General Program Information	
QUESTION	**ANSWER**
What is the purpose of the PGE Small Generator Interconnection Program?	The purpose of our Small Generator Interconnection Program is to comply with state and/or federal regulations and requirements to provide a means to interconnect generators to PGE's electric power system while ensuring the safety, reliability and power quality of PGE's electric power system.
How do I initiate a distribution interconnection request for my project?	To initiate an interconnection request, you must must submit the following to PGE via PowerClerk • One-line diagram • Site plan (this should include property lines, switchgear location, distances, driveway/gravel area, fencing, solar panel layout and proposed point of interconnection) • Proof of site control • Manufacturer technical specification sheet for all lab-tested system components • FERC "Notice of Self Certification" for Qualifying Facility (QF), if applicable • Projects with a nameplate rating greater than 3 MW must include communication equipment product sheets, protocol, and designs to meet the telemetry requirements of OAR 860-82-0070(5) Please mail $1,000 Application Fee check payable to: Portland General Electric Co. Portland General Electric Attn: Small Power Production 121 SW Salmon St, 3WTC0402 Portland, OR 97204
How long does the interconnection process take?	The interconnection process will take approximately 30 to 36 months to complete. This includes approximately 12 months to complete the study process and approximately 18 to 24 months for preliminary design, detailed engineering, procurement, and construction. Depending on the specifics of your project and how it will interconnect with our system, the process may take longer.

What studies does PGE perform to evaluate the impact of my project on the PGE electric system?	We will conduct three studies when evaluating your interconnection request:
	• Feasibility Study
	  ○ Identifies potential adverse system impacts
	• System Impact Study
	  ○ Short-circuit analysis
	  ○ Stability analysis
	  ○ Power flow analysis
	  ○ Voltage drop and flicker studies
	  ○ Protection and set point studies
	  ○ Grounding review
	  ○ The underlying assumptions of the study
	  ○ The results of the analysis
	  ○ Any potential impediments to providing the requested interconnection service
	• Facility Study
	  ○ Interconnection facilities and system upgrade requirements
	  ○ Cost estimate for facilities and upgrade requirements
	  ○ Schedule estimate to procure, construct, and install interconnection facilities and system upgrades

Do you allow studies to be skipped?	Each project entering the interconnection queue should expect to complete the Feasibility Study, System Impact Study, and Facility Study prior to receiving an Interconnection Agreement. This ensures that all applicants are treated in an equal manner and each interconnection request is properly reviewed. There may be instances in which studies can be skipped, as determined by PGE at our sole discretion.
Is detailed engineering performed as part of the Facilities Study?	We will complete preliminary design as part of the interconnection study process with sufficient detail to determine the scope and budget for any required interconnection facilities and system upgrades. Detailed engineering will be completed after the Interconnection Agreement is executed.
Who do I contact if I have questions?	For questions about the small-generator interconnection queue, contact us at Small. PowerProduction@pgn.com or call the Small Power Production Specialists at 503-464-8300.

Protection Information	
QUESTION	**ANSWER**
Why do you require provisions for a transfer trip?	A transfer trip will quickly remove the Project from PGE's system for a trip of the feeder breaker, a transformer lockout or a fault on the transmission system to support the safe and reliable operation of the system. Transfer trips are industry accepted practice and prevent unintentional islanding by the generation project. They also trip the generation project for reliability events that the project can't detect and are used to remove the project from PGE's system when switching or other system work is required.
Why do you require use of fiber optic communication for transfer trips rather than an alternative such as PLC/telco/radio?	Our current standard is to use fiber communication for transfer trip schemes. We have not installed a new PLC or telco scheme for many years due to concerns regarding speed, maintenance and reliability. We don't currently have the infrastructure for a radio solution that will provide the required level of reliability.
Why do you require the use of SEL 487E relays rather than a less expensive alternative?	We exclusively use Schweitzer Engineering Laboratories (SEL) microprocessor-based protective relays. Our protection engineers have determined that the SEL-487E Transformer Protection Relay is the only SEL relay that has the functionality for generator interconnection protection required by PGE design standards. The SEL-487E is the standard transformer protective relay used on our system.
Why are you requiring substation and line modifications when my DER project meets the requirements of IEEE1547 and IEEE1547.1?	IEEE1547 is a performance standard specifying the requirement of the generator at the point it electrically connects to the utility. IEEE1547.1 is a standard that defines the testing required to determine if a generator is compliant with the performance requirements in IEEE1547. The IEEE 1547 standards do not address the system modifications we require to interconnect the generator.
Are you conforming to IEEE 1547.2?	IEEE1547.2 is an application guide that describes the various mitigation techniques available. We have taken IEEE1547.2 into consideration in developing our interconnection requirements.

What equipment is required to mitigate the risk of 3VO voltage rise?	Overvoltage conditions can result from a fault on the high side of a substation transformer when there is back feed through the transformer from a generation project. Overvoltage conditions can damage transformers and line insulators, and impact power quality to existing customers. To rapidly detect the overvoltage condition and trip the generator, the following is required: • 3 phase VT on the high side of the substation transformer • Circuit switcher or circuit breaker on the high side of the substation transformer • Dual SEL-487E relays for overall transformer protection • Transfer trip to the generator via mirror bits

Distribution Equipment Information	
QUESTION	**ANSWER**
Why do you require the replacement of circuit breakers rather than just replacing the protective relays?	Circuit breakers are replaced when the circuit breaker is incompatible with the protective relays to be installed or PGE's Asset Management evaluation determines it is more cost effective to replace the circuit breaker and associated relay protection package rather than replacing only the protective relays in an aging circuit breaker. Bringing an aging circuit breaker up to our current standards is typically more expensive than replacing the circuit breaker.
Why do you require replacement of fuses with electronic reclosers? Why not a larger fuse?	Depending on the size and location of the generator, an electronic recloser might be required instead of a fuse to allow for effective coordination with other protective devices and ensure the safety and reliability of our distribution system. Electronic reclosers are protective devices that can be programmed to provide the protection needed to effectively isolate the distribution system during unplanned power quality/reliability events to minimize impact, and speed restoration of service. On our system, fuses are limited to tapline/service transformer load sizes and do not have voltage sensing capability.

Why do you require replacement of hydraulic reclosers?	Depending on the size and location of the generator, an electronic recloser might be required instead of a hydraulic recloser. On our system, hydraulic recloser ratings are limited to feeder tapline load sizes and do not have voltage sensing capability. In addition to not being rated for higher ampacities, hydraulic reclosers have considerable maintenance requirements when compared to electronic reclosers.
Can reclosers be retrofitted rather than replaced?	PGE does not retrofit reclosers. Our current distribution design standards require voltage sensing equipment on both the line and load sides of the recloser to allow for synchronizing capability. It is cost prohibitive to retrofit existing reclosers, so our practice is to replace a recloser that does not meet our current standards.
Why do you require reconductoring of primary feeders for some interconnection projects?	Due to the interconnected nature of PGE's distribution system, some interconnection projects may require reconductoring of an entire /primary feeder mainline loop. To ensure that no system equipment is damaged, we evaluate interconnecting generators at full capacity while the surrounding load is modeled at a minimum. Some generation and load scenarios can create significant current flow onto our primary distribution system. This current flow can, in some cases, exceed the rating of existing conductors, requiring a primary feeder reconductor.

Distribution Planning Information	
QUESTION	**ANSWER**
How are peak loading conditions defined?	A peak loading condition is defined as the highest coincidental daytime loading condition for a grouping of feeders served from the same substation during a season when loading is at its highest level.
How are light loading conditions defined?	A light loading condition is defined as the lowest coincidental daytime loading condition for a grouping of feeders served from the same substation during a season when loading is at its lowest level.

Do you evaluate flicker in System Impact Studies? What tool is used?	Voltage fluctuation (flicker) are evaluated by comparing two states (QF off/QF on) with field and substation voltage control devices disabled during simulation to determine the voltage delta. CYME power engineering software (CYMDIST) is the modeling tool used to perform system impact studies on the distribution system. Permissible variations in service levels on our primary distribution system are limited to 1.5 percent assuming not more than four fluctuations per hour. Our power quality guidelines are established in PGE design standards, ANSI C84.1-1989, and IEEE 141-1993.
Do you evaluate and report available fault current at the point of interconnection?	We evaluate and report available fault current at the point of interconnection (before and after QF is installed) and at equipment locations up to and including the corresponding substation bus. This information is documented in the System Impact Study.
How is daytime minimum load factored into substation transformer loading evaluation?	Interconnection studies are performed for daytime minimum loading levels for peak system loading conditions and light system loading conditions consistent with PGE and Western Electricity Coordinating Council (WECC) planning standards. Heavy daytime conditions (summer) and light daytime conditions (spring) are collected at hourly intervals for individual feeders and are applied in the model used to simulate the distribution system. For peak loading conditions, the highest coincidental system load is selected and compared to corresponding weather conditions and system configuration. If ideal weather conditions and configurations match, then the affected feeder loadings are applied. For light loading conditions, the lowest coincidental daytime system load is selected and compared to corresponding weather conditions and system configuration. If ideal weather conditions and configurations match, then the affected feeder loadings are applied.
Do you provide the author of studies that are completed by a third party?	We may contract with third parties to perform certain parts of the studies. These studies are reviewed by the third party's lead engineer and subsequently reviewed by PGE engineers responsible for the substations the QF is interconnected with. We do not provide the contact information of the third parties that we engage.

*PGE reserves the right to make changes to this FAQ and its requirements, standards, and policies at any time.