing and simple verbal explanation of intended generation interconnection.

Upon receipt of a complete Application for Operation of Member Owned Generation (Procedure 5-1-5-O-2), Blue Ridge will review the proposed DGR location relative to Blue Ridge facilities. The intent of this preliminary review is to identify and disclose any major challenges or opportunities with the intended interconnection. Be advised, this is not an in-depth review of available capacity, protection schemes, power quality issues, or transmission provider concerns.

In this phase the Cooperative will provide a list of pre-existing values or impediments to interconnection. No interconnection cost estimates are given with the Feasibility Study.

System Impact Study:

A System Impact Study is a thorough review of Impacts of Interconnection to Electrical Facilities.

If the results of the Feasibility Study are favorable to the IM, Blue Ridge will perform an in-depth System Impact study of the generation on the electrical facilities of Blue Ridge. Be advised, this review does not encompass protection, protection coordination, or a review of IM equipment. This review will identify facility capacity upgrades necessary to achieve interconnection to the Blue Ridge Electric System.

Prior to the commencement of the study the IM must provide refined design drawings including scale, scope, and location of project. Drawings associated with site and generation techniques are adequate. Examples of necessary information are: PT/CT locations and ratios, transformer connection configurations, manufacturer and model of protective relaying at PCC, protective device ratings, and any other system information.

The IM is responsible for all costs associated with the study and must provide a deposit for the costs associated with the study. The amount of the deposit is shown in the Cooperative's Service Rules and Regulations, Appendix A, Section 207. If project is not realized, the deposit will be compared to the actual cost of Impact study and debts or refunds settled.

In this phase the Cooperative will determine the costs associated with modifications to Blue Ridge facilities necessary for interconnection. (Note: these costs will not include costs associated with system protection changes. These costs are determined and delivered during the Interconnection Study.)

Interconnection Study:

An Interconnection Study is a thorough review and analysis of interconnecting systems.

If results of the System Impact study are favorable to the IM, Blue Ridge will perform, at the expense of the IM for all costs, an in-depth Interconnection Study of the system(s) proposed. The intent of the Interconnection study is to analyze proposed protection schemes, operating parameters, proposed equipment, and other specific details. In essence, this study will examine the Interconnection scheme for congruence with IEEE-1547 and good utility practices associated with system protection and operation.

IM must provide a complete set of engineering drawings showing all facets of interconnection. One-line drawings, relay and protection drawings, grounding protection drawings, physical layout, and sequence of operation are some, but not all, of the appropriate deliverables. This study shall not begin until all information describing the interconnection has been received by Blue Ridge. The submittal of these documents shall be in one packaged submittal. Blue Ridge will not review or comment on partial submittals. If partial submittals occur inadvertently, Blue Ridge will notify the IM and wait for all remaining documents to be included and submitted.

The IM is responsible for all costs associated with the study. Due to the depth and breadth of the Interconnection Study, Blue Ridge requires an additional cash deposit as listed in the Cooperative's Service Rules and Regulations, Appendix A, Section 207 prior to performing any study activities. An irrevocable letter of credit for the same amount may be acceptable to the Cooperative. If project is not realized, the deposit will be compared to the actual cost of all studies and debts or refunds settled.

Through the Interconnect Study the Cooperative will determine deficiencies in design that do not meet interconnecting standards and note improvements to protection schemes (Blue Ridge and/or IM) necessary for Interconnection. If improvements or changes to Blue Ridge systems are necessary, cost estimates shall be provided.

Interconnection Agreements, Construction, and Testing

<u>Agreements:</u>
All DGR projects require an Interconnect Agreement (IA). For projects in this section the applicable IA is <u>Interconnect Agreement – Systems Larger than 100 kW</u> (Procedure 5-1-5-O-5). Blue Ridge will not execute an interconnect agreement until all deficiencies identified in prior studies (Feasibility, Impact, and Interconnection) have been remedied to the satisfaction of Blue Ridge.

The IM may test any and all systems prior to execution of the interconnect agreement provided the DGR does not make a parallel connection with Blue Ridge's electrical system.

Construction:
Should system improvements be necessary, Blue Ridge and IM will reach an agreement on all aspects of the improvement prior to commencement of Blue Ridge construction or other technical activities. Blue Ridge reserves the right to specify, order, and install any equipment Blue Ridge deems necessary for interconnection of DGR during Agreement negotiations.

Testing:
Prior to granting operating privileges, IM installed DGR shall undergo extensive System Commissioning and Performance Testing (SCPT). After DGR is fully operational and if conditions or operating instances justify, Blue Ridge may require retesting performance of DGR.
Programming and testing of the utility grade relay at the Point of Common Coupling (PCC) are to be implemented and documented by a testing laboratory acceptable to Blue Ridge.
Blue Ridge reserves the right to observe any and all SCPT demonstrations of protection system relays, limits, or other nuances. Testing of all devices shall be coordinated so as to allow for observation. Blue Ridge requires trip testing of specific relay systems associated with protection of PCC. Commissioning of paralleling abilities shall only be allowed after the execution of the interconnect agreement.

The IM is responsible for all costs associated with testing. IM shall provide a signed and certified relay testing document to Blue Ridge showing all relays and protection equipment functioned as designed and specified in the interconnect agreement.

If DGR changes from specifications within the interconnect agreement, Blue Ridge will need to analyze and approve changes against any and all metrics and will require retesting of system; both at the full cost to the IM. If changes are required to the Blue Ridge system, the IM shall be responsible for full cost reimbursement.

PCC protection must be tested every six (6) years and reported to Blue Ridge. Any unsatisfactory conditions found during periodic testing must be remedied prior to any further operation of generation facilities.

Non-Interconnected Generators Greater than 100 kW up to 5 MW

When installing non-interconnected generation the member is required to notify the Cooperative to ensure the system does not create a hazard for other members or utility workers, or interfere with the co-op's reliable supply of electric power. To accomplish this, the member must take care to install the generator so that it will either (1) start up only to serve the member's entire load when disconnected from the electric power grid, or (2) serve only isolated loads when there is a choice of power supply (the cooperative system or the emergency generator).

Section 5. Distributed Generation Resources Greater than 5 MW

Generation larger than 5 MW of capacity is considered “utility scale generation” will be managed on a case-by-case basis. The documents contained in this policy provide a general framework of what will be required for large scale generation. A Construction Agreement and an Interconnection Agreement between Blue Ridge and IM is required. Prior to drafting these documents Blue Ridge, or its designated engineering consultant, and the IM will discuss the technical specifications for the interconnection.

The Interconnection Agreement will address the parties' responsibilities, including financial security, with respect to this interconnection process.

The project financing will proceed in two phases. Prior to commencement of activities for each phase, IM will provide a cash deposit to Blue Ridge. Blue Ridge will true up the costs at the conclusion of each phase and provide a refund to IM of any unused funds, or IM will make further payment to Blue Ridge if the costs exceed the deposit amount. If IM cancels the project, it will be provided a refund of the deposit less costs/expenses incurred by Blue Ridge, provided that $100,000 will be non-refundable. These concepts will be detailed in the construction agreement referenced above. The estimate for Phase 1 of the project will cover the following:

- Drafting of Interconnection Agreement, Construction Agreement, and "process" agreement
- Engineering and design oversight/system support
- Impact Study
- Review of interconnect one lines
- Design, prepare specifications, bid package and project management

Phase 2 will cover the actual construction, with interim steps to be developed at the conclusion of Phase 1.

Date Adopted: 09/11 (Originally adopted by the Board of Directors as Attachment 1 to Policy Statement Number: 6-8B)

Dates Revised: 10/12 (On this date Attachment 1 was converted to Operational Procedure 5-1-5-O-1), 2/13, 05/17, 08/20