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MICRO-GENERATOR APPLICATION GUIDELINE

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MICRO-GENERATOR APPLICATION
Table of Contents

1. Introduction 1
2. Differences between Micro-Generation (MG) and Distributed Generation (DG) 1
3. Purpose 1
4. Legal and related matters 2
5. Disclaimer 3
6. Micro-generators – types and size 3
7. Principal bodies 4
8. Process summary 4
9. Guidelines for filing Form A, Micro-generation project notice 6
10. Electricity compensation 11
11. Obligations 12
Appendix A – Process flowchart 13
Appendix B – Glossary 15
Appendix C – Contact and source information 19
Appendix D – Certification marks 20
Appendix E – Single-line diagram (indicate size) 22
Appendix F – Interconnection and operating agreement sample 24
Form A - Generation project (less than 1 MW) notice 31
Appendix H – Form C, Notice of complaint 34
Appendix I – How to apply for a BA code (Business Associate Identifier) 35
Appendix J – Electrical safety 37
Appendix K - Electrical contractor and electrical inspection 39

1. Introduction

On February 1, 2008, the Government of Alberta passed the *Micro-Generation Regulation*. This regulation allows Albertans, using renewable resources or alternative energy, to generate their own environmentally friendly electricity and receive credit from any excess electricity they send into the electricity grid. The intent of the regulation is for the micro-generator to be self-sufficient.

The AUC was tasked to overseeing an implementation of this regulation as well as developing processes to simplify approvals and interconnection agreements with customers and wire service providers (WSPs).

2. Differences between Micro-Generation (MG) and Distributed Generation (DG)

Before we proceed further, it is necessary to distinguish the differences between micro-generation and distributed generation. The major differences are listed as follows:

	DG	MG
Fuel sources	Could be renewable or non-renewable resources	Must be renewable resources or alternative energy
Generation capacity	Contact local distribution company	Less than one megawatt
Compensation method	Receive cash (based on pool prices) from the AESO for electricity generation	Receive credits from retailer. Credits are shown on monthly electricity bill.
Metering	DG owner is responsible for the metering cost and meter data provisions	Once MG status is approved, the wire service provider is responsible for cost of installing an appropriate meter and collect electricity data.
Pool participant	Must register with the AESO to become a pool participant	Not required to register with the AESO, but need to notify retailer of becoming a MG customer

For distributed generation proponents, they need to follow AUC Rule 007: *Applications for Power Plants, Substations, Transmission Lines and Industrial System Designations* (AUC Rule 007). For a guide of how to become a DG, please reference the Alberta Electric System Operator (AESO) website using the following link: http://www.aeso.ca/downloads/Guide_for_Distribution_Generation_Fact_Sheet_020311.pdf

To be eligible to become a MG, one 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 electricity needs,
> iii. is, at the time of construction or installation of the generating unit, sized to the customer's load or anticipated load or a portion of it, as evidenced by a total nominal capacity of the generating unit that does not exceed the rating of the customer's service,
> iv. has a total nominal capacity not exceeding 1 MW, and
> v. is located on the customer's site or on a site owned by or leased to the customer that is adjacent to the customer's site.

For the micro-generation projects, proponents need to aware of:

a. Generation fuel sources must be renewable or alternative energy (e.g. solar, wind….etc.).
b. The electricity generation is reasonably matched with the on-site consumption.
c. The generation capacity should be less than or equal to one megawatt (MW).
d. The requirements stated in the AUC Rules 007 and 012.
e. Meet all applicable environmental requirements and local by-laws.

3. Purpose

Connecting micro-generation to the 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 step-by-step summary and details of the processes required to obtain official permission and approval for MG installation. The document also addresses obligations of MG applicants, electrical contractors, energy retailers and wire service providers (WSPs) in meeting MG compliance and safety.

4. Legal and related matters

Electrical installations are subject to strict legal and municipal regulations including relevant health and safety legislations. 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 note further details identified throughout the document.

a) Building regulations
Applicants need to contact their municipal development 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. Check with your municipal building safety authority to confirm any building regulations and to determine whether your MG system requires a building permit.

b) Electricity compensation
Applicants must notify their retailer prior to the MG installation. This will ensure applicants are registered so that the retailer can apply proper credit for exported electricity.

c) Electrical safety
Installing a MG brings unique considerations for electrical safety. Precautions must be taken to avoid the risk of electric shock. It is strongly advised that a certified electrical contractor install your MG unit. It is also advised that the project proponents consult with their insurance company on the MG unit installation policy.

d) Equipment certification
The installer must refer to the MG equipment and the manufacturer's installation document to confirm that the MG complies with all relevant local and provincial electrical safety requirements.

e) Additional requirements for wind MGs
Development of wind-powered MGs 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) MG approval
Approval for MG installation is provided as follows:

i. For small MGs (i.e., <= 150 kW) and large MGs (i.e., > 150 kW and <= 1 MW), the applicant needs to submit a project notice (see Appendix H - Form A) to the responsible WSP. If the project is determined to meet all MG requirements as well as comply with the environmental and noise impact assessment requirements of AUC Rule 007 and AUC Rule 012: *Noise Control* (AUC Rule 012), the WSP will approve the project directly.

ii. If the project proponent fails to meet all the criteria as set out in AUC Rule 007 and AUC Rule 012 or has objections from nearby landowners or residents, the proponent must then follow the procedures stated in AUC Rule 007, Section 4 - Small power plant applications less than one Megawatt (MW) (see link: http://www.auc.ab.ca/acts-regulations-and-auc-rules/rules/Documents/Rule007.pdf) to submit an application to the AUC. The application must be submitted to the Commission for approval through the AUC's electronic filing services. An applicant can refer to the following link for the Electronic Filing (e-Filing) System User Guide: http://www.auc.ab.ca/applications/filing-an-application/Documents/E-Filing%20User%20Guide.pdf.

iii. The WSP can reject a MG project that fails to meet all the criteria as set out in the *Micro-Generation Regulation*, Section 1(1)(h). Should an applicant disagree with the project determination, the WSP must file a notice of dispute (see Appendix H – Form B) to the AUC for review. The Commission will conduct a review and issue a decision.

iv. For issues such as metering costs, type of meter to be installed, etc..., the MG project applicant should file a notice of complaint (see Appendix H – Form C) to the AUC for review. The Commission will conduct a review and issue a decision.

g) AUC Rule 012: Noise Control

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 purchasing a wind turbine.

Regardless the micro-generation generating capacity (less than 1 MW), all MG applicants must comply with the requirements stipulated in AUC Rule 012: *Noise Control*. All noise complaint issues for MG projects are dealt with in accordance with AUC Rule 012.

5. Disclaimer

This guide 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 applicant's responsibility to ensure all legal, health, safety, insurance and municipal requirements are adhered to as identified in this document. Concerns should be directed to your wire service provider, 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, you and your, are interchangeable throughout this document for ease of readability.

6. Micro-generators – 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 one megawatt (MW) or less. This document deals with two categories of MGs as follows:

Generator Classification	Rating
Small MG	≤ 150 kW
Large MG	> 150 kW but <= 1 MW

TYPICAL MICRO GENERATION SYSTEM

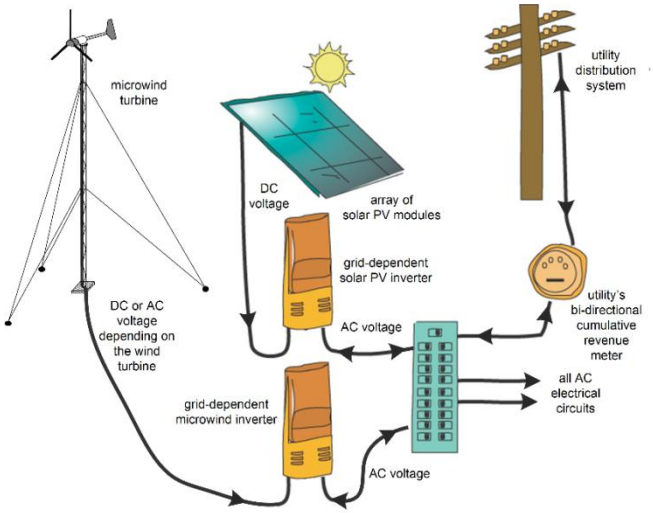


Figure 1. Typical wiring connections for a grid-connected micro wind and solar PV system. (Source: Modified from an unknown source. Gratefully included in this document.)

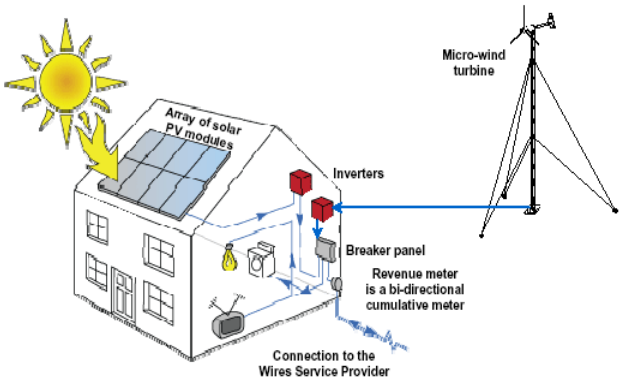


Figure 2. Typical residential grid connected micro-wind and solar PV system configuration. (Source: Alberta Solar Municipal Showcase)

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 bodies

Since the MG system 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)
Approves small and large MG applications.

Alberta Electric System Operator (AESO)
Operates the wholesale electricity market that determines the amount paid to retailers that own MG customers.

Energy retailer
Sells and buys exported electricity from the MG customer. Provide credits to MG customers on a monthly basis.

Electrical inspectors
Ensures that Canadian Electrical Code standards are met for all MG installations.

Wire service provider (WSP)
Provides the grid connection to the MG.

See the process charts in Appendix A for an overview of each governing body's role during the MG approval, development and installation process.

See the glossary in Appendix B for descriptions of each principal body.

8. Process summary

This summary section provides a quick snap shot of what steps you need to follow and in which order. Where necessary, further details are provided in this application guideline.

a) Plan your micro-generator installation

Consult with your neighbours and any landowners or residents that will be affected (e.g. visually for solar installations or visually and by noise for wind turbine installations). Check municipal permit requirements and if you are a wind proponent check municipal noise by-laws.

b) Contact your wire service provider

Applicants must submit a generation project notice to their WSP and inform them of the plans to install a MG. See the WSP contact link in Appendix C.

If the micro-generator capacity is less than or equal to one megawatt and complies with all requirements, the WSP will assess the application and provide approval directly to the MG owner for connection. MG customers are required to meet WSP's terms and conditions for connection and sign an interconnection agreement with the WSP.

If, for some reason, the MG application does not meet the requirements of AUC Rule 007 and AUC Rule 012, the MG proponent is

responsible for submitting an application to the Commission through the AUC's Digital Data Submission (DDS) system. Below is a link to the DDS user guide: http://www.auc.ab.ca/applications/filing-an-application/Documents/DDS%20User%20Guide.pdf. The MG proponent must follow the submission process outlined in Section 4 of AUC Rule 007 (see link: http://www.auc.ab.ca/acts-regulations-and-auc-rules/rules/Documents/Rule007.pdf)

c) Micro-generator information requirements by the WSP

All required documents must be submitted to the WSP for review. The information requirements consist of equipment safety and information along with an interconnection agreement. It is advised that applicants download and read the WSP's terms and conditions document for connecting the generation unit. Appendix F shows samples of an interconnection agreement.

d) Electrical consultation

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

e) Confirm your legal land description

Your legal land address is required when filling in a project notice. If you do not know this information, contact Alberta registries agent or a taxation office for assistance.

f) Obtain municipal permits

Contact your municipality's permit office to confirm whether a development permit, building permit and emergency response plan are required.

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

g) Additional requirements for wind MGs

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

Wind-turbine MG proponents also need to be aware of AUC Rule 012: *Noise Control*. MG proponents are required to comply with the noise bylaws of their municipality as well as AUC Rule 012. More information on AUC Rule 012 is available through the link in Appendix C of this document.

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 for all MG sizes.

i) Prepare a single line diagram (SLD)

It is advised that the MG proponent submits a SLD together with the project notice to the WSP or AUC for approval. Samples of SLD are shown in Appendix E. Project proponent must ensure an SLD is accurately reflecting system.

j) Confirm equipment certification

Physically check the electrical certification mark on all equipment to ensure it is meeting the appropriate Canadian standards. See Appendix D for a list of approved certification marks.

k) Complete the micro-generation project notice

Complete the MG project notice form (See Appendix H) and submit it together with related documents as required by the WSP for approval.

l) Submit the micro-generation project notice

Submit the notice to your WSP with related documents to detail the project, which may include some or all of the following:

- site plan or pictures to illustrate the MG unit location
- detailed single line diagram about the system
- development permit (if required)
- building permit (if required)

- noise documents related to wind-turbine generator (if required)
- environmental impact assessment documents (if required)

m) MG project review

The WSP can reject a MG application if it does not meet the MG criteria as stated in the *Micro-Generation Regulation*. If the application is approved, then the WSP will proceed with the MG meter installation and grid connection.

If the MG project proponent has not met the requirements of the AUC rules, the proponent must submit an application to the AUC for approval.

n) Wire service provider approval

The WSPs will provide the applicant with a confirmation when the MG project notice is approved and when it will be connected to the grid.

For applications made to the Commission, the AUC will follow the application review process. Once the project is approved, a decision report will be issued. The MG project proponent is responsible for communicating the decision with WSP for grid connection.

o) Install your micro-generation unit

It is strongly advised that applicants hire a certified electrical contractor to install the MG unit.

p) Application for electrical inspection

After the MG is installed, a final inspection must be done prior to the generators operation. The inspection could be done by the municipality's electrical inspector or the WSP's inspector. The WSP will only connect MG units that meet all safety requirements. For insurance purposes, it is also advised that applicants obtain a copy of the certificate of inspection and all related documents.

q) Contact your energy retailer

In order to obtain electricity generation compensation, the MG project owner must contact their energy retailer to:

i. advise them of the MG connection date
ii. arrange compensation for excess electricity generated by their MG unit

See contact link in Appendix C for a list of energy retailers.

r) Meter or service line modifications

The WSP makes any modifications that may be required to the meter or electrical service entrance. Where necessary, applicants will be offered either a bi-directional cumulative meter or two one-way meters. If two one-way meters are used, then a second meter base will need to be installed (by the WSP) at the service entrance. The capacity of the service entrance will be increased to accommodate the MG (if required). The WSP will install required meters in accordance with MG classification that specified in the *Micro-Generation Regulation*.

9. Guidelines for filing Form A, Micro-generation project notice

The following guidelines provide detailed information to help applicants complete the project notice form as easily as possible. Additional sources are identified throughout this section so you can access any required information.

A. APPLICATION 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.

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

Phone
Enter a weekday phone number.

Email address
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-mail blockers.

Consultant name (if applicable)
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 we cannot reach you and/or need any 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 neighbour, property owner or business partner.

B. PROJECT DESCRIPTION

Legal land description
In rural areas enter the legal land description. Legal land description is a term used to describe sections of land you have title to for the purpose of government records. This information may be found on your land title, tax assessment or mortgage agreement.

If you have an urban address, enter the lot, block and plan numbers for 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 registries 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.

Site ID
Enter your site identification number. Site identification numbers are required for each electrical installation in Alberta. You can find your site ID number on your electric utility bill.

New utility installations require obtaining a new site ID. Contact your WSP and inform them that you are planning a MG site. You will be required to complete a site ID form. Your building permit number and/or electrical permit number may be required to complete the site ID form.

See contact link in Appendix C for a list of WSPs.

Service address
Enter the service address where you plan on installing the MG.

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.

You can find the exact latitude and longitude by looking online at Google Earth or by using a global positioning system (GPS). A GPS or surveying company can also help with this.

Retailer name
Enter the name of your energy retailer. Look at your electric utility bill for the energy retailer or see the contact link in Appendix C for a list of energy retailers.

Notifying your energy retailer about your MG
Since your energy retailer is the company who sells you your electricity and who will purchase your exported electrical energy, they need to be notified about your MG. Your retailer will arrange financial compensation for excess electricity generated through your MG. They will make the necessary arrangements with the AESO. You will need to provide your retailer with the following information:

- Notice that you intend to install a MG.
- The type of micro-generator you will be installing (i.e. solar, wind, fuel cell, etc).
- The start date of installation.

Generator type
Select the type of MG that you are installing. If your MG is not listed select 'Other' and provide specific details on the generator type.

Application notices are limited to one MG. If you are installing more than one MG you must submit a separate application notice for each. See the glossary in Appendix B for a description of each generator type.

Generator to 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.

Interconnection of an 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 generator. The majority of mini and small MGs on the market today are inverter based.

Non-inverter
This is a special interface that is mated to an induction or a synchronous generator. It causes the generator to behave like a certified grid-connected inverter – where it is certified to shut off automatically during outages on the electrical distribution system, and contains islanding detection and shut down equipment in the highly unlikely case that an electrical island occurs.

Induction
An induction generator is a type of electricity generator that converts rotational energy into electricity and requires an external voltage source to energize its windings.

Synchronous
A synchronous generator is a type of electricity generator that converts rotational energy into electricity independent of any external voltage source.

For a small MG, indicate if the generator to utility interface is inverter or non-inverter based. For a large MG (except solar MG), indicate if the generator to utility interface is an induction or synchronous generator.

Generator rated capacity (kW)
Enter the rated capacity of your generator. Your MG equipment will identify the kW capacity on its name plate.

Demand (kVA)
This is the maximum amount of apparent electrical energy consumed and measured in kVA (kilovolt-amperes). The kVA of your large MG will be identified on your equipment.

Customer annual usage or kWh
A kWh (kilowatt hour) is the basic unit of electricity energy. When you buy electricity from your utility company it is sold to you at a certain rate per kWh. The kWh amount will be identified on each monthly electrical bill. Add the kWh amount identified on each monthly bill for the year to get your total annual usage.

Voltage level of connection
Your equipment supplier or electrical contractor will provide you with the required voltage level of connection. For example, a house always uses 120 or 240 volts, a mini-MG installed on a house would likely be connected at 240 volts. MG owners are responsible for ensuring that the voltage levels at the point of interconnection are maintained.

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

In most cases mini and small MGs will select single phase and large MGs will select three phase. Contact your WSP for confirmation. See contact link in Appendix C for a list of WSPs.

Is the electricity produced to be used primarily by the generator owner?

If the electrical energy you generate is for personal home or farm use, to reduce your electricity bills, select Yes. If the energy is intended for commercial operation or primarily for sale to the electrical market, select No.

If you are applying for a non MG project, are you selling electricity to the AESO?

For MG application, you can ignore this question.

Does your generator unit satisfy Anti-Islanding Clause CSA C22.2 No. 107.1? **

In order to meet the anti-islanding clause, your MG must meet specific electrical safety codes and product performance standards. Safety and performance standards are required to ensure the safety, power quality and interconnection aspects of your MG so it doesn't 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 code: CSA C22.2 No.107.1. If this code is labelled on your equipment, select Yes. If this code is not identified, select No.

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

What is islanding?
An electrical island is where a portion of the WSPs electrical distribution system that contains both electrical loads and electrical generators is isolated from the remainder of the distribution system, but remains energized.

The safety concern is that if an electrical outage occurs (perhaps in the event of a major storm), a MG could continue to unintentionally supply electrical power to the island. While a WSP can be sure that all of its own energy feeds are either shut down or isolated from the area that needs work, an island created by a MG can be out of their control.

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

Large MGs need to follow additional Canadian Electrical Code (CE Code) regulations. Contact your electrical contractor and WSP for details.

Meets MG renewable energy definition?

Renewable or alternative energy means electric energy generated from solar, wind, hydro, fuel cell, geothermal, biomass or other generation source where the electric energy produced provides a greenhouse gas intensity less than or equal to 418 kg per MWh and includes:

- Electric energy generated from products having a current EcoLogo certification.
- Simultaneous generation of electric energy and production of thermal energy from the same fuel source, in which case the greenhouse gas intensity of the total energy produced must be less than or equal to 418 kg per MWh. (*Micro-Generation Regulation – Energy Utilities Act*)

If your MG is solar, wind or hydro, select Yes. If your MG is biomass, fuel cell or other you will need to verify whether your equipment meets greenhouse emission requirements with your equipment supplier.

Requested in service date (YY-MM-DD)

Enter the start date of operation for your MG.

C. SUPPORTING DOCUMENTS

Electric single-line diagram
An electric single-line diagram (SLD) provides a basic connection configuration between the electrical components of your MG and your WSPs electric distribution system.

This handbook comes with example SLDs for your use. See Appendix E.

- Include the wire service provider's technical recommendations in your SLD.
- Phone your municipality for a list of electrical inspectors in your area.
- Since MGs are not common, we recommend that you submit your SLD to an electrical inspector for review and comments.
- Submit your SLD to your electrical contractor for review.

- Applicants or a contracted electrical contractor will be required to submit an application for inspection to the municipality's electrical inspection contractor.

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 is to be located.

The site plan will be needed for any municipal development permit for all MG sizes.

A copy of your real property report is adequate as the basis for the site plan for your MG application. For more information on real property reports, go to:

http://www.alsa.ab.ca/real-property-reports

A site plan should include:

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

Existing engineering aerial drawings can be used. You can also get a great photo of your site from space on Google Earth (http://earth.google.com).

Has an electric permit been obtained?

An electrical permit is required for any major electrical work. An electric permit is a legal document that ensures that your MG is inspected and thus meets the Canadian Electrical Code. Applicants may apply for the electrical permit and do the electrical work if they own and live in their home. It is advised that applicants contract a certified electrical contractor.

Obtaining an electric permit
See the Alberta Municipal Affairs website for the Permit Information Search tool that will direct you to your respective municipality.

http://www.municipalaffairs.gov.ab.ca/cp_permit_information_serach.com

Alberta Municipal Affairs Communication and Inquiry Centre at 1-866-421-6929 or
Email: safety.services@gov.ab.ca.

Finding rules, regulations and permit links
Go to the Safety Codes Council site at follows:
http://www.safetycodes.ab.ca/

Have you met all applicable municipal and zoning requirements and permits?

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 doesn't require it.

Land use bylaws are dependent upon your municipality. For example, does the zoning for your house permit allow you to install a wind turbine in your neighbourhood?

Contact your municipality's permit office to confirm all applicable bylaws in regards to your MG. Ask them whether a development permit, building permit and emergency response plan are required along with any other requirements deemed necessary, along with what steps to take to acquire them.

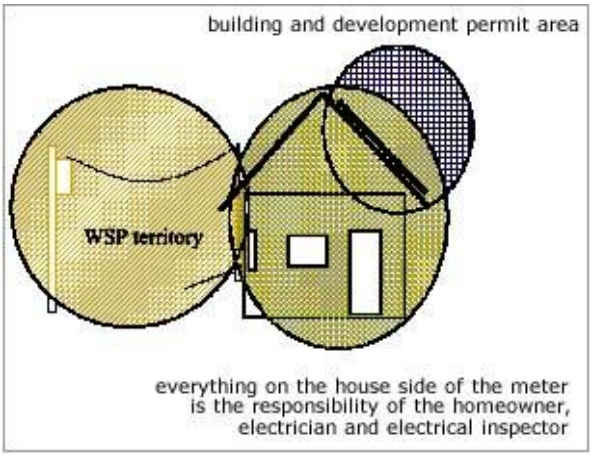


Figure 3: Areas of responsibility for the WSP, homeowner and municipality for a solar PV system on a house (Source: Boyd Solar)

Have you met the requirements stated in AUC Rules 007 and 012?

MG project proponent must know what are the requirements stated in the AUC Rule 007 and 012. These requirements can be found in the AUC's website. If project proponent is not meeting the rules, proponent must submit an application to the AUC for approval.

Have you met all applicable environments requirements?

MG project proponent must know what are the environmental requirements for their MG project. For example, birds issue could be related to a wind turbine project. Proponent should check with environmental agencies. If project proponent is not meeting the requirements, proponent must submit an application to the AUC for approval.

Are you aware of any outstanding objections from nearby landowners or residents regarding your projects?

MG proponent must ensure its MG project is not affecting nearby landowners or residents. If project proponent is not able to resolve objections, proponent must submit an application to the AUC for approval.

Additional wind power requirements

Developing wind power MGs requires specific approval from several agencies including 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 blades can adversely affect air navigation in certain locations. Applicants must complete NAV Canada's Land Use Proposal Submission Form and obtain their approval for a wind MG. Check with NAV's website as follows: http://www.navcanada.ca

2. Transport Canada

Wind turbines can be an aircraft hazard in certain 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 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. For more information, visit Alberta Transportation's website: http://www.transportation.alberta.ca/.

10. Electricity compensation

When an MG generates more electricity than is being consumed, the surplus electricity will (and must in most cases) be fed into the WSP's electrical distribution system. Applicants are paid by their energy retailer for the surplus of electricity. Applicants must contact their energy retailer to arrange for their electricity compensation.

Small MGs will be paid for their exported electrical energy based on the same price of the electrical energy that they are purchasing from their energy retailer. For example, if the retailer's retail energy rate is 10 cents per kWh, the MG owner will be compensated for 10 cents for each kWh generated. Note that this price does not include the price of delivering the electrical energy to the MG owner's site. The WSP will provide you with either a bi-directional cumulative meter (in most cases) or two one-way meters that will measure how much you import into your site and separately measure how much you export onto the electrical distribution system.

For large MGs that use interval meters (ones that record the electrical energy flow every 15 minutes) you will be paid the system marginal price of Alberta's wholesale electricity market. This pool price is shown in units of $/MWh (megawatt-hour). (e.g., $60 per MWh is equal to 6 cents/kWh).

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

11. Obligations

Micro-generator owner obligations

- All costs of operating the MG are the responsibility of the MG owner as per the WSP interconnection agreement.
- Contact your neighbours and those affected by your proposed installation and notify them of your intent to install MG equipment.
- If you are not meeting the requirements stated in the AUC Rules 007 and 012, you must follow the procedures stated in AUC Rule 007, Section 4 – small power plant application less than 1 MW, to submit an application to the Commission for approval.
- Contact your WSP to notify them of your intent to install a MG.
- Contact your energy retailer to inform them of the MG installation date.
- Complete all steps as required described in this Micro-Generator Application Guideline document. Wind proponents are required to check with NAV Canada, Transport Canada, and Alberta Transportation to ensure that the wind turbine tower is meeting their requirements.
- Application notices are limited to one generator type per site. If you are installing more than one MG you must submit a separate application notice for each MG.

Retailer obligations

- Act as a participant of the AESO's electricity market by crediting the MG applicants for excess electricity sent back to the grid.
- Ensure that exported electricity will incur a credit on the applicant's bill to be carried forward to the next bill.
- Ensure unused credits are paid to applicants once a year or as negotiated.

Wire service provider obligations

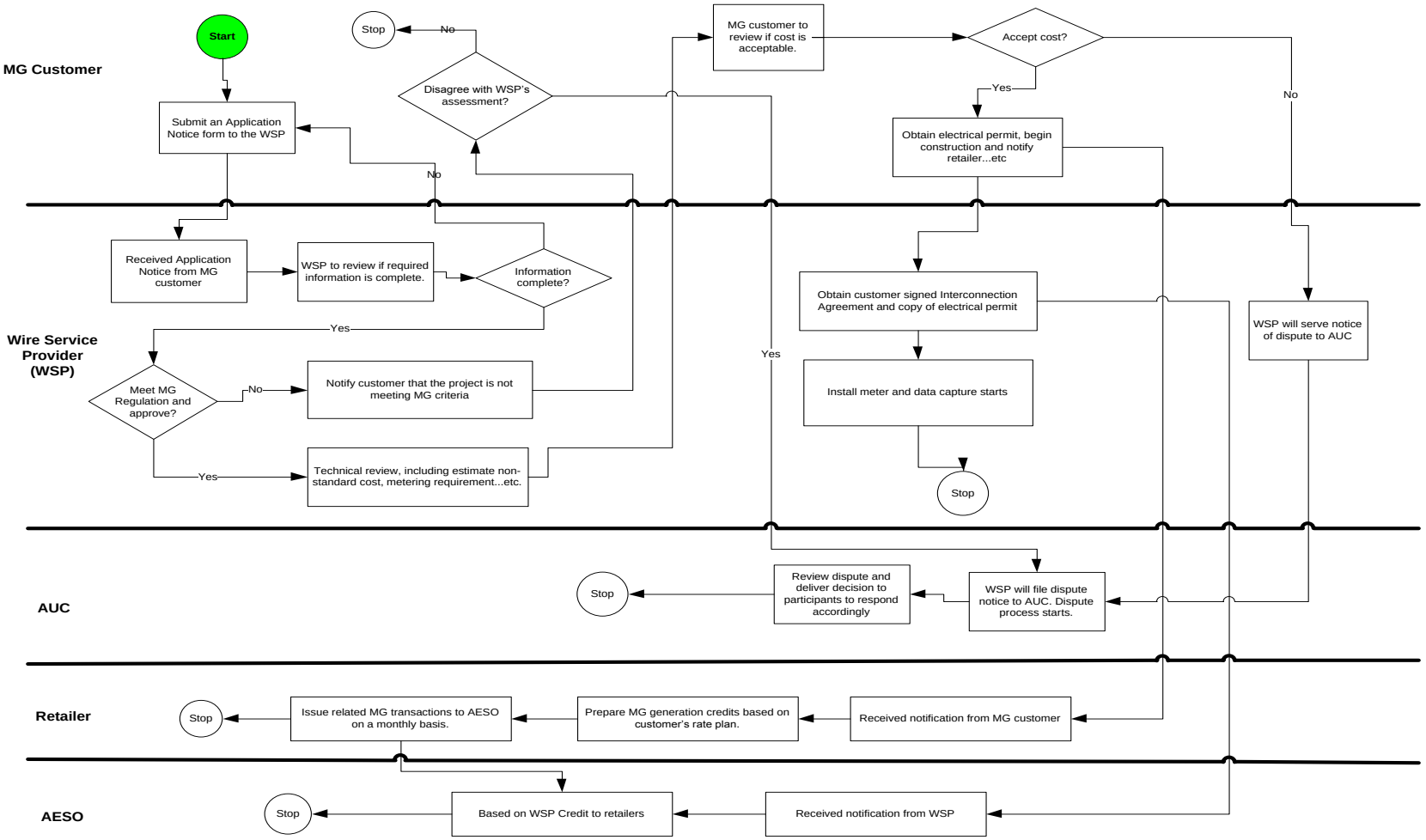
- Responsible for determining whether a MG qualifies as a renewable or alternative energy resource under the *MG regulations*.
- Install an appropriate metering device that will separately measure the imported and exported electricity.
- Cover all the metering, meter data handling and any installation costs incurred by the MG. These costs are to be added to the rate base and recovered from all customers.
- Provide applicants with an interconnection agreement upon MG approval.
- Provide applicants with a letter confirming their MG approval and grid connection.
- Keep and maintain of MG application records in its service area.

Electrical contractor obligations

- Obtain an electrical permit and electrical inspection for their MG electrical work.
- Install MGs in conformance to their designs and the Canadian Electrical Code.

Appendix A – Process flowchart

MG application process



Note: This flow chart is a simplified version, detailed procedures are shown in the guideline.

Appendix B – 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 system 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 a legal certification mark from one of the accredited certification organizations and is affixed to the nameplate on the electrical equipment.

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 electricity 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 electricity 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
Generator 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 electrical safety, shock and fire hazards of electrical products 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.

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

Distributed generator (DG)
Electric generator that is connected to a distribution system.

Distributed generator (DG) source disconnect
A disconnecting switch placed between a generator's output terminals and the wiring of its electrical loads and a distribution system.

Distributed generator (DG) system disconnect
A disconnecting switch placed between a generator's output terminals and a distribution system required to ensure the safety of electrical utility workers**.**

Distribution panel
Electrical box that contains over-current devices between its source circuit and a building's branch electrical 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 an electrical current.

Electric single-line diagram (SLD)
Basic roadmap made up of single lines and graphic symbols that show the interconnections of the electrical circuit or system of circuits.

Energy retailer
Either an independent government-licensed electricity marketing company that supplies electricity at competitive unregulated prices to its customers, or an entity appointed by the wires owner to provide a regulated rate option to customers. Both entities bill the customer for energy consumption and wire charges.

Fuel cell generator
Generator that has hydrogen as its energy source and employs a non-combustion electrochemical reaction as the energy conversion mechanism

Generator
Device that converts energy from one form into electrical energy.

Generator rated capacity (kW)
Basic measurement unit for electrical energy. It is the rate at which electrical energy is produced by a generator at a defined set of operating conditions. A kWh is simply the rate (measured in watts) at which electrical power flows in a circuit multiplied by the time (measured in hours) that the power is flowing at that rate. For example, one kWh equals 1,000 watts flowing for one hour, or 100 watts flowing for 10 hours.

Note: The rated output is less than but usually close to the maximum output.

Grid-connected inverter
Inverter that is able to operate in parallel with a distribution system.

Note: A grid-connected inverter is also known as a grid-intertie or a grid-tied inverter.

Grid-dependent inverter
Grid-connected inverter that operates only in a grid-dependent mode and depends on the power from the utility grid to initiate and continue the inverter's operation.

Hydro-generator
Generator that uses moving water as its energy source.

Inverter
An inverter is an electronic device that converts DC electricity into AC electricity and acts as the interface between your electricity generator and the WSP's electrical distribution system. Electricity from your generator (solar PV, fuel cells, wind turbines, 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. In Alberta this service is provided by Alberta Electric System Operator (AESO).

Induction generator
Device that converts the mechanical or rotational energy into electricity based on electromagnetic induction.

Islanding
Portion of the electrical distribution system that contains both loads and generators and is isolated from the remainder of the distribution system, but remains energized. Islanding is not permitted in Alberta.

Micro-generator
Typically a residential or small commercial generator with a capacity less than or equal to one MW that is connected to the electrical distribution system. The electricity produced is for personal use and it is generally expected that on an annual basis generation will be equal to consumption.

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

Over-current device
Electrical fuse or circuit breaker

Renewable or alternative energy
Electrical energy generated from solar, wind, hydro, fuel cell, biomass or another generation source where the greenhouse gases associated with its generation have a production rate less than or equal to 418 kg of greenhouse gases per MWh of electrical energy generation.

Retailer
See energy retailer

Revenue meter
Single bi-directional meter or two one-way meters; one for import and one for export. The meter measures the electrical energy (and other characteristics of electricity) that flow between a distribution system and a customer. The data is used to generate a bill or credit to the customer. Revenue meters are owned and maintained by wire service providers and must be approved by Measurement Canada.

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

Solar photovoltaic (PV) generator
Generator that uses solar radiation as its energy source.

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

Synchronous inverter
Electrical inverter that changes direct-current (DC) electricity to alternating-current (AC) electricity.

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

Wind generator
Generator that uses moving air as its energy source.

Wire service provider (WSP)
Company that operates and maintains a distribution system.

Appendix C – 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

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

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

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

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

Alberta Utilities Commission (AUC) Rule 007, Checklist for small power plant applications and exemptions
http://www.auc.ab.ca/acts-regulations-and-auc-rules/rules/Documents/Rule%20007/Electric%20small%20power%20plant-exemption%20checklist%20April%2021%202011.doc

AUC Rule 007
http://www.auc.ab.ca/acts-regulations-and-auc-rules/rules/Documents/Rule007.pdf

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

AUC Micro Generation Regulation
http://www.auc.ab.ca/acts-regulations-and-auc-rules/acts-and-regulations/Documents/EUA/AR288-2009.pdf

AUC Digital Data Submission (DDS) User Guide
http://www.auc.ab.ca/applications/filing-an-application/Documents/DDS%20User%20Guide.pdf

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

NAV Canada
http://www.navcanada.ca

Retailer and WSP list

Utilities Consumer Advocate (provided by government of Alberta)
http://ucahelps.alberta.ca/energy-companies.aspx

Utilities Consumer Advocate
www.ucahelps.gov.ab.ca

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

The following two single-line diagram forms are samples only. If applicable, draw your own SLD to show the specific details for your system.

SLD No. 1

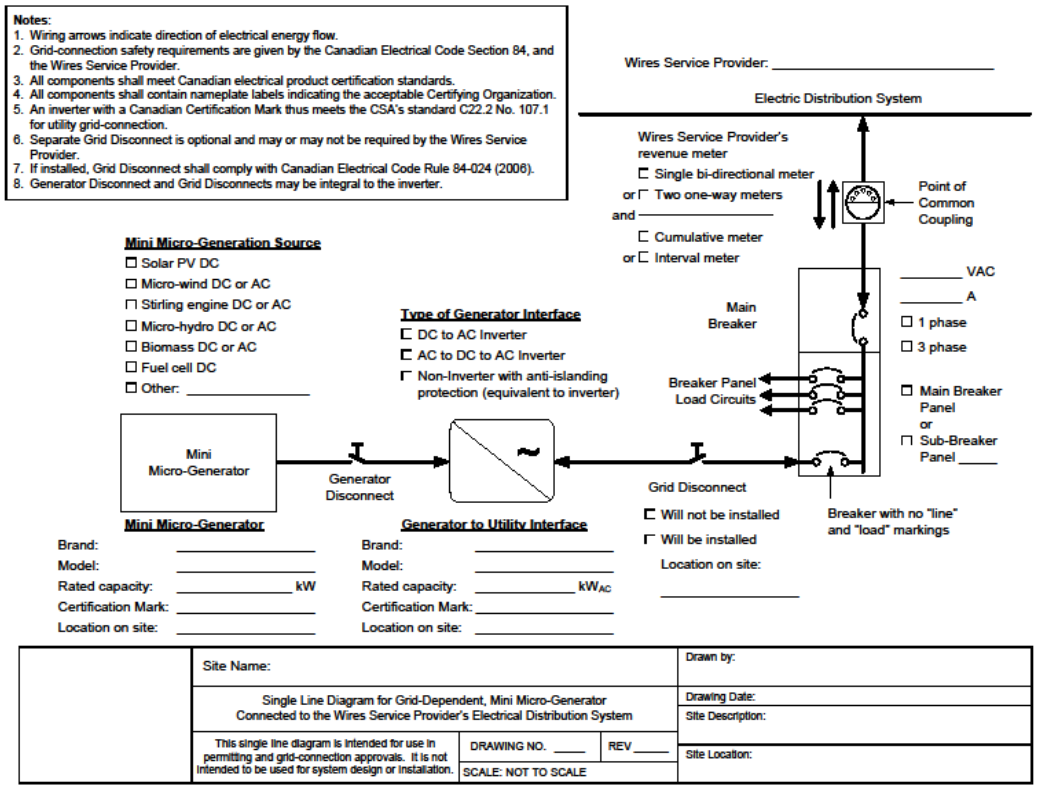


Diagram Courtesy of Howell-Mayhew Engineering

SLD No. 2(indicate size)

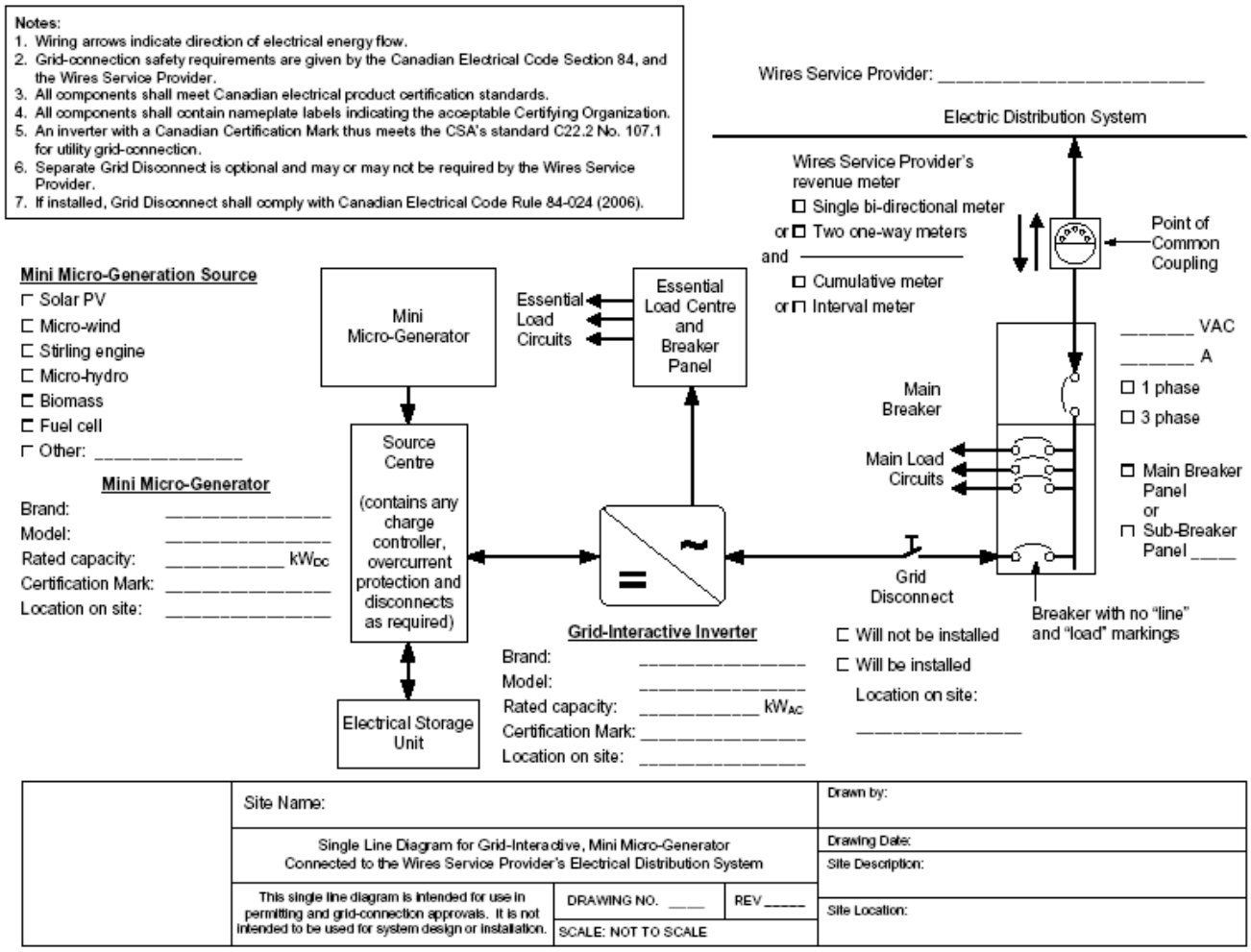


Diagram Courtesy of Howell-Mayhew Engineering

Appendix F – Interconnection and operating agreement sample

The following two documents are samples only. Wire owner may modify an agreement for MG with generation capacity with over 10 kW.

Sample No. 1 - **Interconnection and operating agreement (less than 10 kw inverter based)**

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

In consideration of <Utility Name Here> (the "**wires 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 "**terms 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)**

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

This agreement between _____ (the "**MG customer**") and _____ (the "**wires 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:_____

Form A - Generation project (less than 1 MW) notice

< Enter Wire Service Provider Name Here>

Check one of the following boxes to identify your project:

Micro-generation Project ☐ - Less than 1 MW (project meets micro-generation requirements)
Are you an existing micro-generation customer? Yes ☐, existing capacity:____ kW; No ☐

Non Micro-generation Project ☐ - Less than 1 MW

APPLICANT IDENTIFICATION			
Name:		Company name:	
Address:		City:	
Province:	Postal code:	Phone:	Fax:
Email address:		Preferred method of contact: Email ☐ Mail ☐ Fax ☐	
Consultant name:		Consultant phone:	
Consultant address/city/province/postal code:			
Other interested parties:			
PROJECT DESCRIPTION			
Legal land description:		Site ID:	
Service address:		Retailer name:	
If this is a MG project, have you notified your retailer about your project? Yes ☐ No ☐			
Generator type: Solar ☐ Wind ☐ Hydro ☐ Biomass ☐ Fuel cell ☐ Other ☐ Specify:			
Generator to utility interface: Inverter ☐ Non-Inverter ☐ Induction ☐ Synchronous ☐			
Generator rated capacity (kW):	Demand (kVA):	Customer annual consumption (kWh):	
Voltage level of connection:		Phase: Single ☐ Three ☐	
Is the electricity produced to be used primarily by the generation owner? Yes ☐ No ☐ If you are applying for a non MG project, are you selling electricity to the AESO? Yes ☐ No ☐			
Does your generator unit satisfy Anti-Islanding Clause CSA Standard C22.2 107.1? Yes ☐ No ☐			
If you are applying for a MG project, does your generator meet Micro-Generation Regulation's Renewable/Alternative Energy Definition? Yes ☐ No ☐			
Requested in service date (YY-MM-DD):			
SUPPORTING DOCUMENTS ATTACHED:			
Electric single-line diagram attached: Yes ☐ No ☐		Site plan: Yes ☐ No ☐	
Has an electrical permit been obtained? Yes ☐ Not yet ☐ Have you met all applicable municipal and zoning requirements, including noise rules? Yes ☐ No ☐ Please specify:_____ * Have you met the requirements stated in AUC Rules 007 and 012? Yes ☐ No ☐ Please specify: _____ * Have you met all applicable environmental requirements? Yes ☐ No ☐ Please specify:_____ * Are you aware of any outstanding objections from nearby landowners or residents regarding your project ? Yes ☐ Please specify:_____ No ☐			
Applicant signature:		**Date of application:**	
WIRE SERVICE PROVIDER USE ONLY:			
Wires owner's application reference #:		AESO asset ID (if any):	
Date received:		Interconnection line:	
Approval: Yes ☐ No ☐ Reason(s) for disapproval:			

Interconnection agreement signed? Yes ☐ No ☐ Not applicable ☐	
Meter type: Interval ☐ Cumulative ☐	Substation number:
Meter installed date:	

*Note: If you have not met the requirements of the AUC Rules (i.e. 007 and 012, including environment) or have objections from nearby landowners and residents, you MUST apply to the Commission for approval.

Appendix H – Form B - Notice of dispute

To be completed by applicable owner when there is a dispute with respect to the customer's eligibility of becoming a micro-generator or issue on extraordinary costs. Information required must include the following:

Contact person for the dispute notice:	Name: Phone:
Is applicable owner represented by another person?	Yes ☐ No ☐ If yes, provide name and contact information:
Is a copy of the MG project notice (Form A) attached?	Yes ☐ No ☐
Rejection type:	☐ Qualification (MG Regulation – Section 2.2) ☐ Extraordinary costs (MG Regulation – Section 4.3)
If dispute is related to Section 2.2, has owner served notice on customer within 14 days?	Yes ☐ No ☐
Rejection rationale:	
Other information attached:	

Date of submitting this notice_____

Appendix H – Form C, Notice of complaint

To be completed by customer when there is a complaint on the metering cost. Information required must include the following:

Contact person who submits the complaint notice:	Name: Phone:
If customer is represented by other party?	Yes ☐ No ☐ If yes, provide name and contact information:
Attached a copy of the MG project notice (Form A):	Yes ☐ No ☐
Type of complaint:	☐ Interval metering costs (MG Regulation Section 3 (5))
Provide full details of the complaint:	
Other information attached:	

Date of submitting this notice_____

Appendix I – How to apply for a BA code (Business Associate Identifier)

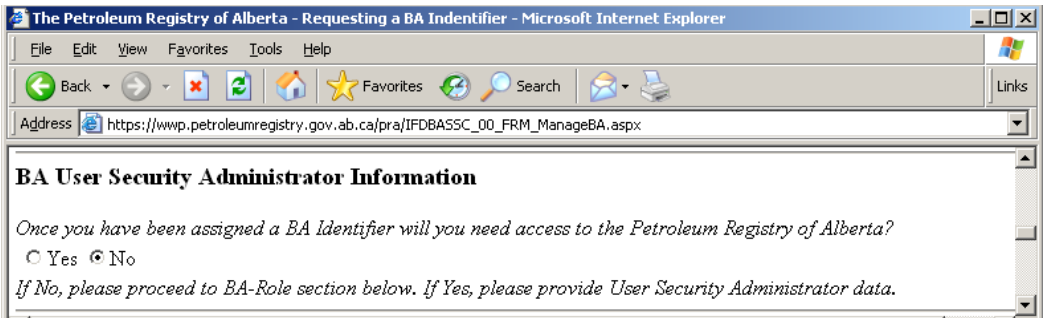
How to Apply for a BA Code (Business Associate Identifier)

To apply for a BA Code you must fill out the Petroleum Registry On-line Form:
http://www.petroleumregistry.gov.ab.ca/PR.asp

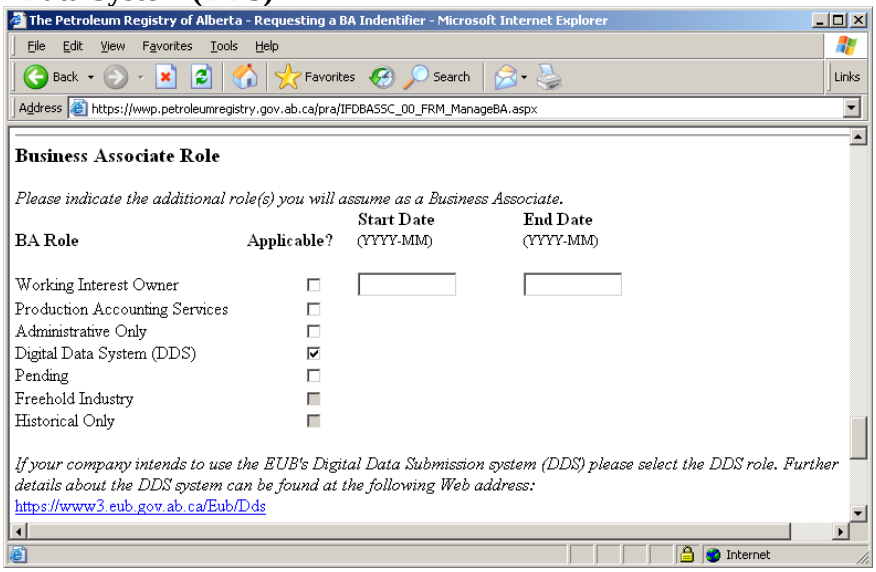
1. Choose **Apply for Access** near the bottom of the window.
2. Choose **Apply for Access** in the box at the bottom of the window.

Notes for Filling Out the Application

1. Fill out **General Information** Section
2. Fill in **Contact Person Information** Section
3. Fill in **Alternate Address(es)** Section – if applicable
4. **BA User Security Administrator Information** Section
   - Choose **No**
   - then SKIP Security Administrator sections

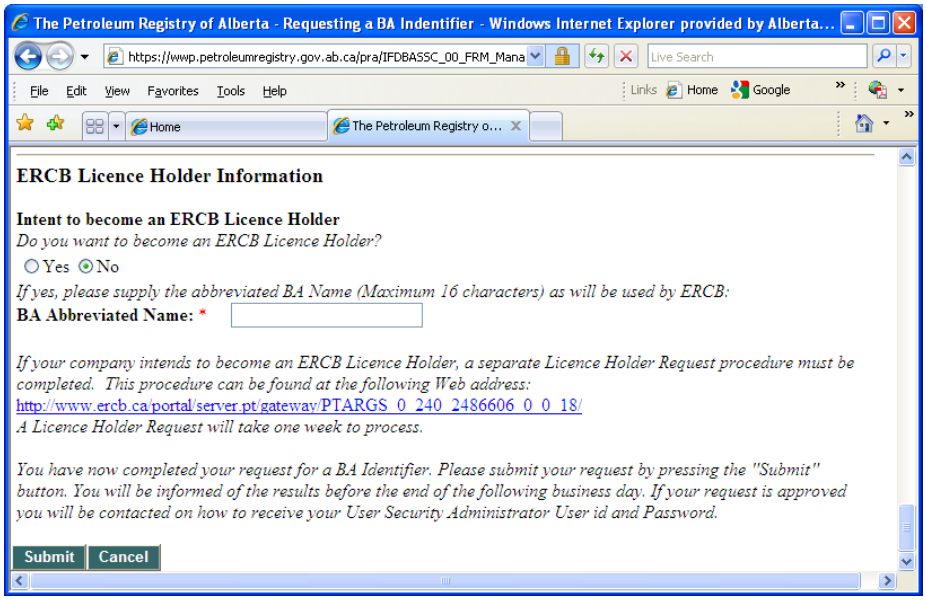


5. **Business Associate Role** Section
- Choose **Digital Data System (DDS)**



6. **ERCB Licence Holder Information** Section

- Choose **No** (*this is for gas wells only*)



7. Click Submit when you're done

Problems?

Please contact the Petroleum Registry of Alberta Service Desk.
Choose the tab entitled Service Desk on the Petroleum Registry homepage for contact details.

Registry Service Desk

Questions related to the submission to or retrieval of information from the registry should be directed to the Petroleum Registry.

Phone: 403-297-6111 (in Calgary)
Phone: 1-800-992-1144 (other locations)
Fax: 403-297-3665
Email: petroleumregistry.energy@gov.ab.ca

Appendix J – Electrical safety

Any system that produces 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 is governed by health and safety standards. This includes ensuring that all safety information is kept up to date.

Before an MG 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 Standata Electrical Information Safety 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 D for details. See also:
http://www.municipalaffairs.alberta.ca/documents/ss/STANDATA/electrical/330-LEG-ECR-2unsigned.pdf

Grid-connected inverters are required to be approved to Clause 15 of the Canadian Standards Association (CSA) inverter standard. (C22.2 No.107.1) Clause 15 of this standard ensures that the inverter will properly shut down during a power outage. This shut down is called 'anti-islanding' and is of utmost importance to Wire Service Providers.

If inverters carry a certification mark that is complete and identical to one of the marks in Appendix D, 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 CSA directly at certinfo@csa-international.org or 416-747-2661 or 1-866-797-4272.System Installed According to the Canadian Electrical Code.

MGs need to be designed and installed according to the minimums laid out by the CE Code. Your MG installer needs to be certified to do this. Note, Section 84 of the CE Code and its rules regarding the need for warning notices and disconnects on MGs.

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 MGs use inverter interfaces. Grid-connected inverter-based units are certified to shut down during outages in the electrical distribution system. Inverter-based small MGs must have a direct visible means to indicate the connection status (i.e., either connected or disconnected).

Equipment documentation

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

Small and large MGs must also include documentation confirming that they meet Canada's standard for anti-islanding which is CSA C22.2 No. 107-1.

Inspection

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

Maintenance

Routine maintenance of MGs 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 K - Electrical contractor and electrical inspection

Electrical contractor

It is highly recommended that you hire a certified electrical contractor to install your MG. 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 contractors licence (where required)
Adequate liability insurance
References

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

Electrical inspection

Before the MG can be connected to the WSP'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 (CE Code) and does not pose a hazard to MG owners, their families, friendsor employees. It also provides an assurance that the installation will not be a hazard to WSP 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 the safety standards have been met for:

1. Approved equipment
   The inspector will confirm that MG owners are using equipment approved by Part 2 of the Canadian Electrical Code and that installation is in accordance with Part 1 of the Canadian Electrical Code.

2. Disconnecting means
   The inspector will verify that a second disconnect means (intended to protect utility workers) is installed if required in the location specified by the local distribution company.

   The inspector will verify that this disconnect is properly sized to handle the electrical output and that it is wired to simultaneously disconnect all ungrounded conductors of the generator from the distribution supply system.

3. Appropriate labelling
   The inspector will look for required labelling as per the CE Code and local regulations.