

Interconnection Guidelines

Includes Net-metered Installations

Customer Generation With Capacity Up to 100 kW

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1. Purpose

This document establishes the minimum requirements for safe and effective operation of small-scale generation interconnected with the Nova Scotia Power Inc. (NSPI) Distribution System. This guide describes NSPI's interconnection requirements, the minimum design standards the Customer-generator must satisfy, and a range of normal and emergency system conditions the generating equipment could encounter while connected to the NSPI Distribution System.

Customer-generators should discuss project plans with NSPI before purchasing or installing equipment, as requirements will vary depending on capacity, type, location and the existing NSPI facilities in place.

Implementing the requirements of this guideline will help ensure that the Customer-generator's equipment does not operate in a manner that would compromise the safe operation, reliability or power quality of the NSPI Distribution System. The Customer-generator is required to install, operate and maintain its generating and interconnection equipment in accordance with manufacturer's recommendations to ensure good working order and fitness for service at all times.

This guideline is based on the following assumptions and principles:

- The addition of the Customer-generator's equipment to the Distribution System will not appreciably change the Distribution System and its characteristics.
- The installation meets the installation requirements of the Canadian Electrical Code (CE Code) Part 1 and the equipment is certified to the relevant CE Code Part 2 product standard. Other local and provincial construction and installation regulations may apply.
- The safety of NSPI personnel, the public and equipment is of primary concern in the design of the interconnection systems.

1.1. Customer Generation at NSPI

A Customer-generator may be permitted to operate at 60 Hertz, three phase generators up to 100 kW or single phase generators up to 30 kW, in parallel with the NSPI Distribution System, provided the Customer-generator meets or exceeds the requirements of these guidelines. In all cases, establishment of an Interconnection Agreement as applicable for Net-metered installations and conformance with NSPI's "Net-metering Service Regulation 3.6" by the Customer-generator is required.

1.2. Limitations

The criteria and requirements of this document are applicable to all generation technologies, with aggregate capacity up to 100 kW for three phase generators and 30 kW for single-phase generators. Based on this size limitation, it is anticipated that the generation systems will be interconnected with radial Distribution Systems at typical primary voltages (rated less than 26,400 V phase to phase) or secondary voltages (less than 750 volts phase to phase).

For generators with capacity greater than 100 kW refer to the document "***Interconnection Technical Requirements for Customer Generation With Capacity Above 100 kW - Connected to Distribution Circuits (Rated 26,400 V and under)***"

This document does not apply to emergency backup generators utilizing automatic or manual transfer schemes in which load is transferred between the distributed generation and the NSPI Distribution System in a momentary “break-before-make” operation.

The requirements in this guideline are not intended to provide protection of the Customer-generator’s equipment. The Customer-generator is fully responsible for protecting their equipment in such a manner that faults or other disturbances on the NSPI system do not cause damage to their equipment, and NSPI shall not be liable for any such fault, damage or disturbance.

2. Getting Connected – The Interconnection Process

The first step in getting connected is to have the project assessed. This is initiated by completing and submitting the form provided in [Appendix A: Interconnection Request And Equipment Information Form](#), to the following address:

Nova Scotia Power Inc.,
P.O. Box 910
Halifax, NS
B3J 2W5
Attn: Erika Smeltzer

The basic steps in the process are as follows:

- 2.1. The NSPI Contact will acknowledge receipt of the Interconnection Request and will then perform a review of the interconnection request and NSPI’s field conditions (*i.e. is the transformer large enough, is there three phase at site, does the metering have to be changed, etc.*) This review will identify any new NSPI equipment or upgrades to the existing Distribution System that are required to enable the connection of the generator. This review takes into account the size, type and location of the proposed generation equipment.
- 2.2. NSPI will develop specific interconnection requirements and cost estimates for required system additions/upgrades (If required), including changes to the NSPI revenue metering equipment.
- 2.3. The cost estimates for the required system additions or changes will be provided to the Customer-generator for review. Once the Customer-generator accepts the requirements and pays the identified costs, the required construction work can be scheduled to commence.
- 2.4. Following installation of the generating equipment, NSPI & the Customer-generator shall sign the “Interconnection Agreement”
- 2.5. As part of the electrical and generating equipment installation, the Customer-generator’s electrician must take out a Wiring Permit and arrange to have all required electrical inspections performed and passed.
- 2.6. After the wiring inspections are performed and passed, and the Interconnection Agreement is signed, NSPI will advise the Customer-generator that interconnection of the generator with the NSPI system can proceed.
- 2.7. At this stage, NSPI may require and/or witness the commissioning and testing of the generation equipment.

- 2.8. Final reconciliation of NSPI's costs will determine the actual costs (or refunds) to be paid by (to) the Customer-generator.
- 2.9. The Customer-generator is now operational.

3. Safety Requirements

3.1. NSPI Safety Requirements - Standard Protection Code

Safe work procedures described in NSPI's Standard Protection Code¹ will be followed by NSPI in providing isolation for work on any part of the interconnected Distribution System.

3.2. Electrical Inspection Act² and the Canadian Electrical Code Parts I & II³

The Customer-generator's installation must meet all applicable national, provincial and municipal electrical construction and safety codes, including, without limitation, the Electrical Installation and Inspection Act. Except as expressly permitted by law, all electrical equipment must have CSA or equivalent approval.

3.3. Permission to Operate

Under no circumstances shall the Customer-generator begin parallel operation of the generator until final written approval in the form of a signed "Interconnection Agreement" has been given by NSPI.

4. Interconnected Systems

An interconnected system is defined as one in which the Customer-generator's generation is connected at a point common with the NSPI Distribution System, resulting in a transfer of power between the two systems. As a result of this interconnection, the generator system becomes an integral part of the NSPI Distribution System and must be considered in the electrical protection and operation of the NSPI Distribution System.

Section 4.1 lists the typical Distribution System operating and power quality conditions within which the Customer-generator's equipment must operate. It lists representative values of parameters that the Distribution System normally maintains and some abnormal conditions that the generating equipment needs to be designed to withstand. It is the Customer-generator's responsibility to ensure that the generating equipment operates correctly in this environment.

Sections 5 & 6 list typical conditions and response to abnormal conditions that the Customer-generator's system must meet as well as typical interconnection protective function requirements.

4.1. NSPI Distribution System

4.1.1. Distribution System Configuration

NSPI's primary Distribution System is a 3-phase, 4-wire multi-grounded common neutral system ("effectively grounded-wye") operated at three typical voltage levels:

- 4,160 Volts line to line (4 kV),
- 12,470 Volts line to line (12 kV)
- 24,940 Volts line to line (25 kV)

Distribution transformers, which step the primary voltage down to utilization voltages, are mainly single-phase units with primaries connected phase to ground. Three phase distribution transformers are normally configured grounded wye- grounded wye. This generally provides a single intentional ground path for short-circuit currents (one zero-sequence path) and has been utilized in the design of short-circuit protection applied to distribution feeder systems. NSPI's standard secondary voltages are:

- 120/240 Volts 1-Phase
- 120/208 Volts Solidly Grounded Wye 3-Phase, 4-Wire
- 347/600 Volts Solidly Grounded Wye 3-Phase, 4-Wire

4.1.2. System Grounding

Distribution Systems are typically three-phase 4-wire multi-grounded systems incorporating single-phase distribution taps. They are typically operated as effectively (solidly) grounded.

Following the addition of any generating equipment, the Distribution System must remain effectively grounded at all locations.

4.1.3. Phasing

Phasing is not standardized across Distribution Systems. For three phase generation, the phase sequence and the direction of rotation must be coordinated with NSPI's Distribution System.

4.1.4. System Frequency

The Distribution System operates at 60 Hz. Frequency deviations are typically 59.7 Hz to 60.2 Hz.

4.1.5. System Voltage

NSPI's Regulation 2.7⁴ provides general guidance as to appropriate Distribution System steady state service voltage levels. Customer-generator systems must operate satisfactorily within the extreme voltage level variation limits shown in Table 1.

Table 1: Normal Service Voltage Variation Limits

Nominal System Voltages	Recommended Voltage Variation Limits for Circuits Up to 1000 volts, Applicable at Service Entrance			
	Extreme Operating Conditions			
	Normal Operating Conditions			
Single Phase 120/240 240 480 600	106/212 212 424 530	110/220 220 440 550	125/250 250 500 625	127/254 254 508 635
Three Phase 4-Conductor 120/208Y 240/416Y 277/480Y 347/600Y	110/190 220/380 245/424 306/530	112/194 224/388 254/440 318/550	125/216 250/432 288/500 360/625	127/220 254/440 293/508 367/635
Three Phase 3- Conductor 240 480 600	212 424 530	220 440 550	250 500 625	254 508 635

Source: Preferred Voltage Levels for AC Systems, 0 to 50 000V- Canadian Standards Association

4.1.6. Flicker and Voltage Distortion

Standard IEEE-519-1992⁵ establishes the quality of power that the utility is to deliver to the customer and describes the typical voltage and current waveforms that exist throughout the Distribution System. Transient conditions exceeding the limits may be encountered. Remote sections of rural Distribution Systems may not meet the limits. IEEE 519-1992 Section 11.5 recommends that the voltage distortion limits as a percentage of the nominal fundamental frequency voltage should not exceed 3% for any individual harmonic, and 5% for the total voltage harmonic distortion THD.

4.1.7. Voltage Unbalance

The voltage unbalance on the Distribution System under normal operating conditions is typically under 3% but may reach 5% due to the unbalanced loading and single-phase voltage regulation. Voltage unbalance is included in the range of Table 1 in section 5.1.3.

Voltage unbalance is calculated using RMS voltage levels measured phase to phase at the service entrance under no load conditions:

$$\text{Voltage unbalance (\%)} = 100 \times [(\text{max. deviation from average}) / (\text{average})]$$

4.1.8. Voltage and Current Surges

The Distribution System may experience voltage and current surges which varies by location due to the effects of other types of equipment connected to the Distribution System, including

switched loads, other generating equipment, switched power factor correction capacitors, and voltage regulation equipment.

4.1.9. Fault and Line Clearing

NSPI's power lines are subject to a variety of natural and man-made hazards. The resulting electric problems are principally short circuits, grounded conductors, and broken conductors. These fault conditions require that the damaged equipment be de-energized as soon as possible because of the hazards they pose to the public and the operation of the NSPI Distribution System.

To maintain the reliability of the Distribution System, NSPI uses automatic re-closing to automatically re-energize the power lines after a fault has occurred. The Customer-generator must be aware of line re-closing when selecting and setting up their generator protection schemes to ensure that the generator ceases to energize the Distribution System prior to any automatic re-close of NSPI's circuit breakers or reclosers.

4.1.10. Fault Levels

Fault levels on distribution circuits will vary depending on circuit configuration. NSPI will provide information on fault levels at a given site upon request by the Customer-generator.

4.2. Generator Types

Although it is anticipated that the majority of generators encountered in this size category will be either induction or inverter-interface types, synchronous units may also be utilized as well.

4.2.1. Synchronous Generators

Synchronous generators are generally capable of supplying sustained current for faults occurring on the NSPI Distribution System. Re-closing by the utility onto synchronous units must be blocked to prevent out-of-synchronous paralleling and to prevent the energization of a de-energized NSPI line.

For this type of generator, synchronizing equipment must be provided by the Customer-generator to ensure proper synchronizing of the Customer-generator's equipment to the NSPI system.

Sufficient time must be allowed to ensure the NSPI system has stabilized following a protection operation.

4.2.2. Induction Generators

Induction generators are basically induction motors that are mechanically driven above synchronous speed to produce electric power. Reactive power supply for induction generators may pose design problems, depending on the generator size. Special considerations for induction generators are:

- Capacitors may be necessary to limit the adverse effects of reactive power flow on NSPI's system voltage regulation.
- Self-excitation of the induction generator due to installed capacitors can produce abnormal high magnitude, distorted voltages
- Voltage flicker resulting from induction generators starting, particularly on low capacity Distribution Systems may be unacceptable to NSPI's

4.2.3. Power Electronic Converter (Inverter) Systems

Inverters convert direct current (dc) power to alternating current (ac) power by means of electronic switching devices. Switching can be controlled by the ac voltage waveform of the NSPI's supply system (grid-dependent) or by internal electronic circuitry (grid-independent). Inverters are generally not capable of supplying sustained fault current. Grid-independent inverters are capable of supplying load current independently of the NSPI supply system.

Excessive harmonic output of power inverters may interfere with other NSPI customers.

5. General Requirements for Interconnection

5.1. Isolation – Safety Disconnect Switch

A manual disconnecting device for isolation purposes must be provided. The form of this switch will vary with the service voltage and capacity but in all cases must be capable of providing a visible break, opening all phases simultaneously (Gang-operated), being locked in the open position and be accessible at all times to NSPI personnel. Location and form of the device is subject to approval by NSPI.

5.2. Grounding

The Customer-generator's equipment must be grounded as per manufacturer's recommendations, the CE Code, and in accordance with the normal practices of NSPI.

Interconnection of three phase transformers, and transformer grounding systems on three phase Distribution Systems, shall be coordinated with NSPI and shall not cause voltage disturbances nor disrupt coordination of NSPI's Distribution System ground fault protection.

5.3. Protection

The interconnecting customer's generator shall be equipped with protective functions or devices designed to:

- Prevent the generating equipment from being connected to a de-energized NSPI Distribution System;
- Prevent connection or parallel operation of the generating equipment with the NSPI Distribution System unless the voltage and frequency are of normal magnitude;
- Prevent isolated operation of the generator (islanding) with any part of the NSPI Distribution System; and,
- Interrupt the maximum available fault current at the point of connection with the NSPI Distribution System.

See Section 6 for specific requirements.

6. Interconnection Protection Requirements

6.1. Response To Abnormal Voltage Levels

Every grid-connected generator requires under/over voltage protection.

Three-phase generator systems shall automatically cease to energize when any individual phase-to-neutral voltage on a grounded-wye system or any individual phase-to-phase voltage on a ungrounded-wye or delta system goes outside the range of Table 2. Single-phase

inverter systems shall detect the phase-to-neutral voltage if connected to neutral. Single-phase equipment connected line-to-line but not to the neutral conductor shall detect the line-to-line voltage.

When any voltage is in an abnormal range of Table 2 below, the Customer-generator’s equipment shall cease to energize the NSPI Distribution System.

Table 2: Response to Abnormal Voltage Levels

Voltage Range		Maximum Clearing Time	
On 120V Base	% Of Base Voltage	Cycles	Seconds
$V \leq 60$	$V \leq 50\%$	Instantaneous	Instantaneous
$60 < V < 106$	$50\% < V < 88\%$	120 cycles	2 sec.
$106 \leq V \leq 127$	$88\% \leq V \leq 106\%$	Normal Operation	
$127 < V < 144$	$106\% < V < 120\%$	30 cycles	0.5 sec.
$V \geq 144$	$V \geq 120\%$	Instantaneous	Instantaneous

*Inverters meeting the specific technical requirements of Appendix C meet this requirement.

6.2. Response To Abnormal Frequencies

Every grid-connected generator requires under/over frequency protection.

When a system frequency is in a range given in Table 3 below, the Customer-generator’s equipment shall automatically cease to energize the NSPI Distribution System. Adjustable under-frequency settings shall be coordinated with the NSPI Distribution System representative.

Table 3: Response to Abnormal Frequencies

Utility Voltage Condition	Frequency Condition	Maximum number of cycles to disconnect	Seconds
Normal Voltage	>60.5	10	0.16
Normal Voltage	<59.5	10	0.16

*Inverters meeting the specific technical requirements of Appendix C meet this requirement.

6.3. Over-current Protection

The Customer-generator’s interconnection equipment must detect and promptly cease to energize for over-current fault conditions.

6.4. Harmonics

Harmonic current injection by the Customer-generator’s equipment into the NSPI Distribution System shall not exceed the limits listed in Table 4 below.

Table 4: Current Harmonic Limits*

Individual harmonic order “n” (odd) ¹	n<11	11≤n<17	17≤n<23	23≤n<35	35≤n	Total Demand Distortion (TDD)
Percent (%)	4.0	2.0	1.5	0.6	0.3	5
¹ Even harmonics are limited to 25% of the limits above						
*Source IEEE P1547 ⁶						

Inverters meeting the specific technical requirements of Appendix C meet this requirement.

6.5. Flicker

The Customer-generator’s facility shall not create objectionable flicker for other customers served from the NSPI Distribution System. It is recognized that flicker is a site dependent condition.

Voltage flicker and deviation is governed by the flicker curve attached as Appendix B. This shows the permissible voltage fluctuation and frequency based on the annoyance factor of lamp flicker.

6.6. Fault Clearing

The Customer-generator may reconnect only when the utility Distribution System voltage and frequency return to normal range (Table 2 & 3) and is stabilized for a period of at least five (5) minutes.

6.7. Synchronizing

Generating systems that can generate an ac voltage waveform independent of the NSPI Distribution System shall be connected in parallel with NSPI only in combination with synchronizing capabilities. The generator shall synchronize to the Distribution System while meeting the flicker requirements of Section 6.5 and without causing voltage variation at the Point of Interconnection of greater than 5%. The generating system may synchronize to the Distribution System only if the NSPI Distribution System is stable and operating within the normal limits of Table 2 and Table 3.

6.8. Islanding

Islanding is not permitted.

The Customer-generator’s equipment shall be equipped with an approved non-islanding protection function design to prevent the generator from being connected to a circuit that is not energized by the utility supply. Alternatives to this protection function will be considered at NSPI’s discretion, where local loads sufficiently exceed the generator capacity (i.e. the aggregate capacity is less than 50% of the minimum circuit loading, or where a transfer trip function is deployed.)

All inverters shall be “non-islanding type” as defined by CSA C22.2 No. 107.1-01 Standard

6.9. Voltage Control

The Customer-generator’s equipment shall not cause the voltage level of the local distribution system to be sustained outside the limits of CSA CAN3-C235-83⁷, Normal Operating Conditions Range (Table in NSPI Regulation 2.7), measured at the Point of Interconnection.

The generator is not required to be capable of adjusting the power factor, but each generating unit shall be capable of operating within a range of 0.95 power factor lag to 0.95 power factor lead.

6.10. Protection Requirements Summary

Table 5: Protection Requirements Summary

Guide Section	Device Category	Up to 10 kW	Greater than 10 kW up to 100 kW
5.1	Interconnection Disconnect Device (Lockable, Accessible, Visible, Gang Operated)	YES	YES
	Dedicated Transformer	NO	YES
6.1	Over-Voltage Trip	YES	YES
6.1	Under-Voltage Trip	YES	YES
6.2	Over/Under Frequency Trip	YES	YES
6.8	Anti-Islanding*	YES	YES
6.3	Overcurrent Trip/Shutdown	YES	YES
6.7	Synchronizing/Synch Check**	YES	YES
*Per Section 6.8 requirements ** Synchronous Types Only			

7. Metering

7.1. Customer-generator Requirements

The Customer-generator must provide and install at Customer-generator's expense, and in accordance with NSPI Metering Standards⁸, meter sockets and metering cabinets in a suitable location to permit access to NSPI.

7.2. Bi-directional Metering

Additional revenue-class metering will be installed so that kW.h (in) and kW.h (out) are separately recorded. Additional metering costs will be borne by the Customer-generator.

7.3. Meter Testing

All revenue metering equipment shall be routinely tested in accordance with Measurements Canada requirements. At any time, either Party may request a test of the accuracy of the revenue metering equipment at its own expense. The results of meter calibrations or tests shall be available for examination by the Parties at all times. If at any time, any meter equipment is found to be inaccurate by more than three percent (3%), NSPI shall cause such metering equipment to be made accurate or replaced as soon as possible. If the meter is found to be accurate within 3%, no adjustment will be required. Each Party shall comply with any reasonable request of the other concerning the sealing of meters, the presence of a representative of the other Party when the seals are broken and when tests are made, and other matters affecting the accuracy of the measurement of electric energy delivered. If either Party believes that a meter is operating inaccurately, it shall immediately notify the other Party.

7.4. Net Metering

Nova Scotia Power offers Net Metering service. The details for qualification for this service are detailed in NSPI Regulation 3.6.

8. Operating Requirements

8.1. General Operating Requirements

NSPI may require operational control over interconnection equipment, as necessary, to ensure safety, reliability or serviceability of the NSPI Distribution System.

8.2. Interconnection Agreement

Prior to operation of the generating equipment, an Interconnection Agreement shall be established between the Customer-generator and NSPI to identify key contacts, desired electrical operating characteristics, and other relevant operating responsibilities considerations.

8.3. Testing

All protective devices or functions supplied to satisfy the requirements in Section 6 shall be routinely tested by qualified personnel at the Customer-generator's expense. Reports and findings of this routine testing shall include the "as left" settings. Test reports will be made available to NSPI.

Special tests may also be requested by NSPI to investigate apparent mis-operations that have had an adverse effect on the NSPI system. The Customer-generator shall conduct, or allow NSPI to conduct such tests and the costs of such tests will be at Customer-generator's expense.

9. Responsibility for Costs

The Customer-generator is responsible for all capital, operating and maintenance costs of all equipment on the generator side of the Point of Interconnection.

Where upgrades and/or revisions are required to existing NSPI systems, to accommodate the generation addition, the Customer-generator shall pay the actual cost of the installation/changes. The Customer-generator shall pay a capital contribution for any required line extensions necessary to extend the NSPI system to the point of interconnection. If this line is dedicated to serve the Customer-generator, all maintenance, repair and replacement costs are the responsibility of the Customer-generator. NSPI will perform and manage the maintenance of these facilities.

10. Glossary of Terms

CSA: Canadian Standards Association, an accredited standards development organization within Canada.

Customer-generator: The owner/operator of the interconnected generation facilities.

Distributed generation: Electric generation facilities connected to the NSPI Distribution System.

Electric Distribution System (NSPI power system): NSPI's facilities that deliver electric power to loads.

Hertz (Hz): The common unit used to describe periodic event frequency. It is a measure of the number of times or cycles that a periodic signal repeats in a second, also denoted as cycles per second.

IEEE: The Institute of Electrical and Electronics Engineers, Inc., an organisation that develops voluntary standards relating to electrical safety and product performance.

Interconnection: The addition of a distributed generation unit to the NSPI Distribution System.

Interconnection Agreement: A document describing terms for the safe and orderly operation of the electrical facilities interconnecting the Customer-generator's Facility and the NSPI's Distribution System.

Inverter: A power electronic device, which converts dc power into ac power.

Islanding: A condition in which a portion of the NSPI Distribution System is energized solely by a distributed generation source.

Isolation: Physically disconnected or separated from all sources of dynamic energy by approved devices or procedures.

Point of Interconnection: The point where NSPI's Distribution System is connected to the Customer-generator's facilities or conductors.

Standard Protection Code: A set of safe work practices for work on the NSPI Distribution System designed to ensure the safety of workers and security of the NSPI Distribution System.

11. Appendices

- 11.1. Appendix A –Interconnection Request And Equipment Information Form (Up to 100 kW)
- 11.2. Appendix B – Standard Voltage Flicker Curve
- 11.3. Appendix C - Specific Technical Requirements – Inverter-Based Systems
- 11.4. Appendix D – References

**Appendix A - Interconnection Request And Equipment Information
Form (Up to 100 kW)**

Interconnection Request And Equipment Information Form (100 kW and Less)

Synchronizer Information (for Synchronous Generators)

Manufacturer			
Manufacturer's Reference Number			
Synchronizer:	<input type="checkbox"/> Automatic	<input type="checkbox"/> Manual	

Inverter Information

Manufacturer		Model No.	
Terminal Voltage	<input type="checkbox"/> Single Phase		<input type="checkbox"/> Three Phase
Nameplate kW		No. Of Units	
Frequency		Rated Power Factor	
Product Certification Info.			

Interconnection Transformer and Fuse Information (where applicable)

Manufacturer		Model No.	
Primary Volts		Connection:	<input type="checkbox"/> Single Phase <input type="checkbox"/> Three Phase
Secondary Volts		No. Of Units	
Nameplate kVA		Three Phase Connection	<input type="checkbox"/> Wye Grounded <input type="checkbox"/> Delta <input type="checkbox"/> Wye
Primary Fuse Data	Type:	Size:	Speed:

Interconnection Circuit Breaker Information (where applicable)

Manufacturer		Type No.	
Load Rating	Amps	Interrupting Rating	Amps
Trip Speed	Cycles		

Section 6: PROTECTIVE EQUIPMENT
(Complete all applicable items, attach a separate sheet if necessary)

6.1 Provide manufacturer's information for the protection package or devices	Provide manufacturer's documentation for protective functions: 1) Under/Over Voltage 2) Over/Under Frequency 3) Anti-Islanding 4) Over-current
6.2 Range of available settings for each Protective Function	Provide list of Protection Functions with available ranges of protection settings for tripping or shutdown, along with time delays.
6.3 Proposed Settings (Set point and times)	Provide list of Protection Functions with settings for tripping or shutdown, along with time delays. Example: High Voltage Trip 127V, Time delay 0.1 sec

Interconnection Request And Equipment Information Form (100 kW and Less)

**Section 7: DOCUMENTATION REQUIRED – Three (3) copies of each required.
(Information below to be submitted for all projects. All diagrams are to be neatly drawn – 11” x 17” size preferred. Free hand drawn and illegible diagrams will not be accepted by NSPI).**

- 7.1. Electrical One-Line Diagram: All
Required: A Single-line drawing showing the electrical relationship and descriptions of the significant electrical components such as the generator, inverters, cables and wiring, switches, meters, transformers, circuit breakers, with operating voltages and ratings.
- 7.2. Site Plan: All
Provide a site plan showing the physical arrangement of the major equipment, including generating equipment, transformers, switches, control panels, the Customer's existing metered services and the interconnection with NSPI's Distribution System. Include the civic address, references, etc. Provide Property Identification Number (PID).
- 7.4. Protective Device Data: All
For all protective devices used to protect and control the interconnection, please provide proposed protective device settings, circuit breaker and fuse data and coordination curves, and a description of how the protection scheme is intended to function.
- 7.5. Point of Contact: All
If the interconnection and start-up process is to be coordinated through a party or individual other than the Customer, provide the name, company, address and phone number of that individual or party with whom the utility is to coordinate the interconnection.

Signatures:

I hereby certify that, to the best of my knowledge, all the information provided in this Interconnection Request And Equipment Information Form is true and correct.

Customer-generator: _____ (Printed)

Completed By:	Signature:	Date:	
---------------	------------	-------	--

Contact Information- Send completed form in hardcopy to:

Nova Scotia Power Inc.,
P.O. Box 910
Halifax, NS
B3J 2W5
Attn: Erika Smeltzer

Appendix B – Flicker Curve

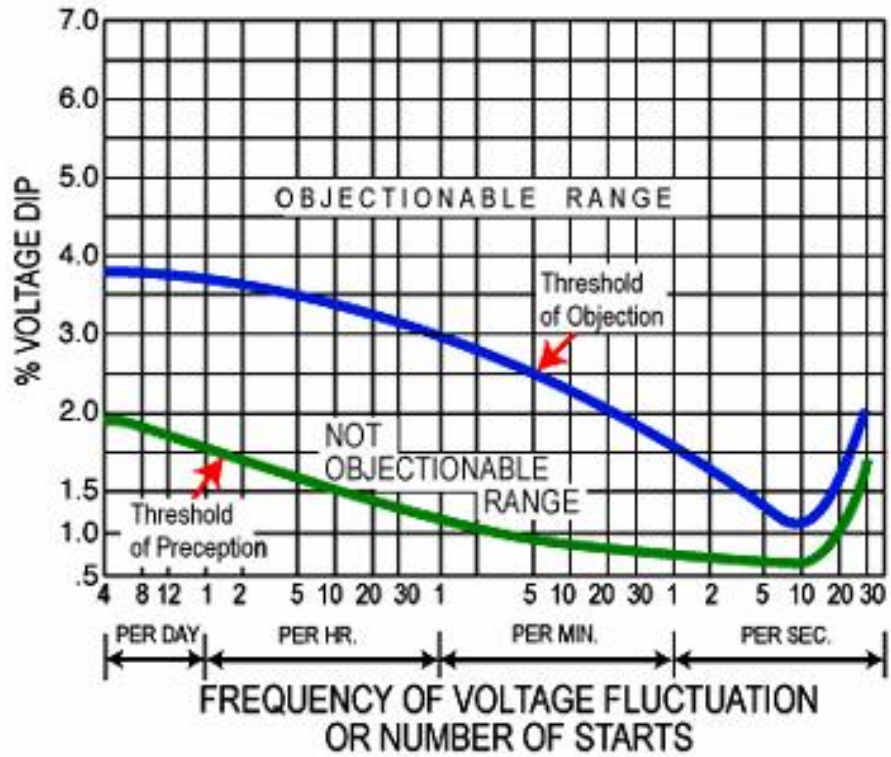


Figure 1: Flicker Curve

Appendix C: Specific Technical Requirements – Inverter-Based Systems

- Output rating of inverter is less than 30 kW
- Systems are rated and connected at a secondary voltage level, i.e. less than 600V nominal, measured line to line
- Systems meet CSA C22.2 No.107.1-01 Standard “General Use Power Supplies”⁹ and are so marked.

Appendix D - References

¹ Nova Scotia Power Inc. [“Standard Protection Code”](#) Current version

² Province of Nova Scotia [“Electrical Installation and Inspection Act”](#) R.S.N.S. 1989, c. 141

³ *CSA 2002 Canadian Electrical Code Part 1, Nineteenth Edition, C22.1-02, Safety Standards for Electrical Installations (CE Code)*

⁴ NSPI [Regulation 2.7](#) “Electric Service Availability and Standard Voltages”

⁵ *IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems*

⁶ *IEEE 1547 Standard for Interconnecting Distributed Resources with Electric Power Systems*

⁷ CSA Standard CAN3 C235-83 – “Preferred Voltage Levels for AC Systems 0 to 50,000V”

⁸ Nova Scotia Power Inc. [“Metering Standards”](#) Current version

⁹ CSA C22.2 No.107.1-01 Standard “General Use Power Supplies”