Micro-generation notice submission guideline

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AUC
Alberta Utilities Commission

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Introduction

This guideline provides specific safety, electrical and procedural aspects and a summary of the processes required to obtain approval for micro-generation connection to the grid. It also outlines obligations of micro-generation applicants (customers), electrical contractors, energy retailers and owners, and provides information about connecting micro-generation to the electrical grid. **An "owner" refers to an owner of an electric distribution system in the service area where the customer plans to construct or alter and operate a micro-generation generating unit.**

Installation must be done with careful consideration to legal matters, safety, and equipment.

Background

The *Micro-Generation Regulation*, enacted in 2008, simplifies the process by which Albertans using renewable resources or alternative energy obtain 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 owners. More detailed information on the process and rules on micro-generation in Alberta can be found in Rule 024: *Rules Respecting Micro-Generation.*

Micro-generation generating units are sized to offset all or a portion of the customer's total energy consumption. Albertans who 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.

Micro-generation generating units that produce more energy annually than has been historically consumed at the customer site are not eligible and will be denied by the owner. Future load additions (e.g., newly purchased equipment that will consume electricity) may be considered if there is sufficient evidence acceptable to the owner (e.g., proof of non-refundable purchase with a unique customer identifier, stamped engineering drawings or reports, post-installation inspection reports for new loads, etc.) that consumption will increase. Micro-generation generating units that are found to be not in compliance with the owner's terms and conditions and interconnection operating agreements may be disconnected.

Disclaimer

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

Note:
The terms applicant, customer, micro-generation owner, micro-generation project proponent, micro-generation customer, you and your, have the same meaning and are used interchangeably throughout this document for ease of readability.

Differences between micro-generation, small scale generation and distributed generation

Customers may find it helpful to understand the differences between micro-generation, small scale generation and distributed generation to ensure that a project proponent is applying for the correct classification for their generating unit. The major differences are listed below:

	Micro-generation	Small scale generation	Distributed generation
Fuel sources	Must use renewable resources or alternative energy	Must use renewable resources or alternative energy	Can use renewable or non-renewable resources
Generation capacity	Less than five megawatts	Up to the limit of the electric distribution system hosting capacity at the interconnection point	Up to the limit specified by the owner
Compensation method	Receive credits from retailer which are applied to monthly electricity bill. (Please refer to Section 7 of the *Micro-Generation Regulation*)	Receive cash (based on pool prices) from the Alberta Electric System Operator for electricity generation	Receive cash (based on pool prices) from the Alberta Electric System Operator for electricity generation
Metering	Owner is responsible for the cost of installing the required meter and metering data management	Owner is responsible for the costs of metering data management. Small scale generation owner is responsible for the metering costs (except in the case of community generation, where the owner is responsible).	Distributed generation owner is responsible for the metering cost and metering data management
Pool participant	Not required to register with the Alberta Electric System Operator	Must register with the Alberta Electric System Operator, who acts as an agent on behalf of the small scale generator	Must register with the Alberta Electric System Operator to become a pool participant
Relationship with energy retailer	Need to notify retailer of becoming a micro-generation customer	N/A	N/A
Revenue intention	Intended for self-supply	May be designed for self-supply and/or to earn revenue	May be designed for self-supply and/or to earn revenue

Note that small scale generation units, despite some similarities to both distributed generation units and micro-generation units, are distinct from both. The *Small Scale Generation Regulation* is unique in that it contains provisions for community generation units, which are subject to a community benefits agreement (see Section 3 of the *Small Scale Generation Regulation)*. If you intend to operate a renewable or alternative energy generating unit for the primary purpose of generating revenue, or if your unit is larger than five MW, you should discuss how to apply to be a small scale generator with the owner.

Proponents seeking approval for distributed or small scale generation must follow Rule 007: *Facility Applications*.

Proponents seeking approval for micro-generation need to follow Rule 007 in relation to the participant involvement program.

In order for a generating unit to be classified as a micro-generation generating unit, the generating unit must satisfy the definition of "micro-generation generating unit" under Section 1(1)(h) of the *Micro-Generation Regulation*:

> "micro-generation generating unit means a generating unit of a customer or an energy storage resource of a customer that stores or discharges electric energy produced by the customer's generating unit that
>
> i. exclusively uses sources of renewable or alternative energy to supply electric 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 five megawatts 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)."

Legal and related matters

Electrical installations are subject to strict legal and municipal regulations including relevant health and safety legislation. Micro-generation 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.

Building regulations

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

Compensation for exported electricity

Applicants must notify their electricity retailer once their application is approved by the owner. This will ensure applicants are registered so that the retailer can apply credit for exported electricity from the micro-generation generating unit.

Electrical safety

Installing a micro-generation 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 micro-generation unit. Some municipalities prohibit homeowners from installing their own micro-generation unit, and it is highly recommended that homeowners in all municipalities hire an electrical contractor to install their residential unit. It is also advised that the micro-generation proponents consult with their insurance company regarding the micro-generation unit insurance policy matters.

Equipment certification

The installer must refer to the specifications of the micro-generation equipment and the manufacturer's installation document to confirm the micro-generation unit complies with all relevant local and provincial electrical safety requirements or standards. Micro-generation applicants are strongly encouraged to contact the owner to discuss the micro-generation equipment intended to be installed.

Additional requirements for wind and solar micro-generation units

Development of wind and solar micro-generation units may require specific approval from NAV CANADA, Transport Canada and Alberta Transportation. Approval ensures that micro-generation installations comply with requirements of air navigation, aeronautical safety and highway development control. Please contact these agencies directly to discuss your project and applicable requirements.

Micro-generation approval processes

Approval for micro-generation installation is provided as follows:

i. For small (i.e., less than 150 kilowatts) and large micro-generation units (i.e., between 150 kilowatts and five megawatts), the micro-generation proponent needs to submit Form A – Micro-generation notice to the owner for assessment. The micro-generation notice form is available on the AUC's and owner's websites. Once it is determined that the micro-generation project meets all requirements, the owner will notify the applicant and install the required meter.

ii. If the owner disputes that the micro-generation project qualifies as a micro-generation generating unit, then the owner would file Form B - Notice of dispute to the AUC for decision. The notice of dispute form is available on the AUC's and owner's websites. The owner can use the same form if there is a dispute of extraordinary costs for micro-generation projects. The notice of dispute must be submitted through the AUC's eFiling System. Follow the links below to access and learn how to use the eFiling System:

    eFiling System
    How to use the eFiling System

iii. For issues such as metering costs, type of meter to be installed, etc., the micro-generation applicant should file Form C - Notice of complaint to the AUC for decision. The notice of complaint form is available on the AUC's and owner's websites.

Applicable AUC Rules

All micro-generation project proponents must comply with requirements stipulated in Rule 007, Rule 012, and Rule 024. Although micro-generation applicants are not required to file applications with the AUC for approval to connect to the grid, micro-generation applicants are required to demonstrate their compliance to the *Micro-Generation Regulation* and applicable AUC rules to the owner.

AUC Rule 012: *Noise Control*

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

For example, for wind turbine projects, the permissible sound level requirements stated in Rule 012 should be met. Noise complaint issues for micro-generation projects will be dealt with in accordance with Rule 012.

Micro-generation generating units – types and size

Types

A range of simple, safe and reliable micro-generation technologies are available for domestic use. These primarily include solar, wind, hydro, fuel cell, geothermal, biomass or other generation sources, if the greenhouse gas intensity of the electric energy produced, or the total energy produced from the simultaneous generation of electric energy and production of thermal energy from the same fuel source, is less than or equal to 418 kilograms per megawatt hour.

Size

In Alberta, micro-generation size is defined as being a generating capacity less than five megawatts. This document deals with two categories of micro-generation units as follows:

Generating unit classification	Capacity size
Small micro-generation	<150 kW
Large micro-generation	> = 150 kW but < 5 MW

Example micro-generation system

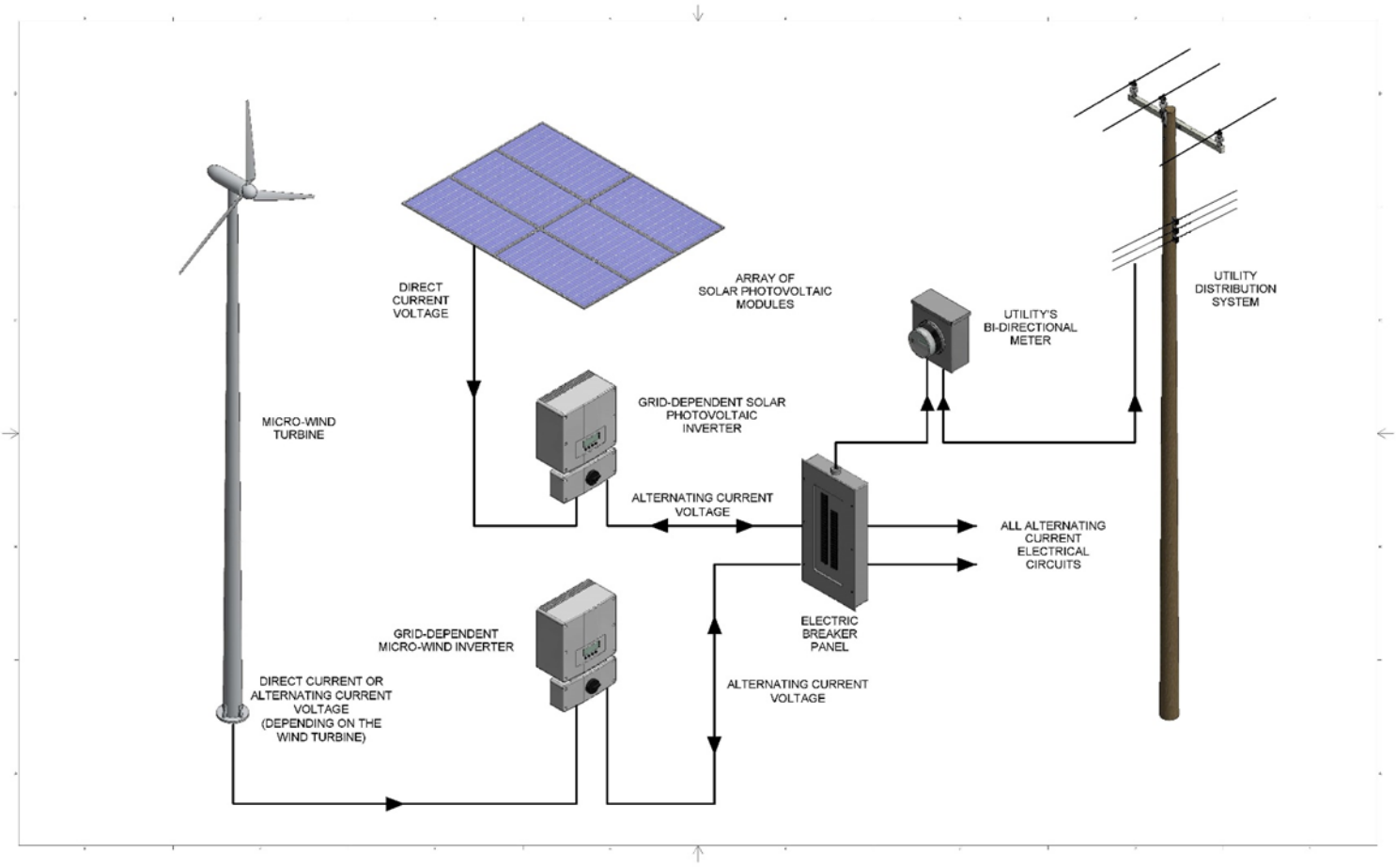

Figure 1. Example of wiring connections and devices for a grid-connected micro-generation wind and solar photovoltaic system.

Notes:

- Figure 1. is not representative of a single-line diagram to be used for application submission.
- The solar photovoltaic and micro-generation 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 for energy storage may also be included.
- Excess electricity is exported to the grid. Additional electricity is supplied from the grid.
- Refer to local electrical authorities (e.g., owners and municipalites) and *Canadian Electrical Code* for further requirements.
- See steps three and four of the micro-generation application process summary for further details.

Principal stakeholders

Since the micro-generation unit will be connected to the electrical distribution grid, several governing bodies are involved in ensuring system safety, the processing of approvals and managing the administration. These include:

Alberta Utilities Commission:
Sets out requirements for micro-generation sites and specifications. Make decisions about micro-generation if a dispute arises.

Alberta Electric System Operator:
Reports on the number of micro-generation sites and installed capacity.

Energy retailer:
Provides credits to micro-generation customers on a monthly basis and manages the administration requirements.

Electrical inspectors:
Ensure *Canadian Electrical Code* standards are met for all micro-generation installations.

Owner:
Provides metering and connection of the micro-generation generating unit to the distribution system.
See the glossary in Appendix A for descriptions of each principal stakeholder.

Micro-generation application process summary

This section provides a quick summary of the steps that need to be taken to become a micro-generator. The steps are not necessarily in sequential order as many need to happen in parallel.

The purpose of the *Micro-generation Regulation*, in part, is to promote self-supply by renewable energy sources, and to simplify regulatory approvals and the overall interconnection process for micro-generators.

The AUC encourages owners to provide milestone and expected work completion timelines to customers both following the receipt of Form A - Micro-generation notice and whenever changes occur during the process. Owners are encouraged to promptly identify and explain any outstanding requirements or conditions for project approval and connection, including any upcoming changes to technical requirements with an effective date for those changes.

In addition, the AUC encourages customers to provide fully completed micro-generation notices. The AUC reminds applicants that their generating unit must be intended to meet all or a portion of customer's total annual energy consumption at the customer's site or aggregated to meet the requirements of a micro-generation generating unit. Customers should respond to owners' questions or requests promptly and as fully as possible, and to provide all requested information and documentation to the best of their knowledge and ability.

1

Plan your micro-generator installation

- Consult with your neighbours and any landowners or residents that will be affected by your project. For example, there may be visual concerns for solar installations and visual and noise concerns for wind turbine installations.
- Check municipal permit requirements and noise bylaws.

2

Contact your electric energy retailer

- In order to obtain compensation for electrical energy exported onto the electricity distribution system, a micro-generator must notify the electricity energy retailer that they intend to become a micro-generator. It is also recommended to notify the retailer of the micro-generation unit's connection date.
- Refer to the Retailers and Distributers page of ucahelps.alberta.ca for a list of all energy retailers.

3

Contact the owner

- Micro-generation project proponents must contact the owner and inform them of plans to install a micro-generation unit. The micro-generation proponent must provide all required information to the owner. It is important to communicate your project plan prior to any micro-generation unit construction. See Appendix B for contact information.
- If the micro-generation capacity is less than five megawatts and complies with all requirements as stated in Rule 024, the owner will assess the application for metering and connection. Micro-generation project proponents are required to meet the owner's terms and conditions for connection and sign an interconnection and operating agreement with the owner.

4

Micro-generator information requirements by owner

- Download and read the owner's technical requirements from their website. All required documents must be submitted to the owner for review. The information requirements consist of equipment safety and information. It is advised that micro-generation project proponents also download and read the owner's terms and conditions document for connecting their generation unit.
- Appendix D provides samples of interconnection and operating agreements. It is also important for micro-generation proponents to communicate their generation plan with the owner prior to any generation equipment purchase or start up.

5

Electrical consultation

- Consult with one or more certified electrical contractors and/or engage licensed engineering consulting firms.
- It is recommended that all electrical work be done by certified and experienced electrical contractors and/or engineering firms. Installing a micro-generation unit is beyond the scope of most do-it-yourself projects. Safety is imperative. Refer to the local electrical authority and the *Canadian Electrical Code* for further requirements.

6

Confirm your legal land description

- Your legal land description is required when filling out Form A - Micro-generation notice .
- If you do not know this information, contact an Alberta Registry agent or local municipal taxation office for help.

7

Additional requirements for wind and solar micro-generation units

- Wind and solar micro-generation units may require approval from additional regulatory bodies including NAV CANADA,
  Transport Canada and Alberta Transportation.
- Wind-turbine micro-generation proponents also need to be aware of Rule 012. Micro-generation proponents are required to comply with the noise bylaws of their municipality as well as Rule 012.

8

Prepare site plan

- Prepare a site plan or picture to illustrate where the micro-generation unit will be located.
- A site plan may be required for the municipal development permit.

9

Prepare a single-line diagram

- Micro-generation applicants need to submit an electrical single-line diagram with Form A - Micro-generation notice to the owner. Samples of single-line diagrams are provided in Appendix C.
- Form A - Micro-generation notice for large units (greater than or equal to 150 kilowatts) will require a single-line diagram stamped by a professional as designated by The Association of Professional Engineers and Geoscientists of Alberta (APEGA) or The Association of Science and Engineering Technology Professionals of Alberta (ASET).

10

Confirm equipment certification

- Physically check the electrical certification mark on all equipment to ensure it is meeting the appropriate Canadian standards.
- Contact the owner or local electrical inspector for questions on equipment certification. Refer to applicable owner interconnection requirements for certification details.

11

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 micro-generation equipment.
- Note: some municipalities may not permit wind turbines to be installed on residential properties in urban locations.

12

Complete Form A - Micro-generation notice

- Complete Form A - Micro-generation notice along with all applicable documents. Rule 024 and owner websites have the micro-generation notice form available for download.
- Applicable documents may include:
  - electrical single-line diagram of the micro-generation system
  - site plan or pictures to illustrate the micro-generation unit location
  - equipment specification from manufacturer
  - applicable certification document(s)
  - electrical permit
  - electrical inspection report (to be submitted after micro-generation installation micro-generator(s) is completed and inspected)
  - documentation verifying that the generator meets the less than or equal to 418 kilograms per megawatt hour limit specified in the *Micro-Generation Regulation* (combined heat and power unit)
  - development permit
  - building permit
  - noise documents related to wind turbine generator
  - environmental impact assessment documents
  - proof of existing site consumption and any new site consumption additions (including calculations, proof of purchase and proof of installation)

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Submit Form A - Micro-generation notice

- Submit the micro-generation notice form to the owner along with the related documents.

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Micro-generation project review

- During the review process, the owner may contact the micro-generation applicant requesting additional information for clarification. If the application is approved, then the owner will proceed with the micro-generation meter installation and grid connection.
- An owner cannot reject a micro-generation notice. If they don't consider the micro-generation project meets the micro-generation criteria as stated in the *Micro-Generation Regulation*, they are required to file Form B - Notice of dispute with the AUC. The AUC will then determine whether or not the micro-generation unit meets the criteria.
- An owner may require upgrades to applicable customer owned equipment, their service or the owner's system to ensure their micro-generation unit can be safely connected to the grid. If the owner determines that the costs of connecting a particular micro-generation unit are extraordinary, and the Commission agrees, then the owner may require the proponent to reimburse the extraordinary portion of the costs. In these circumstances, the owner files a completed Form B - Notice of dispute to the Commission and the matter is addressed in a formal AUC proceeding.

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Owner approval

- The owner will provide the micro-generation applicant with a confirmation when the micro-generation project is approved and arrange appropriate meter installation and grid connection.
- For micro-generation dispute or complaint notices, the AUC will follow the application review process and make a decision. The micro-generation project proponent and the owner are responsible for the required actions as stated in the AUC's decision.

16

Install your micro-generation unit

- It is strongly advised that micro-generation project proponents engage certified and experienced electrical contractors or licensed engineering firms for installation of a micro-generation unit.

17

Application for electrical inspection

- After the micro-generation 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 owner.
- An electrical inspection report is to be submitted to the owner after the micro-generation unit is installed.
- Note: consider obtaining copies of the certificate of inspection and all related documents.

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Meter or service line modifications

- The owner makes any modifications that may be required to the meter or the owner's system to ensure their micro-generation unit can be safely connected to the grid. The proponent may be responsible for costs as determined by the owner.
- Where necessary, micro-generation applicants will be offered either a bi-directional cumulative meter or a bi-directional interval meter. The owner will install the required meter in accordance with the micro-generation unit classification specified in the *Micro-Generation Regulation*.
- The owner will only connect the micro-generation units that meet all safety and connection requirements.
- Large micro-generation applications will have additional requirements that typically require further time prior to compensation.

Guidelines for filing Form A - Micro-generation notice

Micro-generation proponents can access the Form A – Micro-generation notice from Rule 024.The following guidelines provide detailed information to help applicants complete the micro-generation notice form.

Section one: 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 micro-generation unit.

Customer contact information
Enter your address, phone number, fax number (optional) and email address.

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 micro-generation unit. This could include a property owner or a business partner.

Section two: Consultant identification

Consultant name
Enter the name of the person or company who has aided you in completing your Form A - Micro-generation notice, if applicable. The consultant will be regarded as the second line of contact in the event the owner cannot reach you if further clarification is needed.

Consultant contact information
Enter your consultant's phone number, email address and current business mailing address.

Section three: Project description

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

Address options, enter one of the following:
These addresses are described fully in Rule 021: *Settlement System Code Rules* found in Table 5. titled "Site ID catalogue transaction (SID)".

Civic address
Format: unit number, house number, street name, street direction, city/town name

Lot/block/plan
Format: legal lot, block, government plan ID

Rural address (also known as "911 address" or "blue sign address")
Format: address lot ID, address pre-road number, address road type, address post road number
Example: "54 26540 Range Road 11"

Legal land description
Format: legal subdivision (LSD), LSD quadrant, quarter section, section, township, range, meridian

Unformatted address
(If no other address format available)

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

Site ID(s)
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 electricity utility bill. If you are aggregating sites, please enter all the site IDs.

New utility installations require a new site ID. Contact your owner and inform them of your plans to install a micro-generation site and be assigned a site ID.

Service address(s)
Enter the service address where you plan on installing the micro-generation unit, in the first line.

Examples:

Home installation
If you want to install a solar photovoltaic 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 aggregate sites, enter the address for each site. Micro-generation proponents should indicate which site ID has the physical micro-generation generating unit attached.

Retailer name(s)
Enter the energy retailer name for the site where you plan on installing the micro-generation unit. If the project involves aggregated sites, enter the energy retailer name corresponding to each site to be aggregated. Note 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 micro-generation unit you are installing. If your micro-generation energy source is not listed select 'Other' and provide specific details on the generating unit type.

Micro-generation notice applications are limited to one type of micro-generation unit. If you are installing more than one type of micro-generation technology, you must submit a separate Form A – Micro-generation notice 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 power supplied by your energy retailer and delivered by the owner (e.g., may be applicable for new loads).

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 micro-generation generating units on the market today are inverter-based.
Answer yes or no to the following questions:

- Do the inverters comply with "CSA Standard C22.2 107.1 – Power Conversion Equipment" in particular standards respecting "Anti-islanding"?
- Do the inverters comply with the appropriate UL 1741 Supplement Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources, i.e., the specific Supplement that is required by the owner? Consult with the owner for the specific relevant standard.
- Have you reviewed the applicable owner's micro-generator interconnection requirements and terms and conditions?

If you have inverter(s) in your micro-generation unit(s), does it comply with Canadian Standards Association anti-islanding requirements?

In order to meet the Canadian Standards Association (CSA) anti-islanding requirements, your micro-generation 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 micro-generation unit so it does not compromise the safety and electrical power quality of the utility grid.

The nameplate on your micro-generation 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 islanding?

An electrical island is where a portion of the owner's electrical distribution system is isolated from the remainder of the distribution system, but remains energized and operational.

The principal concern is that an owner's power line technician will come into contact with a line that is unexpectedly energized. Although power line technicians are trained to test all lines before working on them, all measures and precautions must be taken to ensure removal of risk.

What is anti-islanding?

Anti-islanding is an electrical function that shuts down the operation of a micro-generation unit during a utility electrical outage. Its purpose is to protect the owner's power line technicians from accidentally working on energized electrical distribution lines.

How does anti-islanding work?

Technology developed for micro-generation units is specifically designed so there is practically no chance of an island stemming from a micro-generation 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 micro-generation units need to follow additional electrical codes and technical interconnection requirements. Contact the owner for details.

Micro-generation generating unit(s) total nameplate alternating current capacity

Enter the rated alternating current capacity of your generating unit. Your micro-generation equipment will have a label identifying its nameplate kilowatt (kW) capacity.

Estimate alternating current demand

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

Estimate customer annual energy consumption

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

Based on the nameplate capacity of the micro-generation unit, the micro-generation proponent should calculate or estimate how much alternating current electric energy can be generated from the generating unit per year.

Voltage level of connection

Micro-generators are responsible for ensuring the voltage levels at the point of interconnection are meeting owners' 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 micro-generation units will select single-phase and large micro-generation units will select three-phase. Contact the owner for confirmation.

Section four: Supporting documents required

Indicate if you have attached the following supporting documents:

Electrical single-line diagram

An electrical single-line diagram provides a basic connection configuration between the electrical components of your micro-generation unit and the owner's electric distribution system.

For larger micro-generation projects, professional engineers or technologists may be required to stamp the single-line diagram drawings, certifying that the connection has been correctly designed and could be connected safely. This has to be provided to the owner prior to connecting the micro-generation 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 micro-generation unit is to be located.

A site plan should include:

- arrow indicating north
- scale of the drawing (for example, one centimetre to 10 metres)
- property lines
- adjacent streets
- distance between buildings and between buildings and property lines
- dimensions of existing buildings
- location of your micro-generation 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 electrical permit is a legal document that ensures your micro-generation unit is inspected to meet the electrical code. Micro-generation 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 micro-generation project proponents have no training or knowledge about electricity, it is recommended they engage certified electrical workers on the micro-generation project.

Electrical inspection report

Prior to any interconnection to the distribution system, you need to provide the owner with an electrical inspection report indicating your micro-generation unit has passed all the electrical inspections.

Other supporting document(s)

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 micro-generation unit installation or indicate why your municipality does not require it.

Answer the following five questions:

- Have you met all applicable municipal and zoning requirements, including noise rules and bylaws?
- Have you completed the participant involvement program stated in Rule 007?
- Have you met the requirements stated in Rule 012?
- Have you met all applicable environmental requirements?
- Are you aware of any outstanding objections from any person regarding your project?

Requested in-service date

Identify the anticipated date to have the micro-generation generating unit in service.

Additional wind and solar requirements

Developing wind and solar micro-generation projects may require specific approval from agencies such as NAV CANADA, Transport Canada and Alberta Transportation.

The following steps may need to be taken in order to receive relevant approvals from these agencies:

1

NAV CANADA

Wind turbine towers and blades and solar facilities can adversely affect air navigation in some locations. Applicants may need to complete NAV CANADA's Land Use Proposal Submission Form and obtain their approval for a wind or solar micro-generation unit. For more information, visit NAV CANADA's website at navcanada.ca.

2

Transport Canada

Wind turbines and solar facilities can be an aircraft hazard in some locations. Applicants may need to complete Transport Canada's Aeronautical Obstruction Clearance Form and obtain their approval for a wind or solar micro-generation unit. For more information, visit Transport Canada's website at tc.gc.ca.

3

Alberta Transportation and Economic Corridors

Approval is required for wind turbines, certain solar projects or any other development located within specific distances to numbered highways and public roads. Applicants may need to complete Alberta Transportation's "Roadside Development Application for Development Near a Primary Highway" form and obtain their approval for a wind or solar micro-generation unit or other micro-generation unit located close to a road. For more information, visit Alberta Transportation's website at alberta.ca/transportation-and-economic-corridors

Section five: Electric distribution system owner use only

This section is to be filled out by the electric distribution system owner. Micro-generation applicants should leave this section blank.

Electricity compensation

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

Small micro-generation units will be paid for their electrical energy supplied out of the micro-generation 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 consumption price is 10 cents per kilowatt hour, the micro-generation unit owner will be credited 10 cents for each kilowatt hour supplied out of their micro-generation site. All fees including distribution charges, transmission charges, local access fee, delivery charges and balancing pool allocations will still be incorporated in the proponent's monthly bill.

The cost of delivering energy is largely fixed and, therefore, cannot be reduced by generating your own electricity. You will also pay normal energy prices if you do not produce enough energy from your micro-generation system and have to take from the grid. Electricity generated and supplied to the site must be offset over a 12-month period.

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

The owner will provide the micro-generation 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 micro-generation site. For large micro-generation units that are equipped with a bi-directional interval meter, the micro-generator will be paid at the hourly pool prices.

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

Obligations

Micro-generator obligations

- All costs of operating the micro-generation unit are the responsibility of the micro-generator as per the owner interconnection and operating agreement.
- Contact your neighbours and those affected by your proposed installation and notify them of your intent to install micro-generation equipment.
- Contact and submit the Form A - Micro-generation notice form to notify the owner of your intent to install a micro-generation unit.
- Contact your energy retailer to inform them of the micro-generation 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 micro-generation unit you must submit a separate notice for each type.
- Update the micro-generation application or provide updated documents to the owner.

Alberta Electric System Operator obligations

- Determine hourly pool prices to be used in compensating large micro-generation units.
- Receive micro-generator generation claims submitted by retailers.
- Provide generation credits to retailers that have micro-generation customers.

Retailer obligations

- Act as a participant in Alberta's electricity market by crediting the micro-generator for electric energy supplied out of the micro-generation site.
- Ensure the electric energy supplied out of the micro-generation site will incur a credit on the micro-generator's bill.
- Ensure unused credits are paid to micro-generator once every 12 months.
- Retailer may notify AUC if there is an excess credit of generation.

Owner obligations

- Responsible for determining whether a micro-generation unit qualifies under all five requirements stated in Section 1(1)(h) of the *Micro-Generation Regulation*.
- Provide applicants with an interconnection and operating agreement upon approval of micro-generation project.
- Provide applicants with a notice confirming their micro-generation approval and grid connection.
- Ensure application meets the safety and technical requirements for interconnection with the owner's system.
- 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 micro-generation unit.

Appendix A – Glossary

Alberta Utilities Commission
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
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
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 power line technician 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.

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 Electrical Safety Information Bulletin STANDATA 18-LEG-002 (REV 1) from Alberta Municipal Affairs for examples of accepted legal certification marks.)

Bi-directional cumulative meter
Electricity-measuring device that measures at 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 at 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
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 addressing the electrical safety, shock, and fire hazards of electrical installations (part I, C22.1), equipment (part 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.

Combined heat and power generator
A form of generation where both electric power and thermal energy (typically for heating) are produced from a single energy source. This allows heat that would normally be lost in typical power generation to be recovered to provide heating. This is often also referred to as cogeneration.

Commission
Common reference to the Alberta Utilities Commission.

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
Customer who owns a generating unit that is connected to a utility's electrical distribution system. See page four of this guideline for more information on how distributed generation differs from micro-generation.

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 end-use customers.

Electrical inspectors
Ensure *Canadian Electrical Code* standards are met for all micro-generation installations.

Electrical wiring
Components that are intended to carry electrical current.

Electrical single-line diagram
Basic drawing consisting of lines and symbols that show the electrical equipment and the electrical circuits that connect 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 owner 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 charges (grid operations and maintenance) in addition to compensating the customer for energy exported to the grid.

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

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

Generator rated capacity
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 watt (W), thousand or kilowatt (kW), or million or megawatt (MW).

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

Independent system operator
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.

Induction generator
Customer who 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 downstream of the point of common coupling.

Micro-generator
Customer who owns a micro-generation generating unit.

Micro-generation generating unit
The micro-generation generating unit is typically a residential or small commercial unit. Its capacity is less than five megawatts 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.

Point of common coupling
The point at which the owner's infrastructure is connected to the customer's facilities or conductors, and where any transfer of electric energy between the customer and the owner takes place.

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

Single-phase inverter
Inverter that changes direct current to alternating current single-phase electricity.

Solar photovoltaic generator
Customer who 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 changes direct current to alternating current three-phase electricity.

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

Owner
Company that operates and maintains an electric distribution system.

Appendix B – Contact and source information

Alberta Energy
alberta.ca/ministry-energy.aspx

Alberta Electric System Operator
aeso.ca

Alberta Municipal Affairs
municipalaffairs.gov.ab.ca

Alberta Safety Codes Council
safetycodes.ab.ca

Alberta Utilities Commission
auc.ab.ca

Electrical Codes and Standards
alberta.ca/electrical-codes-and-standards.aspx?utm_source=redi- rector

Government of Alberta
alberta.ca

Micro-Generation Regulation
https://kings-printer.alberta.ca/1266.cfm?page=2008_027.cfm&leg_type=Regs&isbncln=9780779849581

NAV CANADA
navcanada.ca

Retailer and owner list
The Office of the Utilities Consumer Advocate, created by the Government of Alberta, provides a comprehensive list of energy retailers and distributors in Alberta.
ucahelps.alberta.ca/retailers.aspx

AUC Rule 007: *Facility Applications*
auc.ab.ca/rules/rule007/

AUC Rule 012: *Noise Control*
auc.ab.ca/rules/rule012/

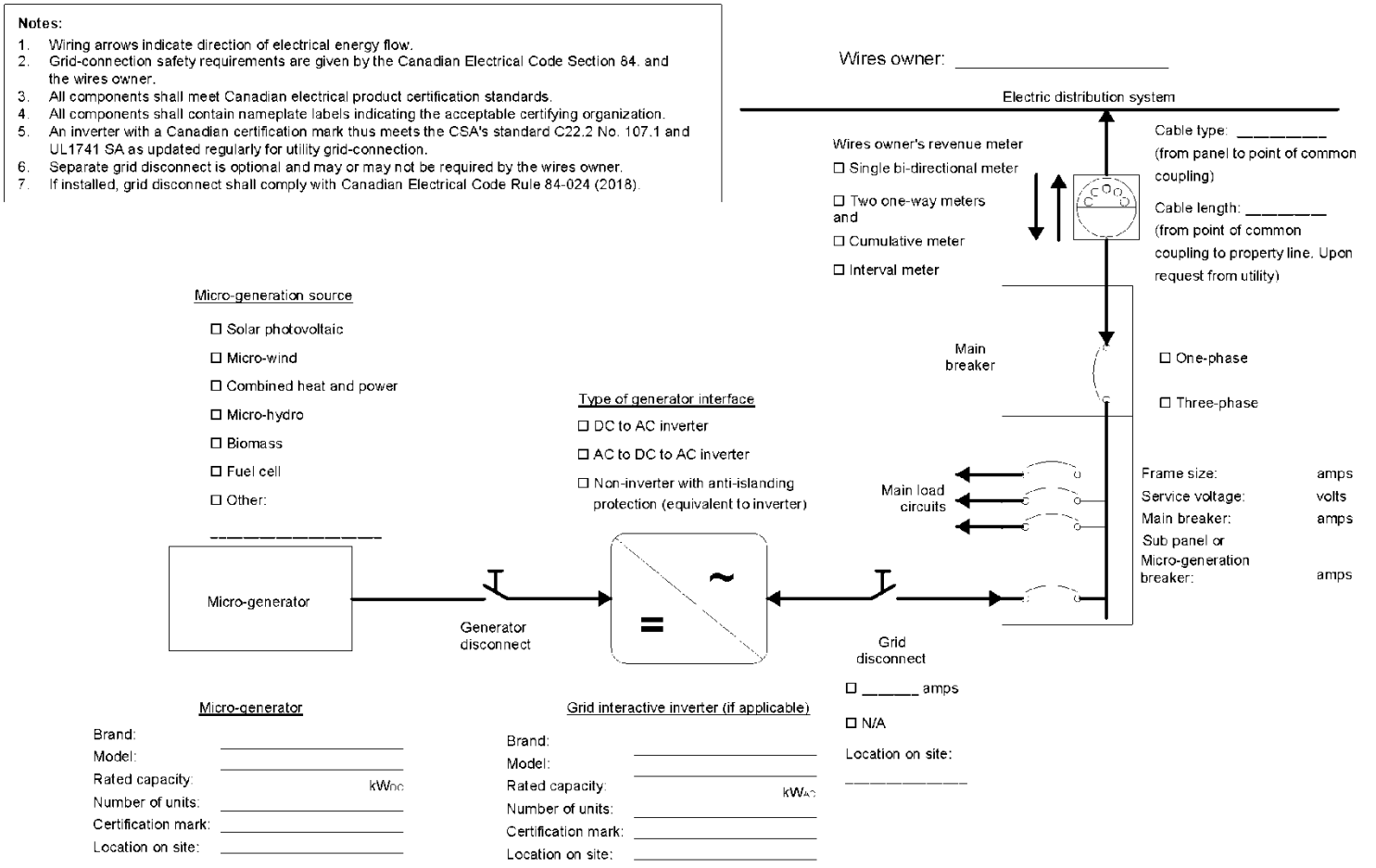
AUC Rule 024: *Rules Respecting Micro-Generation*
auc.ab.ca/rules/rule024/

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

Appendix C – Single-line diagram samples

The two single-line diagram formats, shown below, are examples only. You may refer to these example diagrams for guidance with respect to developing a single-line diagram specific to your micro-generation unit. However, please consult with the owner to confirm the acceptable engineering standards and format of the single-line diagram to show the specific details required for your micro-generation unit project.

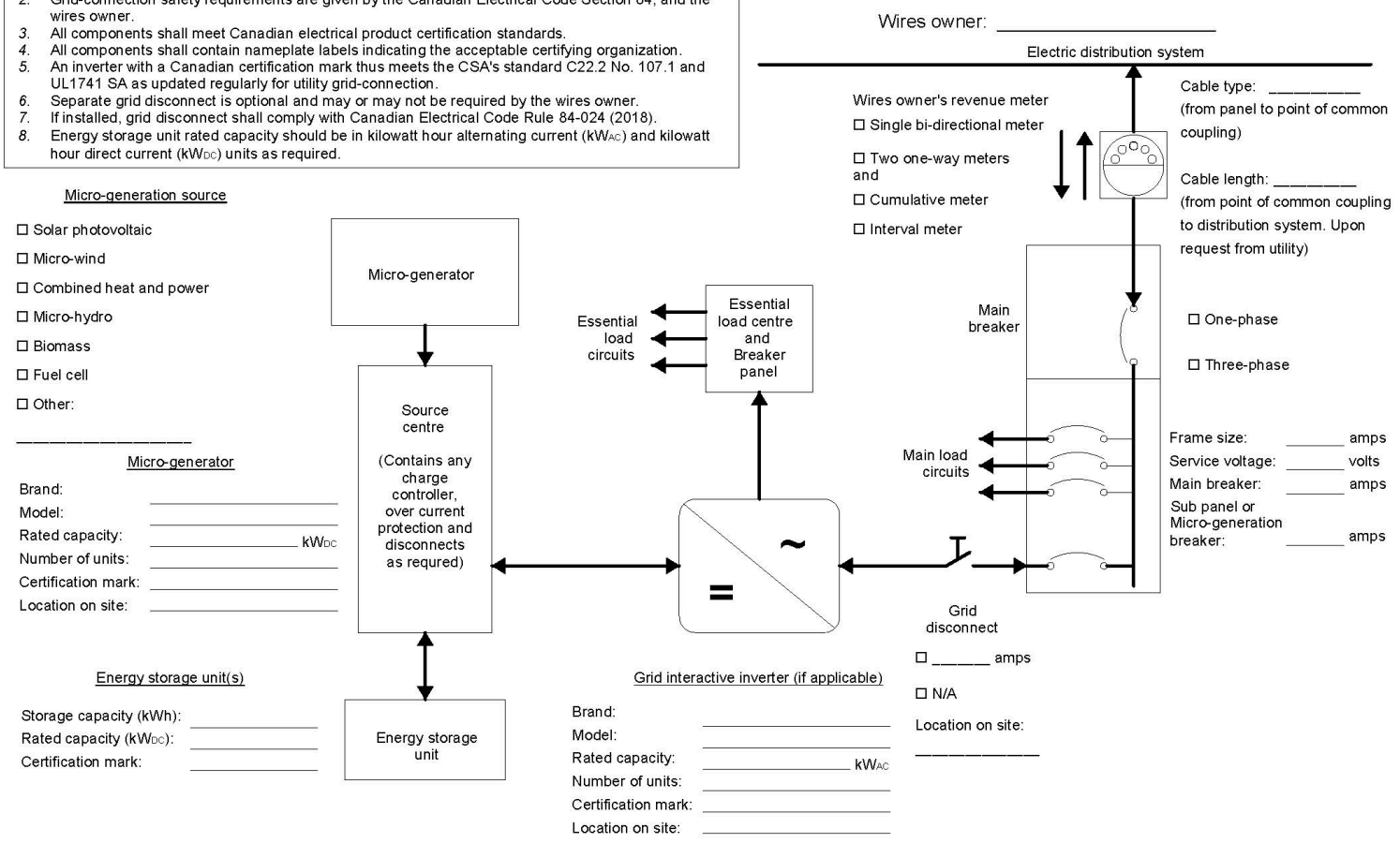
Single-line diagram sample one:



Single-line diagram sample two:

Notes:

1. Wiring arrows indicate direction of electrical energy flow.
2. Grid-connection safety requirements are given by the Canadian Electrical Code Section 84, and the wires owner.
3. All components shall meet Canadian electrical product certification standards.
4. All components shall contain nameplate labels indicating the acceptable certifying organization.
5. An inverter with a Canadian certification mark thus meets the CSA's standard C22.2 No. 107.1 and UL1741 SA as updated regularly for utility grid-connection.
6. Separate grid disconnect is optional and may or may not be required by the wires owner.
7. If installed, grid disconnect shall comply with Canadian Electrical Code Rule 84-024 (2018).
8. Energy storage unit rated capacity should be in kilowatt hour alternating current (kW_{AC}) and kilowatt hour direct current (kW_{DC}) units as required.



	Site name:	Drawn by:
	Single-line diagram for grid-dependent, micro-generator connected to the wires owner's electrical distribution system	Drawing date:
	This single-line diagram is intended for use in permitting and grid-connection approvals. It is not intended to be used for system design or installation. Drawing NO. _____ Rev _____	Site description:
	Scale: Not to scale	Site location:

Appendix D – Interconnection and operating agreement sample (up to 150 kilowatts)

Please note that this sample may not be applicable to your project. Consult with the owner for the appropriate agreement.

Owner's logo

This agreement between_____(the "micro-generation customer") and _____(the "owner") is intended to provide for the safe and orderly operation of the electrical facilities interconnecting the micro-generation customer's generation facility at (land location, Site ID number and description of project) and the electrical distribution system owned by the owner. It is the intent of the micro-generation 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 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 regulation, including (but not limited to) the Alberta Electrical Utility Code, the *Canadian Electrical Code* and the Alberta *Occupational Health and Safety Act*, nor does it supersede the owner's safety policies and procedures or the terms of any electric service agreement between the micro-generation customer and the 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 micro-generation customer and for the 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 micro-generation customer and for the 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 micro-generation customer is:

Name, Title
Address
City, Alberta XXX XXX
Office: xxx-xxx-xxxx
Email: xxxxxx@xxxxxx

The operating authority for the owner is:

First name Last name, job position
Address
City, Alberta XXX XXX
Office: xxx-xxx-xxxx
Email: xxxxxx@xxxxxx

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 micro-generation customer's generation facility and the owner's distribution system.

The operator in charge for the micro-generation customer is:

Name, Title
Address
City, Alberta XXX XXX
Office: xxx-xxx-xxxx
Email: xxxxxx@xxxxxx

The operator in charge for the owner is the owner's control centre system operator. This individual can be reached via the owner's contact center number.

Phone: 1-XXX-XXX-XXXX
Email: xxxxxx@xxxxxx

4. Description of facilities:

The point of common coupling is designated as the low voltage side of the owner's XX kVA transformer and is identified on the attached single-line diagram (description of single-line diagram, rev number, date).

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

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

The owner's distribution system consists of (distribution size voltage 14.4 or 25) kV line (line number) and a (transformer size) in kVA, (transformer connection designation enter ex. wye-wye) transformer. The owner owns and is responsible for the operation of all facilities on the distribution side of the point of common coupling.

The micro-generation customer's generation facility is designed to operate while connected to the Alberta electricity grid, with synchronizing facilities provided on the micro-generation 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 owner prior to synchronization of the micro-generation customer's generation facility and the owner's distribution system taking place. It is recognized by the micro-generation customer that there are no synchronization schemes in place on the owner's distribution system, and that the (upstream distribution facility – enter sub#/name) 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 or remove this comment)

The micro-generation 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. Remove this paragraph if photovoltaic, leave in if not photovoltaic.

5. Suspension of interconnection:

The operation of the micro-generation customer's generation facility and the quality of electric energy supplied by the micro-generation 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 owner. If the operation of the micro-generation customer's facilities or quality of electric energy supplied does not meet the above standards or, in the event the owner determines, in its sole opinion, acting reasonably, that the micro-generation customer's generation facility is or is reasonably likely to: (i) cause damage to; and/or (ii) adversely affect other distribution system customers or the owner's assets, the owner will notify the micro-generation customer of same and the micro-generation customer shall promptly take all reasonable corrective action at its sole cost and expense. The owner may, in its sole discretion and without notice, disconnect the micro-generation customer's facilities from the owner's distribution system until all such correction action and/or compliance with the above standards is reasonably demonstrated.

Additionally, the owner may, in its sole discretion and without notice, disconnect the micro-generation customer's generation facility from the owner's distribution system in the event of: (a) a planned or unplanned power outage on the owner's distribution system, (b) any abnormal operation of the 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 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 distribution system. Nothing in this agreement shall be interpreted as altering the intent of the owner's safe practices manual or safe operating procedures. Safe work routines described in Division D of the Alberta Electrical Utility Code shall be followed when providing isolation for work on any part of the interconnected system.

7. Technical requirements:

Micro-generation 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 owner.

8. Maintenance outages:

Maintenance outages will occasionally be required on the owner's distribution system and the micro-generation 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 micro-generation customer will indemnify and hold the owner harmless from and against all costs, expenses, damages, claims, liabilities and adverse effects resulting from the micro-generation customer's breach of this agreement, negligence or willful misconduct in connection with the operation of the micro-generation customer's generation facility or the interconnection between the micro-generation customer's generation facility and the owner's distribution system.

Notwithstanding the foregoing, the micro-generation customer shall not be liable to the 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 owner's liability to the micro-generation customer, whether pursuant to contract, tort or otherwise, shall be limited to the liability imposed on the 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 owner under the *Electric Utilities Act* (Alberta) and the *Liability Protection Regulation* (Alberta).

10. Access:

The owner shall have access to the micro-generation 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 micro-generation customer may terminate this agreement at any time by: (a) disconnecting its generation facility from the owner's distribution system, and (b) thereafter giving the owner 30 days written notice of such termination.

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

12. Assignment:

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

The micro-generation 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 giving:

a) written notice to the owner of such disposition, and

b) confirmation to the owner that the new owner of the micro-generation customer's generation facility, or the micro-generation customer's interest in the property on which the generation facility resides, has agreed to assume the micro-generation customer's rights and obligations by entering into a new agreement with the owner, each such notice and confirmation to be given prior to the completion of such disposition. The owner may assign its rights and obligations under this agreement without the micro-generation customer's consent.

In addition, the micro-generation 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 owner may send a micro generation decommission notification (GRN transaction) to the micro-generation customer's retailer prohibiting any further generation credits to be processed with respect to the micro-generation customer's generation facility until a new agreement is reached between the owner and the new owner of the micro-generation customer's generation facility.

ACCEPTED BY:

Customer:

Micro-generation customer name: _____
(please print)

Micro-generation customer signature: _____ Date: _____

APPROVED BY:

Owner:

Owner representative name: _____
(please print)

Owner representative signature: _____ Date: _____

Owner reference: project reference # _____, Site ID xxxx

Appendix E – 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 owner workers.

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

Before a micro-generation 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*. 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 micro-generation equipment's nameplate.

- Alberta's STANDATA Electrical Safety Information Bulletin 18 LEG-002 (REV 1) indicates the acceptable certification marks. Equipment that does not carry the appropriate certification mark is not permitted to be sold or installed. Visit the Electrical Codes - STANDATA page on alberta.ca for more details.

- Grid-connected inverters are required to be approved to the Canadian Standards Association 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 a power outage. This shut down is called 'anti-islanding' and is of utmost importance to owners.

- Inverters are required to carry a Canadian Standards Association certification mark to be certified by inverter standard C22.2 No.107.1, as well as a Underwriters Lab certification mark to be certified by the appropriate UL 1741 Supplement Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources.

- For certification concerns or inquiries, contact the equipment manufacturer, owner or the Canadian Standards Association 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 *Canadian Electrical Code*, and found satisfactory by the authority having jurisdiction over electrical systems. The electrical work on your micro-generation unit is required to be done by certified electrician. Note *Canadian Electrical Code* rules regarding the need for warning notices and disconnects on micro-generation 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 micro-generation units use inverter interfaces. Grid-connected inverter-based units are certified to cease energizing the circuits of the electricity distribution system during electrical outages. Owners may require that micro-generation 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.

Micro-generation units must also include documentation confirming that they meet the appropriate Underwriters Lab (UL 1741) standard and Canadian Standards Association C22.2 No. 107-1 standard. For small micro-generation units, a certification mark will suffice.

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

Maintenance

Routine maintenance of micro-generation units is the full responsibility of the micro-generation 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 F – Electrical contractor and electrical inspection

Electrical contractor

It is highly recommended that you hire an electrical contractor or engage an engineering firm to install your micro-generation unit. Some municipalities prohibit home owners from installing their own micro-generation 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 micro-generation units. These systems are relatively new and not many electrical contractors have experience installing these. The electrical contractor will need to install your micro-generation unit according to all regulations and standards.

Electrical inspection

Before the micro-generation unit can be connected to the owner's electrical distribution system it must be inspected by an electrical inspector from the authority having jurisdiction over electrical systems. The inspection provides assurance that the installation meets the safety requirements of the *Canadian Electrical Code* and does not pose a hazard to micro-generation owners, their families, friends, or employees.
It also provides an assurance that the installation will not be a hazard to owner workers who may be required to service or repair the electrical supply to the micro-generation 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 *Canadian Electrical Code* and any requirements of the owner or the municipality.