INTERCONNECTION REQUIREMENTS
DISTRIBUTION

Revision 3

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Distribution & Engineering Services Division

Snohomish County Public Utility District No.1

Everett, Washington

Energizing Life in Our Communities

We deliver essential utility services to help our communities thrive.

Snohomish County Public Utility District No. 1
Everett, Washington
INTERCONNECTION REQUIREMENTS: DISTRIBUTION

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1 Glossary

Applicant - The utility, developer or other entity that requests a new or modified connection for a line, load, or generation resource and includes both current District customers served under one of its retail electric rate schedules and entities that are not currently District electric customers but who intend to connect in the District's electric system

Applicant's Operator – The Company that operates a load delivery, transmission interconnection, or generation facility, which plans to connect to the District's electric system.

Point of Interconnection (POI) - The physical location on the power system where there is a change of ownership between the District and the facility that wants to connect.

Facility – The load delivery (end-user), transmission connection, or generation facility and all equipment associated with the Facility up to the Point of Interconnection with the District. The District owns none of the facilities that make up the Facility.

Feasibility Review – First high-level review of the proposed interconnection in the study process. This study identifies basic parameters of the interconnection, to determine which processes and technical requirements apply, and to provide a non-binding outline of key equipment and work which may be needed

IBR – Inverter Based Resource. Any generation facility that utilizes inverters to convert Direct Current to Alternating Current for delivery to the utility.

Island, Islanding - Islanding describes a condition where the power system splits into isolated load and generation groups, usually when breakers operate for fault clearing or system stability remedial action. These isolated loads and generation groups are called islands. Generally, the 'islanded groups' do not have a stable load to generation resource balance. However, it is possible that, under specific circumstances, generator controls can establish a new equilibrium in an islanded group.

Interconnected Generation - Any generation that is designed to operate in parallel with the District's electric system for more than two seconds is considered to be interconnected and must meet the technical requirements for an interconnected generator.

Interconnection Facilities Study – The interconnection facilities study is the third and final study in the interconnection study process for generation interconnections. The purpose of the study is to provide the applicant with a comprehensive view of potential infrastructure upgrades and costs required to interconnect with the District.

New Large Load Policy – The PUD, as a not-for-profit entity, strives to ensure equity in costs between customers. As such, costs incurred by the utility to build facilities to serve large new loads are paid in advance by the applicant, then repaid as a demand credit over ten years. This policy describes the cost allocation between the applicant and the utility for construction of any upgrades that must be completed in order to accommodate the interconnection of new loads above 2.5 MVA, as well as demand credit schedules. In the SIS, a detailed estimate is provided for the construction and specifies costs paid by the applicant and by the utility.

SCADA (Supervisory Control and Data Acquisition) - A system of remote control and telemetry used to monitor and control the electric system.

Single Point Loads – A load with a single point of interconnection with the District which is owned by one customer.

System Impact Study – The second study in the interconnection study process. The purpose of this study is to provide the applicant with detailed effects to be expected due to operation of the generation or interconnection of load and a good-faith, non-binding cost and construction timeline estimates for system mitigations.

Utility Tie Breaker – A breaker located at the point of interconnection which connects the project and the utility's electrical system.

Voltage Regulation - The difference between expected maximum and minimum voltage at any particular delivery point. The voltage regulation limits are expressed as a percent of the nominal voltage and are defined for both normal and contingency conditions.

Voltage Fluctuations – Voltage fluctuations are rapid changes in voltage that occur over a time period of 1 sec or less.

Temporary Overvoltage - Temporary over-voltages can last from seconds to minutes, and are not characterized as surges. These over-voltages are present during islanding or faults.

2 Interconnection Process

These guidelines contain a procedural overview along with technical requirements for customers seeking interconnection of new generation resources and large loads (end-user facilities) onto the Public Utility District No. 1 of Snohomish County ("District") distribution (12kV) electric system. This procedure also applies to existing projects looking to make a qualified change. The procedural overview (in Section 2.3) outlines the study process that applicants are required to complete as well as basic information on cost allocations. Contractual matters, such as costs, ownership, scheduling, and billing are not the focus of these requirements and will be addressed by Key Accounts in a related part of the process. The technical requirements outlined in this document are in place to ensure the safe operating integrity and reliability of the District-owned electric system.

This document states the minimum requirements for the safe and reliable operation of the customer-owned generating facility that will be connected and operated in parallel with the Snohomish County PUD (District) electric system. The study process required before interconnecting with the District's system is also outlined in this document. Physical laws that govern the behavior of electric systems do not recognize boundaries of electric facility ownership. Therefore, the electric power system must be studied, without regard to ownership, to develop a properly designed interconnection that is compatible with the future electric system as well as present conditions.

For any interconnection with the District electric system or qualified change, the District should be contacted as early as possible.

2.1 Overview

The interconnection process typically begins with the applicant submitting the application and requesting that the District perform a Feasibility Review for the proposed project. During the Feasibility Review, the District evaluates each interconnection request individually, in the order that completed applications were received, and identifies high-level impacts to the District electric system. The system studies and cost estimates are not included in the Feasibility Review process.

Following the Feasibility Review, if the applicant decides to proceed, the District will conduct a System Impact Study. This study will analyze the impacts to the District's system and determine the mitigations required to minimize any negative impacts to the District's system. In the System Impact Study, the District will provide a good-faith estimate of cost and time to construct for the mitigations required. If the project is determined to impact neighboring facilities, a "Joint Study" with other utilities to address any potential impact to the reliability of the bulk electrical system may also be needed. This may require that other entities perform their own studies and impose their own fees and schedules. Interconnection requirements are then provided back to the applicant.

2.2 Project Study Requirements

Specific thresholds determine the level of study required for each project. The thresholds for generator and large load projects proposed for connection to the District's system at either distribution or transmission voltage are outlines below.

Generation

The District has a variety of programs covering the interconnection of generation of various types and sizes to its system. These programs include Net Metering, Net Billing, and Parallel Interconnected Generators. For more information about these programs, please check out the SnoPUD website or contact

Key Accounts. Commercial agreements aside, the technical requirements for these programs are all designed to ensure the operating integrity and reliability of the system.

Generation		
Type	**Size**	**Study required**
Renewable (inverter-based)	≤ 100 kW	Net Metering evaluation - ESR 6
Fuel cell, cogeneration, or renewable (inverter-based)	≤ 200 kW	Net Billing - similar to ESR 6 evaluation
Any type	> 200 kW	Both District and BPA interconnection studies are required

Renewable generation connecting to the system through UL 1741 inverters may be approved in expedited fashion as described in Electrical Service Requirements Chapter 6 (Section 6 Generation Interconnection).

Rotating-machine generation projects not connected through UL 1741 inverters are evaluated based on the machine parameters and the system to which connection is proposed.

All projects connecting generation facilities 200 kW and greater to the system require an interconnection study (see Section 2.3), which will determine whether the project will connect at distribution voltage to a shared feeder, a dedicated feeder, or at transmission voltage. In addition, a Bonneville Power Administration (BPA) interconnection study is required. Because BPA acts as the Balancing Area Authority and Planning Coordinator for the District, this study can identify whether the project will require ancillary services from BPA.

Loads

Load additions less than or equal to 2.5 MVA do not require an official study. For loads greater than 2.5 MVA, where capacity is available to serve the load, an interconnection study is not required, and the project can proceed following payment of Amp fees. Available capacity and the need for study will be determined in the Feasibility Review.

If capacity is not available to serve a load greater than 2.5 MVA, a System Impact Study is conducted, and costs are allocated in accordance with the District's New Large Load Policy. The study will determine whether the load will interconnect at distribution voltage to a shared feeder, a dedicated feeder, or at transmission voltage.

At the present time, new loads up to 9.9 MVA can be interconnected without a power supply review. Loads at 10MVA or above will require an additional power supply analysis.

Loads		
Size	**Study required**	**Typical feed**
≤ 2.5 MVA	No	Shared feeder
> 2.5 MVA with existing capacity	Study is not required if existing capacity is available to serve the requested amount of load	Shared feeder
> 2.5 MVA without existing capacity	If existing capacity is not available to serve the requested amount of load	Determined by study results

2.3 Study Process Summary

The Interconnection Study process has up to three phases. The first phase is the Feasibility Review which is followed by the System Impact Study (SIS) and, finally, the Interconnection Facilities Study (IFS) for generation projects and New Large Load Policy (NLLP) for load projects. The purpose of the three phases is to determine how proposed interconnections will affect the District's system and what system upgrades and improvements must be made to support the interconnection. Once the study process has been completed, a report detailing interconnection requirements are provided back to the applicant.

Applicants should contact the District as early in the planning process as possible for any potential generation, or large load projects within or adjacent to the District system and/or where the output will enter the District Electric System. The applicant shall not make their own assumptions about the final location, voltage, or interconnection requirements. The District may have to add or modify its distribution or transmission system substantially before connecting a customer-owned facility. An Interconnection Study is used to determine the required interconnection facilities and modifications to accommodate the customer-owned facilities. This study may also address transient stability, voltage stability, losses, voltage regulation, harmonics, voltage flicker, electromagnetic transients, machine dynamics, Ferro-resonance, metering requirements, protective relaying, substation grounding, and fault duties as applicable. The applicant will provide the District with sufficient information for adequate system study.

A link to a flow chart illustrating the "Customer Owned Generation – Interconnection Application Process" can be found on the District's Public website: Connecting Generation - Snohomish County PUD

Similarly, a link to a flow chart illustrating the "Large Load – Interconnection Application Process" can be found on the District's Public website: Connecting Large Loads - Snohomish County PUD

2.3.1 Phase 1: Feasibility Review

Time Frame: ~1 month
Fee: $5,000
Application Forms: For Generation or Line: Form 6-1
For Load: New Service Questionnaire (NSQ) Form

The Feasibility Review begins once the applicant submits the interconnection application signed by the end-user, pays the Feasibility Review fee, and provides all project data requested by the District. The specific data requirements vary depending on the type of interconnection. The Feasibility Review process

and timeline commence only after the District confirms receipt of all required project data from the developer.

The goals of this review are to identify basic parameters of the interconnection, to determine which processes and technical requirements apply, and to provide a non-binding outline of key equipment and work which may be needed. Basic parameters of the interconnection might include availability of three-phase service at the project site if required, circuit load capacity, annual circuit and/or line section peak and minimum loads, available short-circuit current, any existing system constraints, and protective devices affected by the proposed installation. Examples of key equipment and work which may be identified include transformer upgrades, or the requirement of a new feeder or a dedicated substation. A determination of whether the applicant's generation is classified as parallel or non-parallel operation with the District's electric system will also be made. For single point loads ≥ 10MW, the feasibility review will also include a discussion about power acquisition options available to the applicant.

The results of the Feasibility Review will be presented to the applicant during the feasibility review meeting. This meeting will be scheduled with the applicant by the District within 10 days of receiving the application. After the feasibility review meeting the applicant will then have 30 days to decide whether to continue with the interconnection study process or withdraw. If the District is not informed of the applicant's intent to proceed by day 30, the District will send the customer a notice that their project has been deemed reviewed. If a notice to proceed is provided in the following 5 business days, the project will maintain its position in the queue otherwise the project will be permanently withdrawn from the queue.

At the agreement of both the District and the applicant, the Feasibility Review may be waived, and the applicant can proceed directly to the System Impact study.

2.3.2 Phase 2: System Impact Study (SIS)

Time Frame:	~5-8 Months
Fee:	$10,000+
Required Materials:	For Generation/Line: Form 6-2, Project Data For Load: Project Data

If the applicant has decided to proceed with the study process after the Feasibility Review or if the Feasibility Review has been waived, the interconnection project will proceed to the System Impact Study (SIS). Before the SIS begins, the applicant must provide the District Form 6-2 and/or the requested project data. Once the required materials have been received and reviewed, the District will tender the applicant a System Impact Study Agreement as well as an Additional Data Request if data in addition to what has been provided is required. Once the applicant has signed the System Impact Study Agreement, submitted the requested data, and paid the fee, the SIS will begin.

The System Impact study may include steady state power flow, short circuit, and transient stability analyses as appropriate depending on the project. The System Impact Study will be performed using utility industry software modeling tools.

The technical analysis begins with a current load flow model of the affected distribution system. The model is then updated with the latest system configuration, generating resources, and projected loads. To evaluate the electrical system impacts, the District employs the District's Distribution General Planning Guidelines, studying both normal conditions and when fed from an alternate source.

Studies identify operation outside the acceptable ranges of facility rating limits, voltage stability limits, and transient stability limits among others. Mitigations (solutions) are proposed which may include

facility additions, upgrades, and other modifications. The applicant may be responsible for all or part of the cost of the mitigation. Mitigations identified by the District must be in place before the proposed interconnection project can be put into service.

The SIS report will identify detailed effects to be expected due to operation of the generation or interconnection of load. The SIS report will also provide a high-level summary of technical requirements that may apply for the interconnection. A good-faith cost and construction timeline estimates for system mitigations required for interconnection will also be provided in the report. The results of the SIS study will be presented to the applicant initially in a draft SIS report. The applicant will have 30 days to provide comments back to the District about the report. The District will then finalize the report and send a final draft back to the applicant.

The results of the SIS will also be presented to the applicant during the SIS review meeting. This meeting will be scheduled with the applicant by the District within 10 days to occur within 30 days of the SIS completion. Any questions or comments about the draft report can be discussed during this meeting. After the final draft is sent, the applicant will then have 90 business days to decide whether to continue with the interconnection process or withdraw. If the District is not informed of the applicant's intent to proceed by day 90, the District will send the customer with a notice that their project has been deemed withdrawn. If a notice to proceed is provided in the following 5 business days, the project will maintain its position in the queue otherwise the project will be permanently withdrawn from the queue.

2.3.3 Phase 3 – Generation: Interconnection Facilities Study

Time Frame:	~5 – 8 Months
Fee:	$50,000+
Required Materials:	If applicable, Additional Data

If the applicant decides to proceed with the study process after the System Impact Study, the interconnection project will proceed to the Interconnection Facilities Study (IFS). To begin the IFS process, the District will tender the applicant an Interconnection Facilities Study Agreement as well as an Additional Data Request if the District has identified additional input data is needed. Once the applicant has signed the Interconnection Facilities Study Agreement, submitted any requested data, and paid the fee, the IFS will begin.

The IFS will identify a detailed cost estimate based on a preliminary design for the project. This study will also include a detailed construction timeline, any applicable electrical switching required, any controls and communications equipment required, any necessary protection equipment required, and, for generation projects, any essential generation controls. The IFS will provide the applicant with a comprehensive view of potential infrastructure upgrades and costs required to interconnect with the District.

The results of the IFS will be presented to the applicant during the IFS review meeting. This meeting will be scheduled with the applicant by the District within 10 days to occur within 30 days of the conclusion of the IFS. After the IFS review meeting the applicant will then have 30 business days to decide whether to continue with the interconnection process or withdraw. If the District is not informed of the applicant's intent to proceed by day 30, the District will send the customer with a notice that their project has been deemed withdrawn. If a notice to proceed is provided in the following 5 business days, the project will maintain its position in the queue otherwise the project will be permanently withdrawn from the queue.

Applicants who have a high degree of certainty of implementing a project may request to combine the SIS and the IFS into a single study. This request will be granted at the District's discretion. This can reduce the total time required for the District to complete its portion of the study phase of the project.

2.3.4 Phase 3 – Large Load: New Large Load Policy

Time Frame:	Project Dependent
Fee:	Project Dependent
Required Materials:	If applicable, Additional Data

If the applicant decides to proceed with the study process after the System Impact Study, the large load project will proceed to the New Large Load Policy (NLLP). To begin the NLLP process, the District will tender the applicant an NLLP contract as well as an Additional Data Request if the District has identified additional input data is needed. Once the applicant has signed the NLLP, submitted any requested data, and paid any required fees, the first task order of the NLLP will begin.

The first task order in the NLLP will identify a more refined (than the SIS) project cost estimate based on a preliminary design for the project. This task order will also produce a more refined construction timeline. Task Order 1 of the NLLP will provide the applicant with a comprehensive view of potential infrastructure upgrades and costs required to interconnect with the District.

The results of Task Order 1 will be presented to the applicant during a review meeting. This meeting will be scheduled with the applicant by the District within 10 days to occur within 30 days of the conclusion of Task Order 1. After the review meeting the applicant will then have 30 business days to decide whether to continue with the interconnection process or withdraw. If the District is not informed of the applicant's intent to proceed by day 30, the District will send the customer with a notice that their project has been deemed withdrawn. If a notice to proceed is provided in the following 5 business days, the project will maintain its position in the queue otherwise the project will be permanently withdrawn from the queue.

Applicants who have a high degree of certainty of implementing a project may request to combine the SIS and Task Order 1 into a single study. This request will be granted at the District's discretion. This can reduce the total time required for the District to complete its portion of the study phase of the project.

2.3.5 Phase 4: Interconnection Agreement

If the applicant decides to proceed with the interconnection after the study process is complete, customer-owned generation/line interconnection project will proceed to an Interconnection Agreement. Large load projects will continue with the NLLP process. The District's Key Accounts team will coordinate these processes.

2.4 Required Data

Data required for the interconnection study process varies from stage to stage as well as project type. The forms used to submit technical data can be found on the District's Public website (links in Section 2.3) or will be provided by submitting a written request to the contact provided in Section 6. Below is an outline of which forms should be used for various scenarios.

Feasibility Review	Form 6-1 for Generation New Service Questionnaire for Load
System Impact Study	Form 6-2 for Generation and Project Data for All
Interconnection Facilities Study	If applicable, Additional Data
New Large Load Policy	If applicable, Additional Data

When completing the forms, the District will work with the applicant to answer any questions. If forms are not filled out to the District's standards, additional data requests will be made of the applicant for the missing or incomplete information before the study begins.

The District will protect proprietary and confidential information as required or permitted by applicable law concerning requests for applicant transmission and distribution system information.

A selection of the information which may be requested in the data submission forms includes the following:

1. Electrical one-line diagrams, type of generation (natural gas, hydro, wind, geothermal, etc.), proposed nameplate ratings, site location maps, site plan, high-voltage system routing, and a description of the proposed connection to the District system.
2. All available generator and transformer data. Note that the machine portion of these data generally means synchronous machine data. Other types of generators (such as induction generators or DC generators with inverters) are handled on a case-by-case basis.
3. Validated models and data for power flow and dynamic (stability) simulation. This validated data can be specified as a requirement of commissioning tests. The data requirements include:
    a. Generator reactive power limits (generator PQ capability curve) addressing effects of all control, protection, and operating/equipment limits that can restrict reactive power output,
    b. Exciter, including power system stabilizer and other limiters, and high side voltage controls,
    c. Prime mover, governor, overfrequency protection, and underfrequency protection,
    d. Generator subtransient, transient, and steady-state reactance and time constant data, and
    e. Generator step-up transformer capacity, impedance, and winding connection data.
4. A description of the anticipated operating profile of the customer-owned generating facility, including the peak monthly megawatt (MW) output of the customer-owned generating facility, expected period of operation, and maintenance periods.

2.5 Cost Allocation Policy

Contractual matters, such as costs, ownership, scheduling, and billing are not the focus of these guidelines. This section is provided as a general overview of how interconnection costs are understood at the District. For more detailed information about cost allocation please contact the District's Key Accounts team (keyaccounts@snopud.com).

The PUD is a not-for-profit, consumer-owned utility that provides electrical service at cost to its ratepayers. The costs of interconnection necessary to deliver service to each applicant are assessed in the interconnection process outlined above. These costs include all the costs of study, engineering, inspection, connection, switching, metering, transmission, distribution, safety provisions, equipment to be owned by the District, and administrative costs incurred by the District directly related to the installation and maintenance of the physical facilities necessary to permit the customer-owned generating facility operation. All costs will align with the District's customer Service Regulations for Electric Service guide.

For new loads equal to or greater than the New Large Load Policy threshold (2.5MW as of 2021), the New Large Load Policy will dictate how the costs of interconnection are split between the applicant and the District. The New Large Load Policy works to ensure that customers causing the District to incur

costs associated with large load additions cover such costs. Line Extension Policy Fees may apply in addition to fees associated with New Large Load Policy.

For new loads less than the New Large Load Policy threshold (2.5MW as of 2021), the applicant will typically have to pay line extension and amps fees as appliable with the rest of the interconnection costs being borne by the District.

2.6 Qualified Change Definition

Certain types of changes to an existing facility or a previously studied facility require that new interconnection studies be performed. These changes are called "qualified changes" and are defined by BPA acting as the District's Planning Coordinator. The BPA definition of qualified change can be found in BPA's "Technical Requirements for Interconnection to the BPA Transmission System" (in the 4/3/25 revision on pg 88 & 89).

Generally speaking, a qualified change is anything that would change the electrical parameters of the project such as differently rated equipment, equipment with significantly different electrical parameters, significant increase in load demand, etc.

If a project is identified to fall into the category of a qualified change, the project will need to be restudied in the same manner as a new interconnection project. This re-study will happen at the applicant's cost and the study timeline will reset once the project re-study begins. The re-study will also occur after any system impact studies that have been received in the interim are completed.

It is at the District's discretion whether projects connected to the distribution system with these types of modifications need to be restudied and the decision to require re-study will be made on a case-by-case basis. At a minimum, any future modification or expansion of the customer-owned generating facility shall require an engineering review and approval by the District.

2.7 Related Requirements and Policies

In addition to the technical requirements provided in Section 3 of this document, proposed projects must also comply with other District and industry standards as applicable. The latest version of each standard should be referenced. A summary of these standards and codes is outlined below.

All Projects

- National Electrical Code
- National Electrical Safety Code
- North American Electric Reliability Council Standards
- Western Electricity Coordinating Council Standards
- Washington State Safety Standards
- District Electrical Service Requirements
- District Construction Standards

Generation

- IEEE Guide for Interfacing Dispersed Storage and Generation Facilities with Electric Utility Systems, ANSI/IEEE Std 1001
- District Generating Facility Planning Requirements as applicable
- Standard for Interconnecting Distributed Resources with Electric Power Systems, IEEE P1547, and UL 1741

The primary District standard is the Electrical Service Requirements manual which contains policies, standards and general requirements for providing overhead and underground distribution service to District customers. For all interconnection requests, the applicant shall have the responsibility of reading and understanding the Electrical Service Requirements document, available from Customer Engineering or from the District's public web page.

The District reserves the right to require the customer to provide at the customer's expense corrections or additions to existing facilities in the event of modification of government or industry regulations and standards

2.8 District's Protection Philosophy

The District is committed to providing excellent service to all of its customers. A critical part of accomplishing this goal is a robust protection system. The District's protection requirements address the following objectives:

- Ensure the safety of the general public, District and other utility personnel.
- Prevent property damage to the general public, District and customers.
- Minimize adverse operating conditions affecting the District and customers.
- Adhere to District standards and requirements.
- Comply with NERC and WECC Standards subject to enforcement.
- Comply with industry standards
- Witness testing of all protective systems will be required before the District allows commissioning and parallel operation.

Any new customers interconnecting with the District's system must take protection considerations into account. The protection schemes and equipment necessary to integrate the new connection must be consistent with District practices, standards, and guidelines. The protection system must be designed to reliably detect faults or abnormal system conditions and provide an appropriate means to isolate the equipment from the system automatically. Special relaying practices may also be required for system disturbance, such as undervoltage or underfrequency detection for load shedding or reactive device switching.

The District cannot assume any responsibility for protection of the applicant's equipment. Applicants are solely responsible for protecting their equipment in such a manner that faults, imbalances, or other disturbances do not cause damage to their facilities or result in problems for other customers.

Each request for interconnection will be handled individually, and the District will make the final determination of the protective devices, maintenance and operation requirements, communications and control requirements, and system modifications and/or additions required. When applicable, the interconnected facility's periodic maintenance, testing, and validation are required and must be consistent with NERC/WECC standard guidelines. The Applicant shall provide equipment specifications, protection arrangements, and design drawings to the District for review and written approval prior to installation. The District will work with the customer to achieve an installation that meets the requirements of both the customer and the District.

2.9 Technical Requirements - General

The technical requirements identified in this document are not intended as a design specification or an instruction manual and the information presented is expected to change periodically based on industry events, evolving standards, and internal and external changes to the District's electric system. Technical

requirements stated herein are consistent with the District's current internal electric facility planning guidelines and practices for system additions and modifications. These requirements are intended to be consistent with the general principles and practices of the Institute of Electrical and Electronics Engineers (IEEE) and American National Standards Institute (ANSI) if applicable. To the extent that the codes, standards, criteria and regulations are applicable, the new or modified facilities shall be in compliance with those standards and practices.

The customer-owned facility and its interconnecting facilities must not degrade the safe operation, integrity, and reliability of the District's system. The District will make the final determination if the District's facilities are properly protected before an interconnection is energized.

Any questions regarding technical requirements stated in this document should be directed to System Planning and Protection Group.

3 Technical Requirements

These technical requirements outline all of the guidelines that customer-owned facilities interconnecting with the District's system at distribution voltage (< 100kV) must adhere to. These facilities include generation facilities and end-user (load) facilities.

3.1 Load (End-User) Facilities

These are the interconnection requirements that load (end-user) facilities must meet when interconnecting with the District's distribution system. Some of these standards are operational requirements that the District must meet when proposing mitigations for an interconnection project.

3.1.1 Voltage

Specification 1: The District maintains distribution voltages according to the ANSI Standard C84.1 which allows for variances for plus or minus 5% from nominal for all voltage levels.

Specification 2: Customer-owned facilities are allowed a maximum of 3.5% voltage fluctuation.

Specification 3: Voltage fluctuations caused by the customer-owned generating facility shall not exceed the Borderline of Visibility as shown in Figure 1 of IEEE Standard 1453-2022.

3.1.2 Power Factor

Specification 1: Unless otherwise specifically agreed, the District shall not be obligated to deliver electric energy to the customer at any time at a power factor below 75% (refers to Average overall power factor for each individually metered service).

Specification 2: Customers-owned facilities interconnecting with the distribution system shall maintain an average power factor of 0.97 lagging.

3.1.3 Underfrequency Load Shedding

Power system disturbances, such as faults and forced equipment outages, can expose the system to oscillations in voltage and frequency. It is important that transmission lines and generation remain in service for dynamic oscillations that are stable and damped. Large-scale blackouts can result from the excessive loss of generation, outage of a major transmission facility, or load rejection during a disturbance. In order to prevent such events, underfrequency load shedding has been implemented throughout WECC, including the Pacific Northwest.

Specification 1: Depending on the type and location of any new customer load, the customer may be subject to tripping for underfrequency conditions.

3.2 Generation Facilities

These are the interconnection requirements that generation facilities must meet when interconnecting with the District's distribution system. Some of these standards are operational requirements that the District must meet when proposing mitigations for an interconnection project.

3.2.1 Voltage

Specification 1: The District will specify control modes for the generation to minimize adverse effects to system voltage.

Specification 2: Voltage fluctuations caused by the customer-owned generating facility shall not exceed the Borderline of Visibility as shown in Figure 1 of IEEE Standard 1453-2022.

Specification 3: The harmonic content of the customer-owned generating facility output must be below that level which would cause undue interference with other customer loads, other utilities, or District equipment. (See IEEE 519)

3.2.2 Reactive Power

Specification 1: Each entity shall provide for its own reactive power requirements, at both leading and lagging power factors as specified by the District.

Specification 2: Prior to start-up of the customer-owned generating facility, the generator operating limits shall be reviewed and approved by the District.

3.2.3 Phase Unbalance

Unbalanced phase voltages and currents can affect protective relay coordination and cause high neutral currents and thermal overloading of transformers. To protect the District's and customer-owned equipment, the District maintains specific guidelines as outlined below. Phase unbalance is defined as the percent deviation of one phase from the average of all three phases.

Specification 1: The customer-owned 3-phase generating facility's contribution at the interconnection point does not cause a voltage imbalance greater than 1% per ANSI Standard C50.10.

Specification 2: The customer-owned 3-phase generating facility's contribution at the interconnection point does not cause a current imbalance greater than 5% per ANSI Standard C50.10.

3.2.4 Harmonics

Specification 1: The voltage and current harmonic content of the customer-owned generating facility output must be below the level which would cause undue interference with other customer loads, other utilities, or District equipment.

Specification 2: The voltage and current harmonic content of the customer-owned generating facility output must be at or below the distortion limits outlined in IEEE 519.

Specification 3: The District requires that the customer-owned IBR generating facilities shall meet the harmonics requirements specified in IEEE Std 1547.

3.2.5 Step Up Transformer

Specification 1: Transformers with high side connect to the District's 12.47kV distribution system shall be wye-grounded/wye-grounded with no delta windings. This is to maintain effective grounding of the system as defined by the Institute of Electrical and Electronics Engineers (IEEE).

Specification 2: The District does not allow customer generation facilities connected to the distribution system to connect on the low side of a delta/wye-grounded transformer with wye-grounded on the high side and delta on the low side.

Specification 3: Secondary-connected generation up to 2.2 MVA can connect through a District-provided 2500 kVA transformer. Above that value, the customer must provide their own transformer (primary service).

3.3 Generation Protection

The following sub-sections outline the protection requirements for generation facilities interconnecting with the District's distribution system. The District cannot assume any responsibility for protection of the applicant's equipment. Applicants are solely responsible for protecting their equipment in such a manner that faults, imbalances, or other disturbances do not cause damage to their facilities or result in problems for other customers.

If addition of the generation creates a condition where District protection is no longer able to adequately detect and clear for faults at every point on the feeder, dedicated facilities may be required for the interconnection.

3.3.1 General Protection

Specification 1: Circuit breakers, disconnect switches, and all other current-carrying equipment connected to the District distribution facilities shall be capable of carrying normal and emergency load currents, and must also withstand available fault currents without damage.

Specification 2: During steady-state operation, all current-carrying equipment connected to the District shall be capable of carrying the maximum continuous current that the interconnected facility can deliver.

Specification 3: All circuit breakers and other fault-interrupting devices shall be capable of safely interrupting fault currents for any fault that they may be required to interrupt.

Specification 4: Application shall be in accordance with ANSI/IEEE C37 Standards.

Specification 5: The customer shall provide equipment specifications, protection arrangement, and design drawings to the District for review and written approval prior to installation. Protective relay settings shall be provided for review at least two weeks prior to commissioning.

Specification 6: The customer shall be fully responsible for the protection of their generator(s) and all of their associated equipment.

Specification 7: Protection shall be provided to protect the District from customer-owned equipment failures as well as ensuring the generation facility is disconnected for faults and other disturbances on the District system in both normal and alternate switching scenarios.

Specification 8: The generator breaker must have an automatic synchronizing capability and be appropriately rated.

Specification 9: DC power must be used for tripping all breakers used for interconnection and breaker failure detection and backup tripping must be provided. If a single generator breaker is used, a utility tie breaker will be required.

Specification 10: Automatic isolation shall be done prior to the District feeder breaker (or line recloser) reclosing and within a reasonable period of time, typically less than two seconds in the absence of direct transfer trip relaying and other pilot relaying.

Specification 11: Following a trip of the generation facility, the customer shall contact the District's Energy Control Center to request permission to reconnect to the system.

3.3.2 Frequency Protection

Specification 1: Customer-owned generating facilities must have protection that accommodates underfrequency and over-frequency tripping with the following operating times:

Table 1: Distribution Frequency Protection Settings

Underfrequency Limit	Over-frequency Limit	Clearing Time
58.4 Hz	61.6 Hz	30.0 seconds
57.0 Hz	61.7 Hz	0.16 seconds

Specification 2: The customer's return to service range shall be as outlined in Table 2.

Table 2: Distribution Frequency Return to Service Criteria

Enter Service Criteria Permitted Service		Default Settings Enabled
Frequency Within Range	Minimum Value	≥ 59.5 Hz
	Maximum Value	≤ 60.6 HZ

Specification 3: The customer's frequency relay settings shall be reviewed and approved by the District prior to start-up of the customer-owned generating facility.

3.3.3 Voltage Protection

Specification 1: Applicant over/under voltage relays settings must comply with the settings listed below:

Table 3: Distribution Voltage Protection Settings

Undervoltage Limit	Over-voltage Limit	Clearing Time
0.7 p.u.	1.10 p.u.	2.0 seconds
0.45 p.u.	1.20 p.u.	0.16 seconds

Specification 2: The customer's return to service range shall be as outlined in Table 4.

Table 4: Distribution Voltage Return to Service Criteria

Enter Service Criteria Permitted Service		Default Settings Enabled
Voltage Within Range	Minimum Value	≥ 0.95 per-unit
	Maximum Value	≤ 1.05 per-unit

Specification 3: The customer's voltage relay settings shall be reviewed and approved by the District prior to start-up of the customer-owned generating facility.

3.3.4 Breaker Duty

The addition of the applicant's proposed project to the District's system may increase the fault duty in the surrounding area. To mitigate the impacts of this increase in fault duty the impacted protection schemes and devices may need to be upgraded at customer cost.

Specification 1: System protection engineers shall review the existing distribution feeder coordination and make necessary changes as required.

Specification 2: The rated interrupting times in cycles typically required of circuit breakers on the District's distribution electric system is 5 cycles or less.

Specification 3: All existing distribution system apparatus (such as breakers, reclosers, fuses, current transformers, etc.) near the proposed generating facility shall be upgraded at customer cost to handle fault duty increases as required.

3.3.5 Direct Transfer Trip Relaying

For projects connected to the distribution system, this pilot relaying scheme is required for projects that could potentially create an unintentional island with other District customers. It is used to ensure that the generation is disconnected in a timely manner when required under both normal and alternate feed conditions. In general, when transfer trip relaying is installed, its operation must be clearly described in an operating procedure, signed by both the customer and the District.

If addition of the generation creates a condition where District protection is no longer able to adequately detect and clear for faults at every point on the feeder, dedicated facilities may be required for the interconnection.

Specification 1: An area is considered to be at risk of islanding when the minimum load served by a protective device is less than double the capacity of the generation. Transfer trip must be installed to all protective devices which serve areas potentially islanded by their operation.

Specification 2: The customer-owned non-IBR generating facility shall install two multi-function protective relays. One of the two will be the primary and the other is a backup (for redundancy). A device with SEL Mirrored Bit features must be provided at the generating facility to process the transfer trip signal and trip the generator breaker(s).

Specification 3: A protection logic processor (SEL-2100, equivalent, or appropriate upgraded device) may be required at the District substation(s) and/or at the utility tie breaker, depending on possible configuration changes or contingencies. If transfer trip capabilities are not provided on the breaker used

for alternate switching configurations, the generation must not be operated during the period that the alternate system configuration is in effect.

3.3.6 Utility Tie Breaker(s)

Specification 1: The customer must install a utility tie breaker when required to reliably detect and clear for all faults on the District system.

3.3.7 Surge Protection

Interconnecting new projects can change equipment duty, and may require that equipment be replaced or switchgear, communications, shielding, grounding and/or surge protection added to control voltage stress to acceptable levels. Voltage stresses, such as lightning or switching surges, can damage equipment. Remedies depend on the equipment capability and the type and magnitude of the stress.

Specification 1: The customer shall be fully responsible for the protection of their generating facility from transient surges initiated by lightning, switching, or other system disturbances.

Specification 2: The District may identify additions required to maintain an acceptable level of the District system availability, reliability, equipment insulation margins, and safety. These will be made at applicant's expense.

Specification 3: In general, stations with equipment operated at 12.5 kV and above, as well as all power transformers shall be protected against lightning and switching surges by the use of surge arrester devices and/or shielding. Typically, this includes station shielding against direct lightning strikes, surge arresters on all power transformers, and surge protection with rod gaps or arresters on the incoming lines.

Note: At voltages below 230-kV, modifications to protect the District system against customer-owned generating facility-generated switching surges are not anticipated.

4 Generation Facility Requirements

This section contains requirements that all generation facilities must meet regardless of interconnection voltage.

4.1 Placement of Generating Facilities

To maintain the existing District high-voltage/distribution system's reliability, all customer-owned generating facilities shall meet the following specifications:

Specification 1: A customer-owned generating facility shall not be allowed within 10 feet (horizontal clearance) from any existing overhead electrical distribution (12.47kV) facilities and 20 feet (horizontal clearance) from any existing high-voltage (115kV and higher) electrical facilities.

Specification 2: Exhaust fumes shall not be directed to any existing overhead electrical facilities.

Specification 3: All feeders capable of serving the customer-owned generating facility (including redundant feeds) shall have all required interconnection relaying.

4.2 Visible Disconnect Switch Requirements

In order to safely perform work on the system, all generation interconnections must provide a disconnect device which isolates all sources of energy from the District's electric system, provides a visible open, and has provisions to allow District personnel to lock the switch open.

Specification 1: At the point of interconnection to the District system, an isolating device(s) shall be placed in an appropriate location, by agreement of the District and affected parties.

Specification 2: The isolation device(s) shall be equipped with a lockable mechanism for clearance tagging and provide a visible air gap in the isolated state.

Specification 3: The isolation device(s) must simultaneously open all phases (gang-operated).

Specification 4: The isolation device(s) must be accessible by the District and ultimately under the District Energy Control Center jurisdiction.

Specification 5: The isolation device(s) must be lockable in the open position by the District.

Specification 6: The isolation device(s) should not be operated without advanced notice to either party, unless an emergency condition requires that the device be opened to isolate the customer-owned generating facility.

Specification 7: The isolation device(s) must be suitable for safe operation under all foreseeable operating conditions.

Specification 8: Connected facilities shall not prevent the District from taking a transmission line or line section or other equipment out of service for operation or maintenance purposes.

Note: The District personnel may lock the device in the open position and install safety grounds for the following reasons:

- If it is necessary for the protection of maintenance personnel when working on de-energized circuits.
- If the customer-owned generating facility or the District equipment presents a hazardous condition.
- If the customer-owned generating facility or the District equipment interferes with the operation of the District system.

4.3 Generation Equipment Ratings

Specification 1: Generation facility ratings shall be based on limits provided by the generator manufacturer including the generator capability curve, with all associated equipment connected in series to the interconnection point.

Specification 2: Generators shall be rated at nameplate rating unless testing provides evidence to support an increase or decrease in capabilities.

Specification 3: The nameplate rating of an IBR facility shall be the minimum nameplate rating of either the inverter or the generation equipment.

Note: The District's transmission system has been developed with careful consideration for equipment ratings and follows the NERC Standard FAC-008.

4.4 Generation Starting as Induction Motor

In general, induction generators start as motors and also synchronous generators may be designed to start as motors.

Specification 1: The customer-owned generators starting as motors shall meet the motor starting requirements in the District Electrical Service Requirements and T&D Guidelines.

Specification 2: If starting requirements are not met, the District may require the customer to provide special or additional starting equipment.

4.5 Islanding

This District does not generally permit islanding conditions to exist except when the customer's generation is feeding their own load. The customer shall be fully responsible for protecting their own facility and District's facilities under islanding conditions. Operations for larger installations must be clearly detailed in an operating procedure signed by the customer and the District.

If generation is capable of operating in parallel with other District customers in an unintentional island, additional protection and control measures will be needed.

4.6 Right to Disconnect

The District reserves the right to discontinue or interrupt the customer-owned generation to correct any system emergency condition, outage, required system maintenance, or equipment failure.

4.7 Inverter Performance Requirements

IBR resources interconnecting with the District's system must meet industry standards of performance.

Specification 1: IBRs interconnecting with the District's transmission system must adhere to IEEE 2800.

Specification 2: IBRs interconnecting with the District's transmission system must adhere to IEEE 1547.

Specification 3: All IBRs interconnecting with the District's system, regardless of interconnection voltage, must adhere to UL 1741.

5 General System Details

This section contains various requirements that facilities must meet regardless of interconnection voltage.

5.1 Grounding Requirements

Specification 1: The applicant's facilities must be designed in accordance with good utility practice, IEEE Std. 80, and the National Electric Safety Code or National Electric Code, as applicable.

Specification 2: Studies must be performed to guarantee step and touch, as well as transferred, potentials are limited to safe levels in any area accessible to District Personnel.

Specification 3: The applicant's substation must have a ground grid that is solidly connected to all metallic structures and other non-energized metallic equipment. This grid shall limit the ground potential gradients to such voltage and current levels that will not endanger the safety of people or damage equipment which are in, or immediately adjacent to, the site under normal and fault conditions.

Specification 4: If the applicant's substation's new ground grid is close to another substation, the two ground grids may be isolated or connected.

Specification 4a: If the ground grids are to be isolated, there must be no metallic ground connections between the two substation ground grids. Cable shields, cable sheaths, station service ground sheaths and overhead transmission shield wires or distribution ground conductors can all inadvertently connect ground grids.

Specification 4b: If the ground grids are to be interconnected, the interconnecting cables must have sufficient capacity to handle fault currents and control ground grid voltage rises.

Note: The integration of generation may substantially increase fault current levels at nearby substations. Modifications to the ground grids of existing stations may be necessary to keep grid voltage rises within safe levels. The System Impact Study will determine if modifications are required and the estimated cost. Any modifications will be performed at customer cost.

5.2 Equipment Ratings

Specification 1: If it is determined that customer's project causes existing District equipment ratings to be exceeded, the customer shall pay to have the equipment upgraded to handle these increases as required.

Specification 2: The design and ratings of the applicant's facilities shall not restrict the capability of the line(s).

5.3 Telecommunication Requirements

Telecommunications facilities will be installed to fulfill the control, protection, operation, dispatching, scheduling, and revenue metering requirements. They may be owned by the District, another utility, a service customer, or a third party. Any new required telecommunication facilities will be identified in the project requirements. Telecommunications facilities must be compatible with, and have similar reliability and performance characteristics to, telecommunications facilities currently used for operation of the District power system to which the new generation or loads will be connected.

5.3.1 Communication Requirements

This section contains requirements related to the remote operation of the Districts system and how interconnected facilities are connected into that operation.

Specification 1: Applicant must designate an official point of contact so that the District's and applicant's personnel can monitor, coordinate, and cooperate to ensure the reliable operation of the electric system during normal and emergency conditions.

5.3.1.1 Normal Conditions

Specification 1: The applicant shall not energize any de-energized District equipment unless the District System Operator specifically approves the energization.

Specification 2: The circuit the generating facility is connected to may be interrupted and re-energized by the District by means of a protective device which also performs automatic reclosing .

Specification 3: If the generation or load facility requires any type of telemetering, then voice communications to the District operator are also required. If the facility is not staffed with operators, alternative arrangements may be made subject to District approval.

Specification 4: A dedicated, direct automatic ring down trunk (or equivalent) voice circuit between the District control center and the operator of the generators or loads may be required for generators or loads of 10 MVA or greater.

5.3.1.2 Emergency Conditions

Emergency telecommunications conditions may develop that affect telecommunications equipment with or without directly affecting power transmission system facilities. Equipment redundancy and

telecommunication route redundancy can protect against certain kinds of failure and telecommunications path interruption.

Note 1: If SCADA communication is lost and ECC is not able to verify condition of the facility, the entity may be isolated until manual control can be established.

5.3.2 Dedicated Communications Link for Pilot Relaying

Specification 1: The signal transmission delay caused by a communications link and all associated communications equipment shall not exceed 15 milliseconds. The District prefers a fiber optic communications link, but other types of communications links may be acceptable pending approval by the District.

5.3.3 Dedicated Communications Link for SCADA

To ensure safety of working personnel and prompt response to system abnormalities, the District shall be allowed to know the status of certain breakers (e.g., utility tie breaker, interconnection breaker, and generator breaker(s)) and the real & reactive power flow at the generator breakers and at the District primary meter.

Specification 1: A dedicated communications link for SCADA shall be required at certain breakers (e.g., utility tie breaker, interconnection breaker, and generator breaker(s)).

Specification 2: A Remote Terminal Unit (RTU) shall be installed at the generating facility and it shall be able to open and close the interconnection breaker remotely. In general, a District-owned local Remote Terminal Unit (RTU) shall be installed at the customer-owned generating facility to perform certain control and monitoring functions as specified.

5.3.4 General Telemetering Requirements

The District System Operations Center requires telemetry data for the integration of new generation resources. This typically consists of the continuous telemetering of kW and kVAr quantities and hourly transmission of the previous hour's kWh and kVArh from the customer-owned generating facility to the District System Operations Center. The net customer-owned generating facility output, which is the customer-owned generating facility generation less the station service load and step-up losses, is normally telemetered.

Specification 1: A dedicated communications link is required for General Telemetry, but this link may be shared with the Revenue Metering System and Voice Communications. Table 5 summarizes telemetry requirements and the following includes specific requirements based on customer-owned generating facility size:

a) Telemetry is required when the output of the customer-owned generating facility entering the District Electric System is 3.0 MVA or greater: For this case, the telemetry of real power and energy (kW and kWh), and reactive power (kVAr and kVArh) is normally required.
b) For customer-owned generating facilities below 3.0 MVA, the District determines telemetry needs on a case-by-case basis. Note that should an existing plant expand to over 3.0 MVA, telemetry is required for the entire plant output.

Specification 2: A voice communications link shall be required for coordination of system protection, control, and communications maintenance activities between the District and the customer-owned generating facility.

Table 5: General Metering and Telemetering Requirements

District Data Requirements[1]			
System or Quantity	**Energy Control Center**	**High Voltage Scheduling**	**Revenue Billing**
kW	Yes	No	No[2]
kWh	Yes	Yes	Yes
kVAr	Yes	No	No
kVArh	Yes	No	Yes
kV	Yes	No	No
Number of Units	Number on Line Number Available	Number on Line Number Available	No
Resource Size	≥ 3.0 MVA[1]	≥ 1 MVA	≥ 1 kW
Data Sample Rate	1 Second or other approved rate compatible with NERC Policy	Last Hour kWh sent each hour	Hourly kWh Data Retrieved daily
Generation Reserves	Contingency non-spinning MW Contingency Spinning MW Regulating MW	Contingency non-spinning MW Contingency Spinning MW Regulating MW	No

Notes:
1. Requirements for customer-owned generating facilities below 3.0 MVA are determined on an individual basis.

2. A kW reading for revenue billing may be required where special transmission arrangements are necessary.

5.4 Commissioning Requirements

This section contains the specifications that customers must meet when commissioning their facilities.

5.4.1 Start-Up (Initial Energization Inspection)

Specification 1: For equipment that can impact the District electric system, the customer shall develop an "Inspection and Test Plan" for pre-energization and energization testing.

Specification 2: The applicant is responsible for pre-energization testing of their generation, line, and load facility equipment.

Specification 3: Prior to initial energization of the customer-owned generating facility, inspection and/or tests shall be jointly performed by both the customer and designated District personnel to verify the proper operation of the generator(s) and associated equipment to the District's satisfaction.

Specification 4: Commissioning testing will be required to demonstrate voltage step response, and voltage and frequency control systems.

5.5 Operations and Metering Requirements

This section contains the specifications required of interconnecting facilities in regard to operations and metering.

5.5.1 Revenue and Interchange Metering

Revenue metering includes energy (kWh) and reactive energy (kVArh) recorded by revenue meters on a demand interval basis. Interchange metering includes bi-directional energy and reactive data as well as special telemetering requirements for scheduling purposes. Energy data recording is required for District's billing and scheduling functions. The District typically owns and maintains the revenue metering at the load-metering and generation metering sites.

Specification 1: All interconnections of facilities capable of exchanging at least 1 kVA of active power require District qualified metering for revenue or interchange.

Specification 2: The metering shall be located to measure the net power at the point of interface to or from the District power grid.

Specification 3: Revenue and interchange metering, telemetering, and data communication facilities require calibration and testing on a programmed periodic basis to ensure correct data readings.

5.5.2 Generation Metering System

Generation metering usually consists of bi-directional meters and related communications systems providing active power (in kW) and energy (in kWh) from the point of interface with the District. Active power is telemetered on a continuous basis and is sent each hour to the District control center for District accounting. Effective telemetering requires real-time knowledge of the quality of measurement. Associated with the telemetering signal, various indications of telecommunications quality or failure shall be included.

Generation metering, telemetering, and data communication facilities require calibration and testing on a programmed periodic basis to ensure correct data readings.

5.5.3 Synchronizing of Facilities

Specification 1: The customer-owned generating facility shall be automatically synchronized with the District system and the customer shall be responsible for the automatic synchronization.

Specification 2: Synchronization capability shall be provided both at the utility tie breaker(s) and at the generator breaker(s).

Specification 3: Breakers used for synchronization may not have more than 5-cycle closing time.

Specification 4: All automatic synchronization shall be supervised by a synchronizing check relay.

Specification 5: The output of a synchronizing check relay used to supervise synchronization must be rated to interrupt the circuit breaker closing circuit current, and the interrupting device must be capable of trip-free operation.

5.5.4 Primary Metering

Specification 1: The District shall own, furnish, and install the standard bi-directional production metering to measure the energy delivered by the District to the customer and the energy received by the District from the customer.

Specification 2: A communications link is required for this Revenue Metering System.

5.6 Maintenance Requirements

Specification 1: The customer shall maintain their generating facility in good working order.

Specification 2: The customer-owned generating facility (generator and associated equipment) may be subject to District inspection upon reasonable notice by the District.

Specification 3: The customer shall assume full responsibility for the routine maintenance of the generating facility and associated protective devices and the keeping of records for such maintenance. These records shall always be available to the District for inspection.

Specification 4: The customer is responsible for generator performance testing, monitoring, and validation. The customer may also be required to perform additional tests as necessary to ensure compliance with WECC standards.

5.6.1 Maintenance Coordination

Specification 1: Transmission and distribution elements (e.g. lines, line rights of way, power transformers, circuit breakers, control and protection equipment, metering, and telecommunications) that are part of the proposed connection and could affect the reliability of the District electric system must be inspected and maintained in conformance with NERC, WECC, and District standards and guidelines, whichever is the most stringent.

Specification 2: The customer has full responsibility for the inspection, testing, calibration, and maintenance of their equipment, up to the location of change of ownership or point of service.

Note: Plant maintenance requirements are specified by NERC.

6 Documentation Requirements & Revision History

The District shall maintain and update the Interconnection Guidelines reflected in this document as necessary to maintain compliance with current NERC, WECC and District standards and guidelines.

Copies of this document will be provided within 5 business days upon request by sending your written request to:

Manager, System Planning and Protection

Public Utility District No. 1 of Snohomish County

P.O. Box 1107

Everett, WA 98206-1107

Revision History

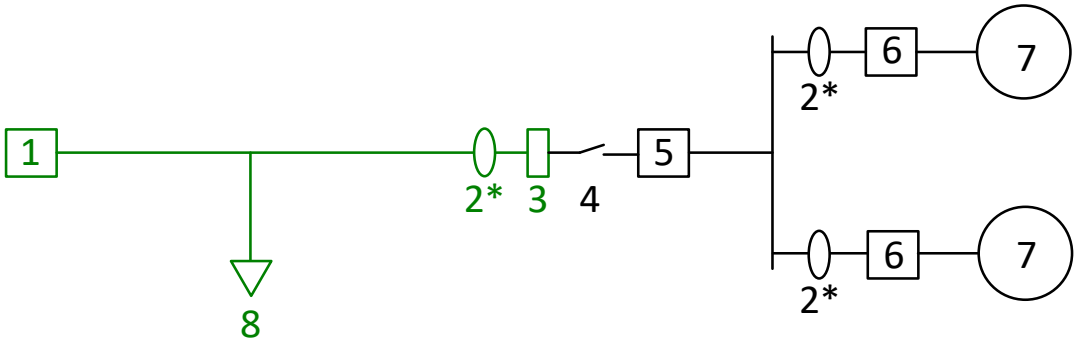
Note to Revisers: Please review to see if update should also be made in the Transmission Interconnection Requirements.

Number	Date	Description	By	Reviewed by	Approved by:
Original	Sept. 29, 2011	Document Origination – Compilation of: 1) SNPD Electric Service Requirements 2) SNPD Customer Service Regulations 3) SNPD General Planning Guidelines, 2/4/10 4) SNPD Electric Transmission Protection Engineering Guidelines, 12/19/08 5) SNPD Electric Distribution Protection Engineering Guidelines, 12/19/08	D. Small	Mark Oens, Manager, System Planning and Protection Derek Backholm, Principal Engineer, System Protection Long Duong, Principal Engineer, Transmission Operations John Liang, Principal Engineer, Transmission Planning Anna Miles, Sr. Manager, Power Supply	
Revision 1	Dec. 18, 2013	Renumbered sections according to the NERC standard requirements numbering change. Minor edits throughout documents.	D. Small	System Planning Dept.	E. Tobin
Revision 2	Feb. 9, 2018	Revisions to Sections 2.0, 2.5 & 2.13 plus minor edits throughout	D. Small	System Planning and Protection	J. Zyskowski
Revision 3	June 18, 2026	Renamed from "Facility Connection Requirements", re-structure document, , divided into two documents [Transmission & Distribution], add in information about DER requirements	E. Parry	System Planning and Protection, Operations	A. Carstens

7 Appendix A: Interconnection Examples

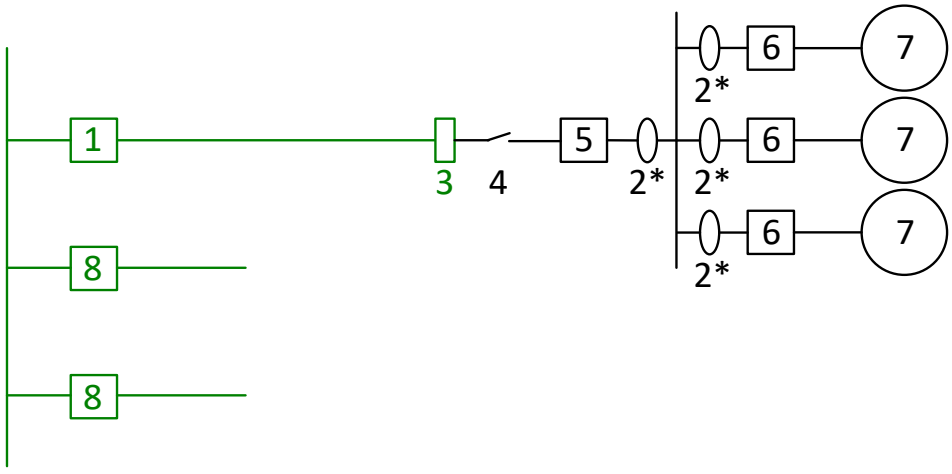
Below are some examples of what Customer-owned generation connection to the distribution system might look like. It must be emphasized that these are examples of installations only and final installations may vary significantly. The exact protective devices, system improvements, and system connections will be determined during the interconnection studies.

Generation Connected to Shared Feeder



1: Feeder Breaker
2: Step Up transformer(s)
*location as applicable
3: Meter
4: Visible Disconnect Switch
5: Utility Tie Breaker (if required)
6: Generator Breaker(s)
7: Generator(s)
8: Other District Customer Load

Generation Connected to Dedicated Feeder (no distribution load connected)



1: Feeder Breaker
2: Step Up transformer(s)
*location as applicable
3: Meter
4: Visible Disconnect Switch
5: Utility Tie Breaker (if required)
6: Generator Breaker(s)
7: Generator(s)
8: District Feeder Breakers

8 Appendix B: Form 6-1

SNOHOMISH COUNTY PUBLIC UTILITY DISTRICT NO. 1

Preliminary Application for Operation of Customer-Owned Generation

FORM 6-1

Who should file this application: *Any customer(s) expressing interest to install generation on their premises. This application should be completed as soon as possible and returned to a District representative in order to begin processing the request.*

Information: *This application is used by the District to perform a Preliminary Interconnection Study to determine the interface requirements at the customer's service point. The applicant should attempt to fill in as much of the form as possible. The applicant will receive a preliminary estimate for the utility interface requirements that may be used in calculating the overall project requirements.*

Further Action: *The Preliminary Interconnection Study will determine the need to submit a copy of the Final Application for Parallel Operation of Customer-Owned Generation.*

Equipment Testing: *Prior to final approval of the customer's generation, protective and control system testing is required. District representatives and Owner representatives must be present to witness and verify the testing for proper operation.*

Owner/Applicant Information

Company _____

Mailing Address _____

City _____ County _____ State _____ Zip _____

Phone _____ Representative _____

Project Design/Engineering (Architect) *(as applicable)*

Company _____

Mailing Address _____

City _____ County _____ State _____ Zip _____

Phone _____ Representative _____

Electrical Contractor *(as applicable)*

Company _____

Mailing Address _____

City _____ County _____ State _____ Zip _____

Phone _____ Representative _____

Generator Data

Manufacturer (if available) _____ Model _____

Type: Synchronous ☐ Induction ☐ Phases: Single ☐ Three ☐ Frequency (Hz) _____

Rated Output: _____ kW _____ kVA

Rated Power Factor: _____ (%) Rated Voltage (Volts): _____ Rated Amperes: _____

Energy Source (gas, steam, hydro, etc.) _____

Transfer Switch Data

Manufacturer _____ Model _____

Type _____ Rating _____ ANSI /UL 1008 Listed? YES ☐ NO ☐

What Standards does it meet? _____

Is transfer switch operational in closed-transition mode? YES ☐ NO ☐

What is maximum time the transfer switch takes to operate? _____

Can it be programmed to operate in parallel with District
for more than 100 milliseconds (0.100 sec)? YES ☐ NO ☐

Estimated Load Information

The following information will be used to help properly design the District/customer interconnection. This information is not intended as a commitment or contract for billing purposes.

Minimum anticipated load (generation not operating) _____ kW _____ kVA

Maximum anticipated load (generation not operating) _____ kW _____ kVA

Description of Proposed Installation and Operation

Please attach a single line diagram showing the customer's primary switchgear, transformers, and generation facilities. Give a general description of the manner of operation of the generation (cogeneration, peak shaving, emergency power, etc.) Please attach additional sheets if necessary.

Signature

Applicant Signature _____ Date _____

Information below to be completed by Snohomish County Public Utility District

PUD Customer Service Representative completes the following:

Executive Account Rep _____ Phone _____

Project Name _____

Street Address _____

City _____ County _____ Phone _____

District service point location _____
(Attach map if available)

Copy of Application and attachment to:

_____ System Planning & Protection Manager

**** Original of this document to be retained in customer's file in Customer Service Department ****

9 Appendix C: Form 6-2

SNOHOMISH COUNTY PUBLIC UTILITY DISTRICT NO. 1

Final Application for Operation of Customer-Owned Generation

FORM 6-2

Who should file this application: *Customers defined by the Preliminary Interconnection Study performed by the District as having generation capable of operating in parallel with the District system. This application should be completed as soon as possible and returned to a District Representative in order to begin processing the request.*

Information: *This application is used by the District to perform a Final Interconnection Study to determine the required equipment configuration for the District/customer interface. Every effort should be made to supply as much information as possible.*

Additional Requirements: *In addition to the items listed on this form, please attach a detailed one-line diagram of the proposed facility, all applicable elementary diagrams of major equipment (generators, transformers, inverters, circuit breakers, protective relays, etc.), specifications, test reports, etc., and any other applicable drawings or documents necessary for the proper design of the interconnection.*

Equipment Testing: *Prior to final approval of the customer's generation, protective and control system testing is required. District representatives and Owner representatives must be present to witness and verify the testing for proper operation.*

Owner/Applicant Information

Company _____

Mailing Address _____

City _____ County _____ State _____ Zip _____

Phone _____ Representative _____

Project Design/Engineering (Architect) *(as applicable)*

Company _____

Mailing Address _____

City _____ County _____ State _____ Zip _____

Phone _____ Representative _____

Electrical Contractor *(as applicable)*

Company _____

Mailing Address _____

City _____ County _____ State _____ Zip _____

Phone _____ Representative _____

Estimated Load Information

The following information will be used to help properly design the District/customer interconnection. This information is not intended as a commitment or contract for billing purposes.

Minimum anticipated load (generation not operating) _____kW _____ kVA

Maximum anticipated load (generation not operating) _____kW _____ kVA

Please complete all applicable items.
Copy this page as required for additional generators.

Synchronous Generator Data

Unit No.(s)_____ Total number of units with listed specifications on site _____

Manufacturer _____ Mfg. Date _____

Serial No. (each) _____

Phases: Single _____ Three _____ RPM _____ Frequency (Hz) _____

Rated Output (for one unit) _____ kW _____ kVA

Rated Power Factor _____ % Rated Voltage (Volts) _____ Rated Amperes _____

Field Volts _____ Field Amps_____ Motoring Power (kW) _____

Synchronous Reactance (Xd) _____ % on _____ kVA base

Transient Reactance (X'd) _____ % on _____ kVA base

Subtransient Reactance (X"d)_____ % on_____ kVA base

Negative Sequence Reactance (Xs) _____ % on _____ kVA base

Zero Sequence Reactance (Xo) _____ % on _____ kVA base

Neutral Grounding Resistor *(if applicable)* _____

_____

I^2t or K (heating time constant) _____

Additional information _____

_____

Induction Generator Data

Rotor Resistance (Rr) _____ ohms Stator Resistance (Rs) _____ ohms

Rotor Reactance (Xr) _____ ohms Stator Reactance (Xs) _____ ohms

Magnetizing Resistance (Xm) _____ ohms Short Circuit Resistance (Xd") _____ ohms

Design Letter _____ Frame Size _____

Exciting Current _____ Temp Rise ($^{\circ}$C) _____

Reactive Power Required _____ Vars (no load) _____ Vars (full load) _____

Additional information _____

_____

Prime Mover *(please complete all applicable items)*

Unit No. _____ Type _____

Manufacturer _____ Serial No. _____

Mfg. Date _____ HP Rated _____ HP Max _____ Inertia Constant_____lb-ft^2

Energy Source (hydro, steam, wind, etc.) _____

_____

Generator Transformer *(please complete all applicable items)*

Transformer (between generator and utility system)

Generator Unit No. _____

Manufacturer _____ Mfg. Date _____

Serial No. _____

High Voltage_____ kV, Connection: _____ delta _____ wye, Neutral solidly grounded? _____

Low Voltage _____ kV, Connection: _____ delta _____ wye, Neutral solidly grounded? _____

Transformer Imepdance (Z) _____ % on _____ kVA base

Transformer Resistance (R) _____ % on _____ kVA base

Transformer Reactance (X) _____ % on _____ kVA base

Neutral Grounding Resistor *(if applicable)* _____

Inverter Data *(if applicable)*

Manufacturer _____ Model _____

Rated Power Factor _____ % Rated Voltage (Volts) _____ Rated Amperes _____

Inverter Type (ferroresonant, step, pulse-width modulation, etc.) _____

Type Commutation: Forced _____ Line _____

Harmonic Distortion: Maximum Single Harmonic % _____

Maximum Total Harmonic % _____

***NOTE**: Please attach all available calculations, test reports, and oscillographic prints showing inverter output voltage and current waveforms.*

Power Circuit Breaker *(if applicable)*

Manufacturer _____ Model _____

Rated Voltage (kV) _____ Rated Amperes _____

Interrupting Rating (Amperes) _____ BIL Rating _____ kV

Interrupting medium/Insulating medium (ex: vacuum, gas, oil) _____ / _____

Control Voltage (closing): _____ Volts ____ AC ____ DC

Control Voltage (tripping): _____ Volts ____ AC ____ DC ____ Battery ____ Charged Capacitor

Close Energy: ____ Spring ____ Motor ____ Hydraulic ____ Pneumatic ____ Other

Trip Energy: ____ Spring ____ Motor ____ Hydraulic ____ Pneumatic ____ Other

Bushing Current Transformers _____ Max. Ratio _____ Relay Accuracy Class _____

Multi ratio: _____ Yes _____ No (Available taps) _____

Miscellaneous *(Please use this area and any additional sheets for applicable notes and comments)*

Signature

The customer agrees to provide Snohomish County Public Utility District with additional information required to complete the interconnection. The customer shall operate his equipment within the guidelines set forth by the *Interconnection Requirements for Customer-Owned Generating Facility Connected to District Distribution/High Voltage System*.

Applicant Signature _____ Date _____

Information below to be completed by Snohomish County Public Utility District

PUD Customer Service Representative completes the following:

Executive Account Rep _____ Phone _____

Project Name _____

Street Address _____

City _____ County _____ Phone _____

District service point location _____
(Attach map if available)

Equipment Testing
Testing performed and witnessed for proper operation on ____/____/____ by:

Owner _____ Owner Rep _____ Contractor _____

Executive Account Rep _____ System Protection Rep _____

Project Designer / Engineer _____ Construction Rep _____

Miscellaneous Comments / Notes

Copy of Application and Attachments to:

____ Power & Business Services AGM
____ Transmission & Distribution Engineering Services Manager
____ System Planning & Protection Manager
____ Distribution Construction Services Manager

**** Original of this document to be retained in customer's file in Customer Service Department ****

10 Appendix D: New Service Questionnaire (NSQ)

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1

1097C 09/23

COMMERCIAL

New Service/Rewire Questionnaire/Agreement

PROJECT INFORMATION - To be completed by contractor or property owner responsible for construction costs

Name - Legal name for contracts | Project Name | UBI/FEIN

Type of Business: ❑ Sole Proprietor ❑ LLC ❑ Partnership ❑ Corporation Phone Numbers:

Billing Address for Construction Charges | City | State | Zip

Service Address for Project | City | State | Zip

Parcel No.: | Approximate Project start date:

CONSTRUCTION CONTACTS -	Name	Phone Number	Fax	Email
Business Contact				
Electrical Contractor				
Site Super				

TEMPORARY SERVICE - for construction purposes only

❑ Overhead ❑ Underground ❑ No temporary required Approx. date temporary needed:

Contact information for party responsible for Temporary fees and monthly consumption billing ❑ Same as above

Name: Email: Phone #:

NEW PERMANENT SERVICE OR CHANGES TO EXISTING SERVICE

❑ New Construction ❑ Rewire - upgrading/changing existing service - Existing AMPs_____ ❑ Multi-Meter Number of Units: _____

Specify type of Business Approximate date of permanent service:

Contact information for party responsible for permanent monthly consumption billing ❑ Same as above

Name: Email: Phone #:

ELECTRICAL SERVICE ENTRANCE - REQUIRED

❑ Overhead ❑ Underground ❑ 200amps ❑ 400amps ❑ _____amps _____ voltage ❑ Single-Phase ❑ Three-Phase

Phase Wire Size: Neutral Wire Size: Number of runs: ❑ AL ❑ CU

ELECTRICAL LOAD INFORMATION - REQUIRED

Building square footage: _____

				Existing	New	Voltage	Phase
Lighting				_____ kW	_____ kW	_____	_____
Heating	❑ Electric	❑ Gas	❑ Other _____	_____ kW	_____ kW	_____	_____
Cooling	❑ Electric	❑ Gas	❑ Other _____	_____ kW	_____ kW	_____	_____
Water Heating	❑ Electric	❑ Gas		_____ kW	_____ kW	_____	_____
Electric Vehicle Charging	❑ Level 1	❑ Level 2	❑ Level 3	_____ kW	_____ kW	_____	_____
Miscellaneous				_____ kW	_____ kW	_____	_____
Motor Loads				_____ kW	_____ kW	_____	_____
			Total:	_____ **kW**	_____ **kW**		

Motor Loads* (characteristics of proposed load):

Size in HP	Quantity	Soft Start?	Starting AMPs	Running AMPs	Phase	Class	Voltage	No. of starts	Per Day or HR

Will there be any generation at this facility? ❑ Yes ❑ No If yes, what kind of interconnection? ❑ Open transition ❑ Closed transition

In order to proceed with the engineering and determination of charges, the following information may be required:

1. Electronic site plan required with lot lines, dimensions, easements, ROW, sewer, storm & desired transformer location. Attached? ❑ Yes ❑ No
2. Complete riser diagram / one-line with desired metering location (one location per building) Attached? ❑ Yes ❑ No
3. Grades & Stakes form signed attesting that property corner locations and final grade is established. Attached? ❑ Yes ❑ No
4. Will existing power facilities require relocation? ❑ Yes ❑ No

Prior to energizing the service, all PUD standards and service requirements must be met and approved by the PUD. You can find the Electrical Service Requirements at: www.snopud.com/construction. Email application and documents to: inspections@snopud.com.

It is understood that if additional work is required of the PUD, due to customer revisions of the electrical load and/or voltage requirements or other information as supplied or requested on this form, the additional costs shall be borne by the customer. **The PUD provides for installed load, not future load.**

Customer Signature Date:

☐ **Electronic Signature:** *By checking the Signature box, inserting my name on the signature line, and submitting the form electronically to the PUD, I certify that I understand and agree to the above terms.*

****To establish your permanent service usage billing account, please contact our Customer Service Department at 425-783-8442. We will not be able to install and energize the permanent meter without an account set-up.

PUD INTERNAL USE Date Received: Billing Partner: Sold to: Assigned Engineer:
❑ Scanned to BSR@snopud.com Connection Object: Ship to: Fees Paid

Interconnection Requirements_Distribution

Final Audit Report 2026-06-18

Created:	2026-06-18
By:	Cherilyn Suiter (CJSuiter@snopud.com)
Status:	Signed
Transaction ID:	CBJCHBCAABAA3UI3gOF6igcs9e4cjr2zDLtVoDjXBM-N

"Interconnection Requirements_Distribution" History

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