www.auc.ab.ca

MICRO-GENERATION NOTICE SUBMISSION GUIDELINE

(Version 2.0)

September 20, 2017

Table of Contents

1. Introduction

The *Micro-Generation Regulation*, which was established in 2008, simplifies the process by which Albertans using renewable resources or alternative energy, gain approval to generate their own electricity and receive credit for the electricity they generate but do not consume.

When the regulation was passed, the Alberta Utilities Commission (AUC) oversaw the implementation of the regulation as well as developed processes to simplify approvals and Interconnection and Operating Agreements with customers and Wires Service Providers (WSPs) or Wires Owners (WOs). More detailed information on the process and rules on micro-generation (MG) in Alberta can be found in the Rule 024: *Rules Respecting Micro-Generation* (Rule 024).

Micro-generation generating units are sized to offset all or a portion of the customer's total energy consumption. Albertans that want to generate electricity to earn revenue, and not for their own use, are considered commercial generators and do not meet the requirements to be a micro-generator.

In December 2016, the Government of Alberta revised the *Micro-Generation Regulation*. Changes include increasing the size limit of an MG generating unit to 5 megawatts (MWs) from 1 megawatt (MW) and allowing an MG generating unit to serve adjacent sites on the same feeder and with the same retailer.

2. Purpose

Connecting MG to the electrical grid requires careful consideration of legal matters, safety, equipment and installation.

This guideline is intended to provide an overview of the safety, electrical and procedural aspects regarding the development of MGs on private property. It provides a summary and the processes required to obtain official permission and approval for MG connection. The document also addresses obligations of MG applicants, electrical contractors, energy retailers and WSPs or WO in meeting MG compliance and safety.

3. Differences between micro-generation and distributed generation

It is necessary to distinguish the differences between MG and distributed generation (DG). The major differences are listed as follows:

	DG	MG
Fuel sources	Can use renewable or non-renewable resources	Must use renewable resources or alternative energy
Generation capacity	Up to the limit specified by the electric distribution system owner or the operator	Less than 5 MW
Compensation Method	Receive cash (based on pool prices) from the Alberta Electric System Operator (AESO) for the electricity generation	Receive credits from retailer. Credits are shown on monthly electricity bill. (Please refer to Compensation for Micro-Generation stated in Section 7 of the *Micro-Generation Regulation*)
Metering	DG owner is responsible for the metering cost and meter data management	WSP or WO is responsible for the cost of installing the required meter and the collection of the electricity data.
Pool participant	Must register with the AESO to become a pool participant	Not required to register with the AESO
Relationship with energy retailer	No change	Need to notify retailer of becoming an MG customer

For distributed generation, proponents need to follow Rule 007: *Applications for Power Plants, Substations, Transmission lines, and Industrial System Designations and Hydro Developments* (Rule 007). For a guide on how to connect a DG generating unit, please refer to the AESO website using the following link:

https://www.aeso.ca/download/listedfiles/Guide-for-Distribution-Connected-Generation.pdf

In order to be classified as an MG customer, the generating unit must meet the provisions stated in the *Micro-Generation Regulation,* Section 1(1)(h), restated as follows:

> "micro-generation generating unit" means a generating unit of a customer that
>
> i. exclusively uses sources of renewable or alternative energy,
> ii. is intended to meet all or a portion of the customer's total energy consumption at the customer's site or aggregated sites,
> iii. has a total nameplate capacity that does not exceed the lesser of 5 MW or the rating of the customer's service,
> iv. supplies electric energy only to a site that is located on property that the customer owns or leases, and
> v. is located
> a. on the property referred to in subclause (iv), or
> b. on property that the customer owns or leases that is adjacent to the property referred to in subclause (iv).

4. Legal and related matters

Electrical installations are subject to strict legal and municipal regulations including relevant health and safety legislation. MG applicants need to be aware of the requirements of relevant municipal permitting regulations, installation obligations, electrical safety and manufacturer compliance. Before commencing work, it is advisable to consider the matters covered below and throughout the document.

a) Building regulations

Applicants need to contact their municipal permitting department to determine if a development permit is required. Before installing MG equipment to a home or building, the applicant needs to consider the structural condition of the building. The MG project proponents should check with their local municipal building safety authority to confirm any building regulations and to determine whether their MG generating unit requires a building permit.

b) Compensation for exported electricity

Applicants must notify their electricity retailer once their application is approved by their WSP or WO. This will ensure applicants are registered so that the retailer can apply proper credit for exported electricity from the MG generating unit.

c) Electrical safety

Installing a MG generating unit brings unique considerations for electrical safety. Extreme caution must be taken to avoid any electric shocks. A certified electrical contractor is required to install a commercial MG unit. It is recommended that homeowners hire an electrical contractor to install their MG generating unit. Some municipalities prohibit homeowners from installing their own MG unit. It is also advised that the MG proponents to consult with their insurance company regarding the MG unit insurance policy matters.

d) Equipment certification

The installer must refer to the specifications of the MG equipment and the manufacturer's installation document to confirm that the MG generating unit complies with all relevant local and provincial electrical safety requirements or standards. MG proponents are strongly encouraged to contact and discuss with their WSP or WO regarding the MG equipment intended to be installed.

e) Additional requirements for wind MG generating units

Development of wind-powered MG generating unit requires specific approval from NAV Canada, Transport Canada and Alberta Transportation. Approval ensures that MG installations comply with requirements of air navigation, aeronautical safety and highway development control.

f) Micro-generation approval processes

Approval for MG installation is provided as follows:

i. For small (i.e., <150 kW) and large MG units (i.e., > =150 kW and < 5 MW), the MG proponent needs to submit an MG Notice (see AUC's, WSP's or WO's

website to download the notice form) to WSP or WO for assessment. Once it is determined that the MG project meets all MG requirements, the WSP or WO will notify the applicant and install required meter.

ii. If the MG project fails to meet all the criteria as set out in the *Micro-Generation Regulation*, Section 1(1)(h), the MG Notice can be rejected by the WSP or the WO. In order to reject the MG project, the WSP or WO must file a Notice of Dispute (see AUC's, WSP's or the WO's website to download a dispute form) to the AUC for decision. The WSP or the WO can use the same form on the dispute of extraordinary costs (such as transformer upgrade, protection relay, etc.) for MG projects. The Notice of Dispute must be submitted through AUC's eFiling system. The following link provides the eFiling system user guide:

http://www.auc.ab.ca/applications/filing-an-application/Documents/AUCeFilingSystemUserGuide.pdf

iii. For issues such as metering costs, type of meter to be installed, etc., the MG applicant should file a Notice of Complaint (see AUC's, WSP's or WO's website to download a complaint form) to the AUC for decision.

g) Rule 012: Noise Control (Rule 012)

Wind turbine noise output can vary widely across different products. Most products sold today come with a noise rating. It is important to consider noise rating when installing a wind turbine or other micro-generation equipment.

All MG project proponents must comply with requirements stipulated in Rule 007 and Rule 012. Although MG applicants are not required to file applications with the AUC for approval to connect to the grid, the MG applicants are required to demonstrate to the WSP or WO and adhere to the *Micro-Generation Regulation* and applicable AUC rules. For example, for wind turbine projects, the permissible sound level requirements stated in the Rule 012 should be met. Noise complaint issues for MG projects will be dealt with in accordance with Rule 012.

5. Disclaimer

This document does not provide installation guidance nor is it intended as legal advice. All measures have been taken to provide sound advice and procedures. However it is the MG proponents' responsibility to ensure all legal, health, safety, insurance and municipal requirements are adhered to. Concerns should be directed to your WSP or WO, electrical contractor, equipment supplier, insurance company and any governing body where safety codes and conduct are in question.

Note:
The terms applicant, MG owner, MG project proponent, MG customer, you and your, are interchangeable throughout this document for ease of readability.

6. Micro-generation generating units – types and size

Types

A range of simple, safe and reliable MG technologies are available for domestic use. These primarily include solar photovoltaic (PV), hydro, wind, biomass and fuel cell.

Size

In Alberta, MG size is defined as being a generating capacity of no more than 5 MW. This document deals with two categories of MG units as follows:

Generating unit classification	Capacity rating
Small MG	<150 kW
Large MG	> = 150 kW but < 5 MW

TYPICAL MICRO GENERATION SYSTEM

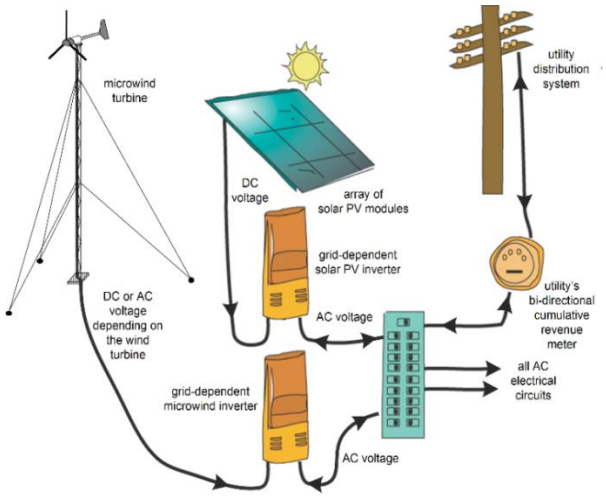
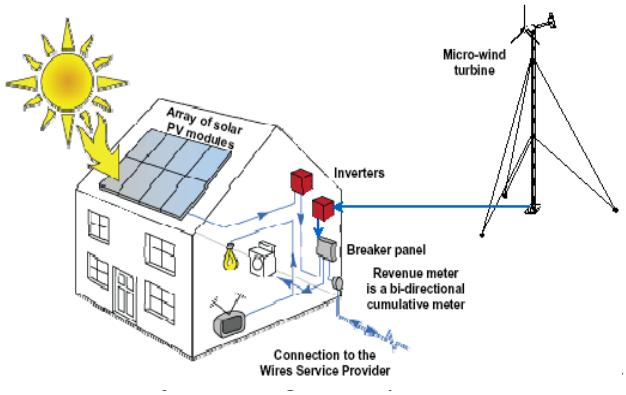


Figure 1. Typical wiring connections for a grid-connected micro wind and solar PV system. (Source: Modified from an unknown source. Gratefully included in this document.)



(Municipal Showcase)

Notes:

- The solar PV and micro wind systems illustrated above are included only to show how they are configured. Having both systems is not typical.
- These systems can operate in parallel with each other, but are otherwise not interconnected.
- A battery bank may also be included.
- Excess electricity is exported to the grid.
- Additional electricity is supplied from the grid.
- Electrical energy is purchased from and sold to the energy retailer at standard retail rates as per their approved tariffs.

7. Principal stakeholders

Since the MG generating unit will be connected to the electrical distribution grid, several governing bodies are involved in ensuring the system's safety, processing of approvals and administration. These include:

Alberta Utilities Commission (AUC)

Alberta Electric System Operator (AESO)

Energy retailer: Provides credits to MG customers on a monthly basis.

Electrical inspectors: Ensures that Canadian Electrical Code (CE Code) standards are met for all MG installations.

WSP or WO: Provides metering and the connection the micro-generation generating unit to the distribution system.

See the Glossary in Appendix A for descriptions of each principal stakeholders.

8. Micro-generation application process summary

This section provides a quick outline of what steps you need to follow and in which order. Where necessary, further details are provided.

a) Plan your micro-generator installation

Consult with your neighbours and any landowners or residents that will be affected (e.g. visual for solar installations or visual and noise for wind turbine installations). Check municipal permit requirements and municipal noise bylaws.

b) Contact your WSP or WO

MG project proponents must contact their WSP or WO and inform them of the plans to install an MG generating unit. The MG proponent should provide all required information to the WSP or the WO. It is important to communicate your project plan prior to any micro-generation generating unit

construction. See Appendix B for a list with applicable links.

If the MG capacity is less than or equal to 5 MW and complies with all requirements as stated in Rule 024, the WSP or the WO will assess the application and provide approval directly to the MG project proponent for metering and connection. MG project proponents are required to meet WSP's or WO's terms and conditions for connection and sign an Interconnection and Operating Agreement with the WSP or the WO.

c) Micro-generator information requirements by WSP or the WO

All required documents must be submitted to the WSP or the WO for review. The information requirements consist of equipment safety and information. It is advised that MG project proponents download and read the WSP's or WO's terms and conditions document for connecting their generation unit. Appendix E shows samples of an Interconnection and Operating Agreement. It is also important for MG proponents to communicate their generation plan with WSP prior to any generation equipment purchase or start up.

d) Electrical consultation

Consult with one or more certified electrical contractors and/or engage engineering consulting firms. It is recommended that all electrical work be done by certified and experienced electrical contractors and/or engineering firms. Installing an MG unit is beyond the scope of most do-it-yourself projects. Safety is imperative.

e) Confirm your legal land description

Your legal land address is required when filling out a Micro-Generation Notice. If you do not know this information, contact an Alberta Registry agent or local municipal taxation office for help.

f) Obtain municipal permits

Contact your local municipality permit office to confirm whether a development permit, building permit and emergency response plan are required. It is very important to obtain permits prior to installation of any MG equipment.

Note:
Some municipalities may not permit wind MGs to be installed on residential properties in urban locations.

g) Additional requirements for wind MGs

Wind MG units require approval from additional regulatory bodies including NAV Canada, Transport Canada and Alberta Transportation.

Wind-turbine MG proponents also need to be aware of Rule 012. MG proponents are required to comply with the noise bylaws of their municipality as well as Rule 012.

h) Prepare site plan

Prepare a site plan or picture to illustrate where the MG unit will be located. This may be required for the municipal development permit.

i) Prepare a single line diagram

The MG applicants need to submit an electrical single line diagram (SLD) with a MG Notice to the WSP or the WO. Samples of an SLD are shown in Appendix D.

j) Confirm equipment certification

Physically check the electrical certification mark on all equipment to ensure it is meeting the appropriate Canadian standards. Contact the WSP or the WO or local electrical inspector for questions on equipment certification. See Appendix C for a list of approved certification marks.

k) Complete the Micro-Generation Notice

Complete the Micro-Generation Notice form (See the AUC's, WSP's or WO's website to download form) along with the project's details. The related documents may include some or all of the following:

- Site plan or pictures to illustrate the MG unit location
- Detailed SLD about the MG system
- Electrical permit
- Electrical inspection report (to be submitted after MG installation)
- Development permit (if required)
- Building permit (if required)

- Noise documents related to wind-turbine generator (if required)
- Environmental impact assessment documents (if required)

l) Submit the Micro-Generation Notice

Submit the MG Notice to your WSP or the WO along with the related documents to detail the project.

m) Micro-generation project review

During the review process, the WSP or the WO may contact the MG applicant requesting additional information for clarification. If the application is approved, then the WSP or the WO will proceed with the MG meter installation and grid connection .

A WSP or WO cannot reject an MG Notice. If they don't consider that the MG project meets the MG criteria as stated in the *Micro-Generation Regulation*, then they are required to file a Notice of Dispute with the AUC so that AIC can determine whether or not the MG unit meets the MG criteria.

n) WSP or WO approval

The WSP or the WO will provide the MG applicant with a confirmation when the MG project is approved and arrange appropriate meter installation and grid connection.

For MG dispute or complaint notices, the AUC will follow the application review process and make a decision. The MG project proponent and the WSP or the WO are responsible for the required actions as stated in the AUC's decision.

o) Install your micro-generation unit

It is strongly advised that MG project proponents engage certified and experienced electrical contractors or engineering firms for installation of an MG unit.

p) Application for electrical inspection

After the MG unit is installed, a final electrical inspection must be done prior to operating the generating unit. The inspection will be done by the municipality's electrical inspector, and perhaps also by staff from the WSP or WO. The WSP or the WO will only connect MG generating units that meet all safety and connection requirements. For insurance purpose, it is also advised that applicants should obtain a copy of the certificate of inspection and all related documents.

q) Contact your electric energy retailer

In order to obtain compensation for electrical energy exported onto the electricity distribution system, an MG generating unit owner must contact the electricity energy retailer to notify them that they are intended to become a micro-generator. It is also good to notify them about the MG unit's connection date.

See Appendix C for information on where to find a list for all energy retailers.

r) Meter or service line modifications

The WSP or the WO makes any modifications that may be required to the meter or electrical service entrance. Where necessary, MG applicants will be offered either a bi-directional cumulative meter or a bi-directional interval meter. The WSP or the WO will install the required meter in accordance with the MG generating unit classification specified in the *Micro-Generation Regulation*.

9. Guidelines for filing a Micro-Generation Notice form

MG proponents can use to following link to download the Micro-Generation Notice form:

http://www.auc.ab.ca/acts-regulations-and-auc-rules/rules/Pages/Rule024.aspx

The following guidelines provide detailed information to help applicants complete the Micro-Generation Notice form.

1. CUSTOMER IDENTIFICATION

Name
Enter the name you want to appear in legal documents.

Company name (if applicable)
Enter the company name you want to appear in legal documents if a company is responsible for owning and operating the MG unit.

Address
Enter the street address for your home residence or company office.

Phone
Enter a weekday phone number including area code.

Fax
Enter a fax number if you want to use one.

Email
Enter your personal or company email address. Be sure that the email address can safely receive MG documentation without risk of being blocked by junk email blockers.

Consultant name
Enter the name of the person or company who has aided you in completing your MG application, if applicable. The consultant will be regarded as the second line of contact in the event the WSP or the WO cannot reach you and/or need further clarification.

Consultant address
Enter your consultant's current business mailing address including postal code.

Consultant phone
Enter your consultant's day-time phone number including area code.

Other interested parties
Enter the names and contact information of any other parties who may have a say in the functioning, legalities or aesthetics of the MG. This could include a property owner or a business partner.

2. PROJECT DESCRIPTION

If the MG project involves aggregated sites, make sure you identify each site details individually. Expand the aggregated sites list on a separate sheet of paper, if required.

Site legal description
In rural areas enter the legal land description The legal land description is a term used to describe the parcels of land to which you have title for the purpose of government records. This information may be found on your land title or tax assessment.

If you have an urban address, enter the lock, block and plan of your MG location. If you have a rural address enter the quadrant, section, township, range and meridian location of land as per the example below.

Example:

Quadrant	Section	Township	Range	Meridian
SW	18	57	7	W4

The example above uses the rural address for the Southwest Quarter of Section 18, Township 57, Range 7, and West of the Fourth Meridian. It would be shown as **SW18-57-7-W4**.

If you do not have this information contact your local taxation office or an Alberta Registry agent for help. Your street (civic) address will be required to perform a search. Searches can be done for most urban areas with the exception of most condominiums. There is a nominal fee for this search.

Legal land description(s)
For aggregated sites provide for each site the legal land description as described under the Site legal description section.

Site ID/ Site ID(s)
Enter your site identification (ID) number. Site identification numbers are required for each electrical installation in Alberta. You can find your site ID number on your electricity utility bill. If you are aggregating sites, please enter all the site IDs.

New utility installations require obtaining a new site ID. Contact your WSP or the WO and inform them that you are planning to install an MG site.

Service address
Enter the service address where you plan on installing the MG, in the first line.

Examples:
Home installation
If you want to install a solar PV system on your home, you would enter your home address.

Rural/farm installation
If you want to install a wind turbine on your farm, enter the address of where your turbine will be placed on your property including the location latitude and longitude.

For aggregated sites

If the project involves aggregates sites, enter the address for each site. MG proponent should indicate which site ID has the physical MG generating unit attached.

Retailer name(s)
Enter the energy retailer name for the site where you plan on installing the MG. If the project involves aggregated sites, enter the energy retailer name corresponding to each site to be aggregated. Note that the retailer's name must be the same for all the sites being aggregated.

Energy source(s) of the generating unit
Select the type of MG unit that you are installing. If your MG energy source is not listed select 'Other' and provide specific details on the generating unit type.

Micro-Generation Notices are limited to one MG unit. If you are installing more than one type of MG technology, you must submit a separate Micro-Generation Notice form for each.

Type(s) of generating unit(s) connected to the utility interface
Electrical equipment, appliances, tools, machines and lights connected to the wiring in your home, farm or business use alternating current (AC) power supplied by your energy retailer and delivered by your WSP or the WO.

Interconnection of a renewable or alternative energy system to the utility grid will require a particular type of interface. The type of interface you choose will depend upon your type of generating unit. The majority of small MG generating units on the market today are inverter based.

Micro-generation generating unit(s) total nameplate a.c. capacity (kW)

Enter the rated a.c. capacity of your generating unit. Your MG equipment will have a label identifying its nameplate kilowatt (kW) capacity.

Estimate a.c. demand (kVA)
This is the maximum amount of apparent electrical power consumed by the site as measured in kilovolt amperes (kVA).

Estimate customer annual energy consumption (kWh)
The energy amount in kilowatt hours (kWh) will be indicated on each electricity utility bill. Add the kWh amount indicated on each monthly bill for a year to determine total annual consumption.

Based on the nameplate capacity of the MG generating unit, the MG proponent should calculate or estimate how much a.c. electric energy can be generated from the generating unit per year.

Voltage level of connection
MG generating unit owners are responsible for ensuring that the voltage levels at the point of interconnection are meeting WSP or the WO's connection requirements and maintained at all times.

Single or three phase
Single or three phase relates to how electric power is delivered to your site. Enter whether your electrical energy is delivered using single or three phase voltage.

In most cases small MGs will select single phase and large MGs will select three phase. Contact your WSP or WO for confirmation.

If you have inverter(s) in your micro-generation unit(s), does it comply with "CSA standard C22.2 No. 107.1 Power Conversion Equipment" in particular standards respecting "Anti-islanding"?
In order to meet the Canadian Standards Association (CSA) anti-islanding requirements, your MG unit must meet specific electrical safety codes and product performance standards. Safety and performance standards are required to ensure the safety, power quality and interconnection character of your MG unit so it does not compromise the safety and electrical power quality of the utility grid.

The nameplate on your MG equipment and its installation manual should identify the following standard: CSA C22.2 No.107.1. If this standard is labelled on your equipment, select Yes. If this standard is not labelled, select No.

What is anti-islanding?
Anti-islanding is an electrical function that shuts down the operation of an MG unit during a utility electrical outage. Its purpose is to protect WSP's or the WO's line workers from accidentally working on energized electrical distribution lines.

What is islanding?
An electrical island is where a portion of the WSP's or the WO's electrical distribution system that is isolated from the remainder of the distribution system, but remains energized and operational.

The principal concern is that a WSP line worker will come into contact with a line that is unexpectedly energized. Although line workers are trained to test all lines before working on them, all measures and precautions must be taken to ensure the removal of all risk.

How does anti-islanding work?

Technology developed for MGs unit is specifically designed so that there is practically no chance of an island stemming from an MG unit. Grid-connected inverters monitor the distribution line and cease to deliver electrical energy to the grid in the event that an outage occurs.

Large MG units need to follow additional electrical code. Contact your WSP or the WO for details.

Requested in service date
Identify the anticipated date to have the MG generating unit in service.

3. SUPPORTING DOCUMENTS REQUIRED

Indicate if you have attached the following supporting documents:

Electric single line diagram
An electric SLD provides a basic connection configuration between the electrical components of your MG and your WSP's or WO's electric distribution system. For larger MG projects, professional engineers may be required to approve the SLD drawings, certifying that the connection has been correctly designed and could be connected safely. This has to be provided to the WSP or the WO prior to connecting the MG unit to the grid.

Site Plan
A site plan is a drawing of your property showing the property lines, any structures that currently exist on your land (house, garage, fence, etc.) and where the proposed MG unit is to be located.

A site plan should include:

- An arrow indicating north.
- The scale of the drawing (for example, one cm to 10 m).
- Property lines.
- Adjacent streets.
- Distance between buildings and between buildings and property lines.
- Dimensions of existing buildings.
- Location of your MG unit.
- Other relevant items or information for your project.

Existing engineering or aerial drawings can be used. You can also submit a photo of your site with information suitably marked on it.

Electrical Permit
An electrical permit is required for any electrical work. An electric permit is a legal document that ensures that your MG work is inspected to meet the electrical code. MG proponents may apply for the electrical permit and do the electrical work if they own and live in their home and if their municipality permits homeowners to do this work. If MG project proponents have no training or knowledge about electricity, it is advised that they should engage certified electrical workers on the MG projects.

Electrical inspection report
Prior to any interconnection to the distribution system, you need to provide your WSP or WO with an electrical inspection report indicating that your MG unit has passed all the electrical inspections.

Other supporting document(s), if any,
In most cases municipal and zoning requirements and guidelines will be identified in your development permit. If you do not have a development permit at the time of application, you must provide the permit prior to your MG installation or indicate why your municipality does not require it.

Other supporting document(s), if any, sometimes may help the WSP or WO in assessing the MG projects.

Additional wind power requirements
Developing wind power MG projects requires specific approval from agencies such as NAV Canada, Transport Canada and Alberta Transportation.

The following steps must be taken in order to receive approval from these agencies:

1. NAV Canada

Wind turbine towers and blades can adversely affect air navigation in some locations. Applicants must complete NAV Canada's Land Use Proposal Submission Form and obtain their approval for a wind MG. For more information, visit NAV's website at http://www.navcanada.ca.

2. Transport Canada

Wind turbines can be an aircraft hazard in some locations. Applicants must complete Transport Canada's Aeronautical Obstruction Clearance Form and obtain their approval for a wind MG. For more information, visit Transport Canada's website: http://www.tc.gc.ca

3. Alberta Transportation

Approval is required for wind turbines or any other development located within 300 metres of a numbered highway or 800 metres of an intersection of the numbered highway with another public road. Applicants must complete the Alberta Transportation form titled Roadside Development Application for Development near a Primary Highway and obtain their approval for a wind MG unit or other MG unit located close to a road.

10. Electricity compensation

When an MG site generates more electric energy than is being consumed, the surplus electric energy will be supplied out of the MG site into the WSP's or the WO's electrical distribution system. The micro-generators are paid by their energy retailer for this surplus of energy. MG applicants must notify their energy retailer that they are becoming a micro-generator.

Small MG units will be paid for their electrical energy supplied out of the MG site based on the same price of the electrical energy that is supplied into the site from their energy retailer. For example, if the retailer's retail energy price is 10 cents per kWh, the MG owner will be compensated 10 cents for each kWh supplied out of their MG site. Note that this price does not include the price of delivering the electric energy to the MG owner's site nor is the MG owner required to pay for delivery of their electric energy to the grid.

Details of the micro-generation compensation can be found in Section 7 of the *Micro-Generation Regulation*.

The WSP or the WO will provide the MG proponent with either a bi-directional cumulative meter (in most cases) or a bi-directional interval meter (which records cumulative electrical energy every 15 minutes) in order to be able to measure electric energy supplied into and out of the MG site

For large MG units that are equipped with a bi-directional interval meter the MG unit owners will be paid at the hourly pool prices.

For more information on the pool prices, visit the AESO's website at: www.aeso.ca.

11. Obligations

Micro-generator obligations

- All costs of operating the MG unit are the responsibility of the MG owner as per the WSP or the WO Interconnection and Operating Agreement.
- Contact your neighbours and those affected by your proposed installation and notify them of your intent to install MG equipment.
- Contact and submit the Micro-Generation Notice to WSP or WO of your intent to install an MG unit.
- Contact your energy retailer to inform them of the MG unit's installation date.
- Micro-Generation Notices are limited to one generating unit type per site. If you are installing more than one type of MG unit, you must submit a separate notice form for each type of MG unit.

AESO obligations

- Determine hourly pool prices for use in large MG units compensation
- Review MG generation claims submitted by retailers
- Provide generation credits to retailers that have MG customers

Retailer obligations

- Acts as a participant of the Alberta's electricity market by crediting the MG owner for electric energy supplied out of the MG site.
- Ensures the electric energy supplied out of the MG site will incur a credit on the MG owner's bill.
- Ensures unused credits are paid to MG unit owners once every 12-month period.

WSP or WO obligations

- Responsible for determining whether an MG qualifies under all five requirements stated in Section 1(1)(h) of the *Micro-Generation Regulations*.
- Install appropriate meter that separately measures the imported and exported electricity.
- Cover all metering, meter data handling and any meter installation costs incurred for the MG unit.
- Provide applicants with an Interconnection and Operating Agreement upon MG approval.
- Provide applicants with a notice confirming their MG approval and grid connection.

Appendix A – Glossary

Alberta Utilities Commission (AUC)
Independent, quasi-judicial agency of the government of Alberta that regulates Alberta's electric utilities to ensure safe and reliable delivery of utility services.

Alberta Electric System Operator (AESO)
Independent not-for-profit Company established by the government of Alberta to govern the safe, reliable and economic planning and operation of Alberta's electrical transmission system, offer open transmission system access for large companies, develop and administer transmission tariffs, and operate the wholesale electricity market.

Alternating current (AC)
Electric current that regularly reverses its direction of flow, which in Canada is at 60 times per second.

Anti-islanding
Technology in a micro-generation generating unit that prevents it from feeding electricity into a distribution system during a utility electrical outage. Its purpose is to protect utility workers from working on a live distribution system.

Approved electrical equipment
Electrical equipment that bears an approved certification mark from one of the accredited certification organizations and is affixed to the nameplate on the electrical equipment. See Appendix C.

Note: The presence of such a mark indicates that the equipment is in compliance with an appropriate product standard in Part 2 of the Canadian Electrical Code. If the equipment does not have one of these certification marks it is not legal to sell or use it. (Refer to Appendix B or Electrical Safety Information Bulletin STANDATA LEG-ECR-2 from Alberta Municipal Affairs for examples of accepted legal certification marks.)

Bi-directional cumulative meter
Electricity-measuring device that measures in two separate data points the total electrical energy that has flowed in a circuit from one reading date to the next. One data point shows the amount of electrical energy that has been exported to the grid. The other data point shows the amount of electrical energy that has been imported from the grid.

Bi-directional interval meter
Electricity-measuring device that measures in two separate data points the total electrical energy that flows in a circuit between intervals of usually 15 minutes. One data point shows the amount of electrical energy that has been exported to the grid. The other data point shows the amount of electrical energy that has been imported from the grid.

Biomass generator
Customer that owns a generating unit that uses biomass products such as wood logs, wood chips, wood pellets, miscanthus (elephant grass) or straw as its energy source.

Canadian Electrical Code (CE Code or CSA C22.1)
Standard published by the Canadian Standards Association for addressing the electrical safety, shock, and fire hazards of electrical installations (part I.C22.1), equipment (par II, C22.2), utility distribution and transmission circuits (part III, C22.3), industrial or institutional installations (part IV, C22.4) and electrical inspection (part VI, C22.6) in Canada.

Commission
Common reference to the Alberta Utilities Commission (AUC).

Direct current
Electric current that flows in one direction.

Disconnect
To turn off the electrical current in a circuit.
Device that provides a disconnecting function.

Disconnecting means
Electrical components such as switches that provide a disconnecting function.

Distributed generator (DG)
Customer that owns a generating unit that is connected to a utility's electrical distribution system.

Distributed generator (DG) source disconnect
Disconnect placed between the output terminals of a customer's generating unit and the circuit of the electrical loads that it feeds and the interconnected electrical distribution system.

Distributed generator (DG) system disconnect
Disconnect placed between the output terminals of a customer's operating unit and the interconnected electrical distribution system**.**

Distribution panel board
Electrical box that contains over-current protection devices connected to a number of branch circuits.

Distribution system
Electrical lines and equipment typically operating at less than 25,000 volts that manage and distribute electrical energy from a substation to customers.

Electrical wiring
Components that are intended to carry electrical current.

Electric single-line diagram (SLD)
Basic drawing consisting of lines and symbols that show the electrical equipment and the electrical circuits that connection them.

Energy retailer
Either an independent government-licensed electricity marketing company that supplies electrical energy at unregulated prices to its customers, or an entity appointed by the WSP or WO to provide a regulated price option to customers. In both these options, the energy retailer bills the customer for the purchase and delivery of the energy they have consumed, for the billing administration and for wire charges (grid operations and maintenance).

Fuel cell generator
Customer that owns a generating unit that generates electricity from hydrogen using a non-combustion electrochemical reaction.

Generator
Customer that owns a device that converts energy from one form into electrical energy.

Generator rated capacity (kW)
Basic measurement unit for the ability of a customer's generating unit to generate electrical power. This is the rate at which electrical power is generated by a generating unit at a defined set of operating conditions. Such unit of capacity include W (Watts), kW (thousands of watts), or MW (millions of watts).

Inverter
Electronic device that converts DC electricity into AC electricity and acts as the interface between a DC generating unit and the WSP's electrical distribution system. Electricity from the generating unit (solar PV, fuel cells, wind turbine etc.) is converted to a form that can be supplied to the utility grid.

Independent system operator (ISO)
Company responsible for the safe, reliable and economic planning and operation of the Alberta Interconnected Electric System (AIES). In Alberta this service is provided by Alberta Electric System Operator (AESO).

Induction generator
Customer that owns a generating unit that converts the rotational energy into electrical energy using principles of electromagnetic induction.

Islanding
Portion of the electrical distribution system that contains both loads and generating units that is isolated from the remainder of the distribution system, and remains energized during an electrical outage in the main system. Islanding is not permitted in Alberta except within building circuits.

Micro-generator
Customer that owns a MG generating unit. The generating unit is typically a residential or small commercial unit. Its capacity is less than five MW that is connected to an electrical distribution system. The intent is to generate electricity for personal use and for the amount of energy to be less than the annual site consumption.

NAV Canada
A private, non-share capital corporation that owns and operates Canada's civil air navigation service.

Over-current protection device
Electrical fuse or circuit breaker

Renewable or alternative energy
Electrical energy generated from solar, wind, hydro, fuel cell, biomass or other energy source where the greenhouse gases produced by its generation have an emission rate less than or equal to 418 kg of greenhouse gases per MWh of energy.

Retailer
See energy retailer

Revenue meter
Meter that is used by the WSP or WO to measure the electrical energy (and other characteristics of electricity) that flows between their distribution system and their customer. The meter data is used to generate a bill or credit to the customer. Revenue meters are owned and maintained by WSP or WO as approved by Measurement Canada.

Single-phase inverter
Inverter that generates single-phase electricity.

Solar photovoltaic (PV) generator
Customer that owns a generating unit that uses solar radiation as its energy source.

Stand-alone inverter
Inverter that supplies a load not connected to a distribution system.

Three-phase (multi-phase) inverter
Inverter that generates three-phase electricity.

Wind generator
Customer that owns a generating unit that uses moving air as its energy source.

Wires service provider (WSP)/ Wire Owner (WO)
Company that operates and maintains a distribution system.

Appendix B – Contact and source information

Alberta Department of Energy (DOE)
http://www.energy.gov.ab.ca

Alberta Department of Energy (DOE) Key Initiatives
Alberta Energy: Alberta Energy Publications
http://www.energy.alberta.ca/About_Us/985.asp

Alberta Electric System Operator (AESO)
http://www.aeso.ca

Alberta Municipal Affaires
http://municipalaffairs.gov.ab.ca

Alberta Safety Codes Council
http://www.safetycodes.ab.ca

Alberta Utilities Commission (AUC)
http://www.auc.ab.ca

AUC Rule 007 checklist for small power plant applications and exemptions
http://www.auc.ab.ca/acts-regulations-and-auc-rules/rules/Pages/Rule007.aspx

AUC Rule 007: *Applications for Power Plants, Substations, Transmission lines, and Industrial System Designations and Hydro Developments*
http://www.auc.ab.ca/acts-regulations-and-auc-rules/rules/Documents/Rule007.pdf

AUC Rule 012: *Noise Control*
http://www.auc.ab.ca/acts-regulations-and-auc-rules/rules/Documents/Rule012.pdf

Micro Generation Regulation
http://www.qp.alberta.ca/1266.cfm?page=2008_027.cfm&leg_type=Regs&isbncln=9780779745371

Government of Alberta
http://www.alberta.ca

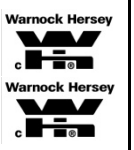
NAV Canada
http://www.navcanada.ca

Retailer and WSP list
The Office of the Utilities Consumer Advocate - Provided by government of Alberta
(Comprehensive list of energy retailers and distributors in Alberta.
https://ucahelps.alberta.ca/retailers.aspx

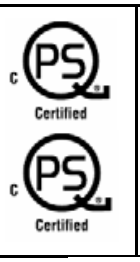
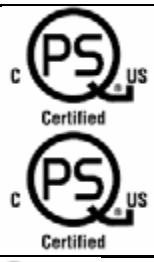
The Office of the Utilities Consumer Advocate
www.ucahelps.gov.ab.ca

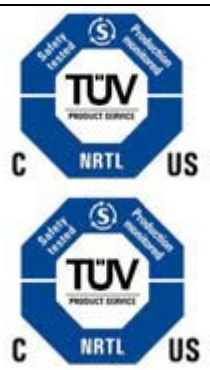
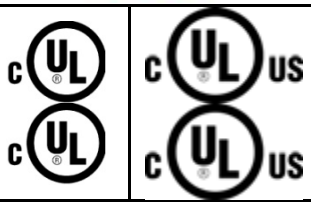
Electrical Safety Information Bulletin STANDATA LEG-ECR-2 from Alberta Municipal Affairs
http://www.municipalaffairs.alberta.ca/cp_electrical_codes_standards

Appendix C – Certification marks

Certification Body	Certification Marks		
CSA International			The CSA certification mark alone without any identifier indicates products approved to Canadian national standards. If another country's identifier is present (i.e., US, NRTL), then the small 'C' Canadian identifier is required to indicate that the product also complies with Canadian national standards.
			
Curtis-Straus LLC			The Curtis-Straus LLC certification mark requires the small 'C' Canadian identifier at the 8 o'clock position to indicate compliance to Canadian national standards.
ETL Intertek Entela			The ETL Intertek Entela certification mark requires the small 'C' Canadian identifier at the 8 o'clock position to indicate compliance to Canadian national standards. Identifiers for other countries may be present but in all cases, the small 'C' is required.
ETL Intertek Semko			ETL Intertek Semko has two certification marks, the ETL mark and the WH mark. Each mark requires the small 'C' Canadian identifier to indicate compliance to Canadian national standards. Identifiers for other countries may be present but in all cases, the small 'C' is required.
			
			
FM Approvals			The FM certification mark requires the small 'C' Canadian identifier to indicate compliance to Canadian national standards. Identifiers for other countries may be present but in all cases, the small 'C' is required.
LabTest Certification Inc.			The Labtest Certification Inc. certification mark requires the small 'C' Canadian identifier to indicate compliance to Canadian national standards. Identifiers for other countries may be present but in all cases, the small 'C' is required.

Met Laboratories		The MET certification mark requires the small ‘C’ Canadian identifier to indicate compliance to Canadian national standards. Identifiers for other countries may be present but in all cases, the small ‘C’ is required.
Nemko Canada Inc.		The Nemko certification mark requires the small ‘C’ Canadian identifier at the 8 o’clock position to indicate compliance to Canadian national standards.

NSF International			The NSF International certification mark requires the small ‘C’ Canadian identifier to indicate compliance to Canadian national standards. Identifiers for other countries may be present but in all cases, the small ‘C’ is required.
OMNI-Test Laboratories, Inc.			The OMNI-Test Laboratories Inc. certification mark requires the small ‘C’ Canadian identifier to indicate compliance to Canadian national standards. Identifiers for other countries may be present but in all cases, the small ‘C’ is required.
Quality Auditing Institute			The QAI certification mark requires the small ‘C’ Canadian identifier to indicate compliance to Canadian national standards. Identifiers for other countries may be present but in all cases, the small ‘C’ is required.
QPS Evaluation Services Inc.			The QPS certification mark requires the small ‘C’ Canadian identifier to indicate compliance to Canadian national standards. Identifiers for other countries may be present but in all cases, the small ‘C’ is required.
TÜV Rheinland of North America			The TÜV Rheinland certification mark requires the small ‘C’ Canadian identifier to indicate compliance to Canadian national standards. Identifiers for other countries may be present but in all cases, the small ‘C’ is required.

TÜV Product Service		The TÜV Product Service certification mark requires the small ‘C’ Canadian identifier to indicate compliance to Canadian national standards. Identifiers for other countries may be present but in all cases, the small ‘C’ is required.
Underwriters’ Laboratories		The UL certification mark requires the small ‘C’ Canadian identifier to indicate compliance to Canadian national standards. Identifiers for other countries may be present but in all cases, the small ‘C’ is required.
		The ULC certification mark is a Canada-only mark indicating compliance to Canadian national standards. It does not require a small ‘C’ Canadian identifier.

Appendix D – Single-line diagram sample (indicate size)

The following two single-line diagram forms are examples only. You may use these SLDs if they apply to your MG unit. Otherwise, draw your own SLD to show the specific details for your MG unit.

SLD No. 1

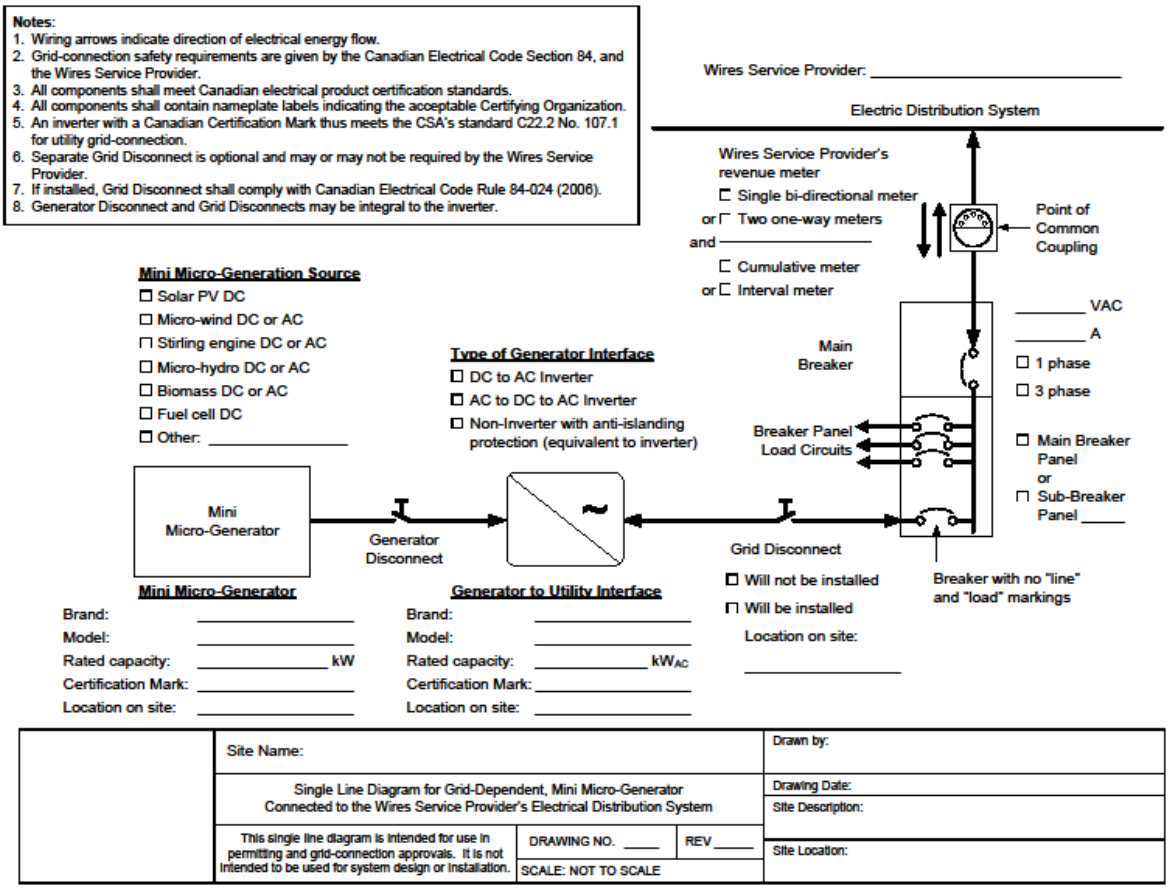


Diagram Courtesy of Howell-Mayhew Engineering

SLD No. 2

(Indicate size)

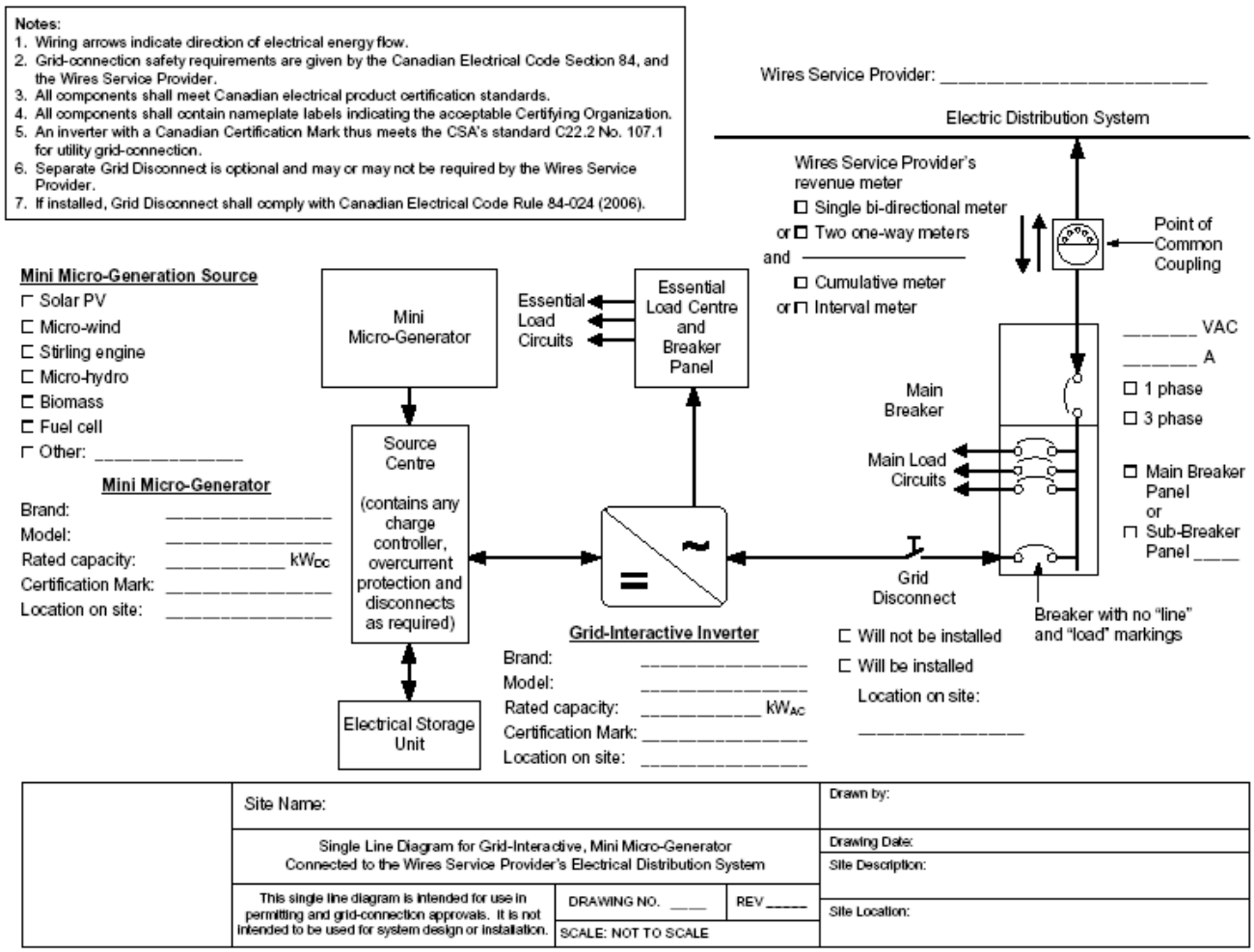


Diagram Courtesy of Howell-Mayhew Engineering

Appendix E – Interconnection and Operating Agreement sample

The following two documents are samples only. They are provided in order to familiarize you with a Wire Service Provider's Interconnection and Operating Agreement.

Sample No. 1 - **Interconnection and Operating Agreement (Less than 10 kW inverter based)**

Wires Owner's letterhead
This template is generic. Each wire service provider will use their specific format.

In consideration of <Utility Name Here> (the "W**ires Owner**") agreeing to allow you to connect your inverter-based 10 kW or smaller installed capacity generation facility located at **(land location)** (your "**generation facility**") to the Wires Owner's distribution system, you hereby agree to the following terms and conditions.

1.0 Eligibility

1.1 You agree that the connection between your generation facility and the Wires Owner's distribution system will be subject to all applicable laws and bound by the Wires Owner Terms and Conditions of service (the "T**erms of Service**"), which are filed with, and approved by, the Alberta Utilities Commission ("**AUC**") from time to time, and which are available to you on request.

1.2 You certify that you meet all of the requirements of AUC Rule 024.

2.0 Technical Requirements

2.1 You represent and warrant that you have installed, or covenant that you will: (a) install prior to the connection of your inverter based generation facility to the Wires Owner's distribution system; and (b) maintain thereafter in accordance with and for the duration of this agreement, an inverter satisfying Section 84 of the Canadian Electrical Code and CSA C22.2 No. 107.1-01 (General Use Power Supplies) or UL 1741.

2.2 You covenant and agree to perform regularly-scheduled maintenance to your generation facility as outlined by its manufacturer in order to assure that its connection devices, protection systems, and control systems are maintained in good working order and in compliance with all applicable laws.

2.3 You agree to the automatic disconnection of your generation facility from the Wires Owner's distribution system in the event of: (a) a planned or unplanned power outage on the Wires Owner's distribution system, (b) any abnormal operation of the Wires Owner's distribution system, (c) a direction from the independent system operator ("**ISO**") or other governmental authority, or (d) any other event that requires such disconnection pursuant to the Terms of Service, applicable law or good electricity practice.

2.4 You covenant and agree that the design, installation, maintenance, and operation of your generation facility will be conducted in a manner that ensures the safety and security of both the generation facility and the Wires Owner's distribution system.

2.5 Due to the Wires Owner's obligation to maintain the safety and reliability of its distribution system, you covenant and agree that in the event you determine or the Wires Owner determines, in its sole opinion, acting reasonably, that your generation facility is or is reasonably likely to: (i) cause damage to; and/or (ii) adversely affect other distribution system customers or the Wires Owner's assets, you will disconnect your generation facility immediately from the Wires Owner's distribution system upon direction from the Wires Owner and correct the problem at your own expense prior to reconnection.

2.6 You represent and warrant that the total generation capacity of your generation facility is **(insert capacity)**. You covenant and agree that you will not make any alteration to the design or operation of your generation facility, including, but not limited to, the total generation capacity of your generation facility, without the prior written approval of the Wires Owner.

2.7 You hereby grant the Wires Owner access to your generation facility, including for purposes of inspection, maintenance, operation and meter reading.

3.0 Liabilities

3.1 You will indemnify and hold the Wires Owner harmless from and against all costs, expenses, damages, claims, liabilities and adverse effects resulting from your breach of this agreement and from your negligence or willful misconduct in connection with the operation of your generation facility or the interconnection between your generation facility and the Wires Owner's distribution system.

3.2 Notwithstanding Section 3.1, you shall not be liable to the Wires Owner under any circumstances whatsoever for any loss of profits or revenues, business interruptions losses, loss of contract or loss of goodwill, or for any indirect, consequential, incidental or special damages, including but not limited to punitive or exemplary damages, whether any of the said liability, loss or damages arise in contract, tort or otherwise. For purposes of this agreement, damages claimed by third parties shall not be considered indirect, consequential, incidental or special damages, regardless of the type of damages being claimed.

3.3 The Wires Owner's liability to you, whether pursuant to contract, tort or otherwise, shall be limited to the liability imposed on the Wires Owner pursuant to the Terms of Service. Nothing in this agreement is intended to abrogate, alter or diminish the statutory liability protection granted to the Wires Owner under the *Electric Utilities Act* (Alberta) and the *Liability Protection Regulation* (Alberta).

4.0 Termination

4.1 You may terminate this agreement at any time by: (a) disconnecting your generation facility from the Wires Owner's distribution system, and (b) thereafter giving the Wires Owner 30-days written notice of such termination.

4.2 The Wires Owner may terminate this agreement on 30-days' notice upon the occurrence of any of the following: (a) your disposition of your generation facility or your interest in the property on which it resides; (b) your breach of this agreement; (c) the retirement of the Wires Owner's distribution system; and (d) any change in law that affects the Wires Owner's rights or obligations under the *Micro-Generation Regulation* (Alberta) or AUC Rule 024.

5.0 Assignment

5.1 You agree that this agreement constitutes an interest in land with respect to the lands on which your generation facility is located, and that the Wires Owner may register this agreement at the appropriate land titles office against title to the lands on which your generation facility is located.

5.2 You covenant and agree that you will not sell, assign, transfer, convey or otherwise dispose of your generation facility or your interest in the property on which it resides without the prior written consent of the Wires Owner, which shall not be unreasonably withheld. It will be a condition of the Wires Owner's consent that the new owner of your generation facility or your interest in the property on which it resides be assigned your rights and obligations under this agreement. The Wires Owner may assign its rights and obligations under this agreement without your consent.

5.3 In addition, you agree that if your rights and obligations under this agreement are not assigned to the new owner of your generation facility or your interest in the property on which it resides, the Wires Owner

may send a micro-generation decommission notification (GRN transaction) to your retailer prohibiting any further generation credits to be processed with respect to your generation facility until a new agreement is reached between the Wires Owner and the new owner of your generation facility.

Approved by:

Wires Owner signature:_____ Date:_____

MG customer signature: _____ Date:_____

Sample No. 2 **Interconnection and Operating Agreement (small micro-generator)**

Wire Owner's letterhead
This template is generic. Each wire service provider will use their specific format.

This agreement between _____ (the "**MG customer**") and _____ (the "W**ires Owner**") is intended to provide for the safe and orderly operation of the electrical facilities interconnecting the MG Customer's generation facility at **(land location and description of project)** and the electrical distribution system owned by the Wires Owner. It is the intent of the MG customer to generate electricity primarily for its own use sized to the customer's load or portion thereof, and to be reimbursed for any excess generation. It is the intent of the Wires Owner to operate its distribution system to maintain a high level of power quality and service for its customers. It is the intent of both parties to operate their respective facilities in a way that ensures the safety of the public and their respective employees.

1. Relation to other documents:

This agreement does not supersede any requirements outlined in any government regulations, including (but not limited to) the *Alberta Electric and Communication Utility Code*, the *Canadian Electrical Code* and the *Alberta Occupational Health and Safety Act*, nor does it supersede the Wires Owner's safety policies and procedures or the terms of the **[commercial contract]** between the MG customer and the Wires Owner or any of its affiliates.

2. Operating authority:

The operating authority for each of the parties hereto is the person identified by name or job title responsible to establish operating procedures and standards within their organization. The operating authorities for the MG customer and for the Wires Owner shall ensure that timely updates are made to this document to reflect any changes to system operating characteristics, disconnect devices and single line diagrams referenced in this agreement. The operating authorities for the MG customer and for the Wires Owner shall ensure that the operators of the generation facility and the distribution system are competent in the respective operation thereof and are aware of the provisions of any operating agreements, laws, regulations and rules relating to the safe operation of electrical power systems.

The operating authority for the MG customer is **(name or title of person designated the operating authority, their address and phone numbers)**.

The operating authority for the Wires Owner is **(name or title of person designated the operating authority, their address and phone numbers)**.

3. Operator in charge:

The operator in charge for each of the parties hereto is the person identified by name or job title responsible for the real time operation of all electrical facilities related to the interconnection between the MG customer's generation facility and the Wires Owner's distribution system.

The operator in charge for the MG customer is **(name or title of person designated the operator in charge, their address and phone numbers)**.

The operator in charge for the Wires Owner is **(name or title of person designated the operator in charge, their address and phone numbers)**.

4. Description of facilities:

The point of common coupling is designated as **(description of point of common coupling)**, and is identified on the attached single-line diagram.

The **(breaker, switch etc.) (switch number)** will be used as the main disconnect point (visible/lockable) for the MG customer's generation facility, and is owned and operated by **(specify owner/operator here)**. This switch **(does/does not)** have load-break capability and therefore **(can/cannot)** be operated while the generation facility is producing or consuming power.

The MG customer's generation facility consists of a (**size**), (**type**), (**connection**) generator. (**The MG customer**) owns and is responsible for the maintenance and operation of all facilities on the generator side of the point of common coupling.

The Wires Owner's distribution system consists of **(distribution size voltage)** kV line **(line number)** and a **(transformer size), (transformer connection designation)** transformer. The Wires Owner owns and is responsible for the operation of all facilities on the distribution side of the point of common coupling.

The MG customer's generation facility is designed to operate while connected to the Alberta electricity grid, with synchronizing facilities provided on the MG customer's breaker **(breaker number)**. In the absence of outstanding clearances between the operators in charge, notice will not be required to be given to the Wires Owner prior to synchronization of the MG customer's generation facility and the wires owner's distribution system taking place. It is recognized by the MG customer that there are no synchronization schemes in place on the wires owner's distribution system, and that the (**upstream distribution facility)** contains automatic equipment that will provide for voltage regulation or automatic re-closure under some conditions. **(Insert description of any special blocking or protection schemes.)**

The MG customer's generation facility is capable of controlling either voltage or power factor, and is normally set to control **(voltage or power factor)** to **(setting, tolerance)** at the generation facility's terminals.

5. Suspension of interconnection:

The operation of the MG customer's generation facility and the quality of electric energy supplied by the MG customer shall meet both the standards and anti-islanding requirements as specified in Part 2 of the *Alberta Distributed Generation Interconnection Guide* and any further standards identified by the Wires Owner. If the operation of the MG customer's facilities or quality of electric energy supplied does not meet the above standards or, in the event you determine or the Wires Owner determines, in its sole opinion, acting reasonably, that your generation facility is or is reasonably likely to: (i) cause damage to; and/or (ii) adversely affect other distribution system customers or the wires owner's assets, the Wires Owner will notify the MG customer of same and the MG customer shall promptly take all reasonable corrective action at its sole cost and expense. The Wires Owner may, in its sole discretion and without notice, disconnect the MG customer's facilities from the wires owner's distribution system until all such correction action and/or compliance with the above standards is reasonably demonstrated.

Additionally, the Wires Owner may, in its sole discretion and without notice, disconnect the MG customer's generation facility from the wires owner's distribution system in the event of: (a) a planned or unplanned power outage on the wires owner's distribution system, (b) any abnormal operation of the wires owner's distribution system, (c) a direction from the independent system operator ("**ISO**") or other governmental authority, or (d) any other event that requires such disconnection pursuant to: (i) the wires owners' terms and conditions of service (the "**terms of service**"), which are filed with, and approved by, the Alberta Utilities Commission from time to time; (ii) applicable law, or (iii) good electricity practice.

6. Safe work planning:

Safe work planning practices such as pre-job plans and tailboard conference procedures shall be followed whenever both parties are involved in work on the interconnected system. Nothing in this agreement shall be interpreted as altering the intent of the wires owner's safe practices manual or safe operating procedures. Safe work routines described in Division D of the *Alberta Electrical and Communication Utility Systems Regulations* shall be followed when providing isolation for work on any part of the interconnected system.

7. Technical requirements:

MG customer covenants and agrees that it will not make any alteration to the design and operation of its generation facility, including, but not limited to, the total generation capacity, voltage and frequency of its generation facility, without the prior written approval of the Wires Owner.

8. Maintenance outages:

Maintenance outages will occasionally be required on the wires owner's distribution system and the MG customer's generation facility. Both parties hereto are required to provide reasonable notice, given the circumstances, and plan to minimize downtime. It is recognized that in some emergency cases, such notice may not be possible. Outages shall be coordinated by the operators in charge.

9. Liabilities:

The MG customer will indemnify and hold the Wires Owner harmless from and against all costs, expenses, damages, claims, liabilities and adverse effects resulting from the MG customer's breach of this agreement, negligence or willful misconduct in connection with the operation of the MG customer's generation facility or the interconnection between the MG customer's generation facility and the wires owner's distribution system.

Notwithstanding the foregoing, the MG customer shall not be liable to the Wires Owner under any circumstances whatsoever for any loss of profits or revenues, business interruptions losses, loss of contract or loss of goodwill, or for any indirect, consequential, incidental or special damages, including but not limited to punitive or exemplary damages, whether any of the said liability, loss or damages arise in contract, tort or otherwise. For purposes of this agreement, damages claimed by third parties shall not be considered indirect, consequential, incidental or special damages, regardless of the type of damages being claimed.

The wires owner's liability to the MG customer, whether pursuant to contract, tort or otherwise, shall be limited to the liability imposed on the Wires Owner pursuant to the terms of service. Nothing in this agreement is intended to abrogate, alter or diminish the statutory liability protection granted to the Wires Owner under the *Electric Utilities Act (Alberta)* and the *Liability Protection Regulation (Alberta).*

10. Access:

The Wires Owner shall have access to the MG customer's generation facilities, including for purposes of inspection, maintenance, operation and meter reading. Access and inspections shall be arranged by the operators in charge.

11. Termination:

The MG customer may terminate this agreement at any time by: (a) disconnecting its generation facility from the wires owner's distribution system, and (b) thereafter giving the Wires Owner 30 days' written notice of such termination.

The Wires Owner may terminate this agreement on 30 days' notice upon the occurrence of any of the following: (a) the MG customer's disposition of its generation facility or its interest in the property on which it resides; (b) the MG customer's breach of this agreement; (c) the retirement of the Wires Owner's distribution system; and

(d) any change in law that affects the Wires Owner's rights or obligations under the *Micro-Generation Regulation (Alberta)* or AUC Rule 024.

12. Assignment:

The MG customer agrees that this agreement constitutes an interest in land with respect to the lands on which the MG customer's generation facility is located, and that the Wires Owner may register this agreement at the appropriate land titles office against title to the lands on which the MG customer's generation facility is located.

The MG customer covenants and agrees that it will not sell, assign, transfer, convey or otherwise dispose of its generation facility or its interest in the property on which its generation facility resides without the prior written consent of the Wires Owner, which shall not be unreasonably withheld. It will be a condition of the wires owner's consent that the new owner of the MG customer's generation facility or its interest in the property on which its generation facility resides be assigned the MG customer's rights and obligations under this agreement. The Wires Owner may assign its rights and obligations under this agreement without the MG customer's consent.

In addition, the MG customer agrees that if its rights and obligations under this agreement are not assigned to the new owner of its generation facility or its interest in the property on which its generation facility resides, the Wires Owner may send a micro-generation decommission notification (GRN transaction) to the MG customer's retailer prohibiting any further generation credits to be processed with respect to the MG customer's generation facility until a new agreement is reached between the Wires Owner and the new owner of the MG customer's generation facility.

Approved by:

Wires Owner signature:_____ Date:_____

MG customer signature: _____ Date:_____

Appendix F – Electrical safety

Any system that generates electricity can be potentially dangerous, creating the possibility of electrocution and fire hazards. Improperly installed systems will create serious safety hazards to property owners, families and WSP workers.

All precautions must be taken to ensure the installation and operation of the applicant's MG unit is governed by health and safety standards. This includes ensuring that all safety information is kept up to date.

Before an MG unit is installed, it is imperative to understand and follow the safety requirements including but not limited to:

Equipment approved by the Canadian Electrical Code (CE Code). Manufacturers of all electrical products are required to certify their products to the appropriate Canadian product safety standards. Compliance to these standards is indicated by a mandatory certification mark located on the MG equipment's nameplate.

Alberta's STANDATA Electrical Safety Information Bulletin LEG-ECR-2 [Rev 16] indicates the acceptable Certification Marks. Equipment that does not carry the appropriate certification mark is not permitted to be sold or installed. See Appendix C for details and the following link:

http://www.municipalaffairs.alberta.ca/cp_electrical_standata

Grid-connected inverters are required to be approved to the Canadian Standards Association (CSA) power supply standard C22.2 No.107.1 Clause 15 of this standard ensures that the inverter will properly cease to energize the electricity distribution system during an power outage. This shut down is called 'anti-islanding' and is of utmost importance to WSPs.

If inverters carry a certification mark that is complete and identical to one of the marks in Appendix C, then the inverter has been certified to CSA inverter standard C22.2 No.107.1.

For certification concerns or inquiries, contact the Equipment Manufacturer, WSP or the CSA directly at certinfo@csa-international.org or 1-416-747-2661 or 1-866-797-4272.

All electrical work needs to be designed and installed according to the minimums laid out by the CE Code. The electrical work on your MG unit is required to be done by certified electrician. Note Sections 6, 14, 64 and 84 of the CE Code and its rules regarding the need for warning notices and disconnects on MG units.

Extreme caution must be exercised to avoid electric shock. Your installer must conform to the equipment manufacturer's installation instructions to ensure all necessary safety precautions are applied at all times.

Most small MG units use inverter interfaces. Grid-connected inverter-based units are certified to cease energizing the circuits of the electricity distribution system during electrical outages. WSP may require that MG units have a direct visible means to indicate the connection status (i.e., either connected or disconnected), though typically this is not required.

Equipment documentation

The equipment installation and operating instructions should contain the contact details for the manufacturer, equipment supplier and the installer.

MG units must also include documentation confirming that they meet Canada's standard for anti-islanding which is CSA C22.2 No. 107-1. For small MG units the certification mark will suffice.

MG owners must maintain a quality control and inspection program according to the manufacturer's recommendations. MG owners must provide to their WSP a complete set of detailed drawings which the WSP will use to assist in the MG inspection.

Maintenance

Routine maintenance of MG units is the full responsibility of the MG owner. The complete system, control and protective equipment must be in accordance with the manufacturer's recommendations. Maintenance records should be kept for warranty and insurance purposes.

Appendix G - Electrical contractor and electrical inspection

Electrical contractor

It is highly recommended that you hire an electrical contractor or engage engineering firm to install your MG unit. Some municipalities prohibit home owners from installing their own MG unit. Extreme caution must be exercised to avoid electric shock.

Reference must be made to the manufacturer's instructions to ensure all necessary safety precautions are applied at all times. Applicants are advised to ensure that their electrical contractor also has the following:

- Municipal business and/or contractor licence (where required)
- Adequate liability insurance
- References

Ask about the amount of experience the electrical contractor has in installing MG units. These systems are relatively new and not many electrical contractors have experience installing these. The electrical contractor will need to install your MG unit according to all regulations and standards.

Electrical inspection

Before the MG unit can be connected to the WSP's or WO's electrical distribution system it must be inspected by an electrical inspector. The inspection provides assurance that the installation meets the safety requirements of the Canadian Electrical Code and does not pose a hazard to MG owners, their families, friends, or employees. It also provides an assurance that the installation will not be a hazard to WSP or WO workers who may be required to service or repair the electrical supply to the MG owner's farm, home or business.

The inspector will ensure that approved equipment is used (as shown by the labels on its nameplate) and that the equipment is installed and labelled as per Part 1 of the CEA Code and any requirements of the WSP or WO or the municipality.