



## Solar PV Guidelines

This document is intended to be a guideline to permits required for Solar PV systems placed on houses, duplexes and townhouses. Other types of installations may be required to have involvement of a registered professional. Questions can be directed to:

Town of Cochrane  
Building Safety Codes  
101 RancheHouse Road  
Cochrane, AB T4C 2K8  
Phone: 403-851-2572  
Email: [safety.codes@cochrane.ca](mailto:safety.codes@cochrane.ca)

### Regulatory Approval Steps:

- 1) Get your utility approvals in place from Alberta Utilities Commission and from Fortis. For the best and most current information go to <http://www.hme.ca/connecttothegrid/>. At this website you will find information on how to connect to the grid and a path to the documentation required for the utility's approvals.
- 2) Apply to the Town of Cochrane for your Electrical permit. The (Alberta) Permit Regulation requires an electrical permit for Solar PV installations. Details for electrical permit application and the information to be submitted with the application (See page 6).
- 3) Electrical Plans Review will only be required for Solar Systems greater than 5KV. See the Solar Photovoltaic Electrical Permit Application Requirements List (See page 7).
- 4) Building permit: A building permit is required only if new elements are constructed to support the system. To confirm the loads involved are acceptable without structural changes, complete (and bring along when you apply for your electrical permit) a "Structural Review Checklist of PV Array Mounting System" (See page 5).
- 5) Development permits are not required for residential Solar PV installations in Cochrane.

## **A Guide to the Requirements for Electrical Permits for Solar Systems on Residential Buildings in the Town of Cochrane**

### **The electrical permit application must contain:**

1. The permit application must name who is responsible for installing the electrical components of the system. Permits may only be issued to an electrical contractor. All electrical contractors must have a Master's Certificate and a Town of Cochrane business license. NOTE: An Electrical Plans Examination will be required for any PV Solar System operating at more than 5KV.
2. Submit a single-line diagram of the system. Canadian Electrical Code (CEC) Rule 84-030 requires a permanent single-line diagram be posted at the Supply Authority disconnect. This diagram is to show the PV array configuration, the wiring method, overcurrent protection, the inverter, rapid shutdown initiation and the location of the disconnect switches. It should have a reference to the disconnect locations. A sample single line diagram is attached (pg. 3).
3. Submit the two main current and two main voltage ratings for the solar PV array as required by the (CEC) Rule 64-200 - rated operating current and voltage; maximum photovoltaic source circuit voltage and rated short-circuit current. These values are all required for design and signage posted on the system. This is often covered by including them on the single-line diagram.
4. Submit an equipment list with the manufacturer **and** model number of each of the major components. The following should be included:
  - PV modules
  - inverter(s): Micro or string inverter
  - combiner box
  - the PV module mounting system (the rack)
  - grounding/bonding type for the modules and rails (such as WEEB clips or lay-in lug)
  - Rapid shutdown system components

**The Electrical inspection** is conducted when the system is installed. Ideally the inspector will have access to the roof top components, and this is best accomplished by calling the inspection the day of the installation. The CEC requires that all electrical systems, including solar PV systems follow all relevant code articles in the most recent CEC. Section 84 deals with Utility interactive systems and the rules for installation of electric power production sources interconnected to a Supply Authority System. Section 64 deals specifically with renewable energy and solar photovoltaic systems. As well, other (CEC) sections apply to conductors, overcurrent protection, bonding and grounding. All components must be approved for use in Canada. The electrical permit and inspection processes are set up to monitor compliance with all of this.

**Operating the new system** -you can operate your system once you have received authorization from Fortis Alberta. Fortis may require a copy of your final electrical inspection report and copy of your application to your electrical Energy Retailer prior to installing a bi-directional meter.

Sample form for required single line diagram:

Sample form for required single line diagram:

From Howell-Mayhew Engineering [www.hme.ca](http://www.hme.ca)

**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 Service Provider.
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 for utility grid-connection.
6. Separate Grid Disconnect is optional and may or may not be required by the Wires Service Provider.
7. If installed, Grid Disconnect shall comply with Canadian Electrical Code Rule 84-024 (2006).
8. Generator Disconnect and Grid Disconnects may be integral to the inverter.

**Mini Micro-Generation Source**

Solar PV DC

Micro-wind DC or AC

Stirling engine DC or AC

Micro-hydro DC or AC

Biomass DC or AC

Fuel cell DC

Other: \_\_\_\_\_

**Mini Micro-Generator**

Brand: \_\_\_\_\_

Model: \_\_\_\_\_

Rated capacity: \_\_\_\_\_ kW

Certification Mark: \_\_\_\_\_

Location on site: \_\_\_\_\_

**Type of Generator Interface**

DC to AC Inverter

AC to DC to AC Inverter

Non-Inverter with anti-islanding protection (equivalent to inverter)

**Generator to Utility Interface**

Brand: \_\_\_\_\_

Model: \_\_\_\_\_

Rated capacity: \_\_\_\_\_ kW<sub>AC</sub>

Certification Mark: \_\_\_\_\_

Location on site: \_\_\_\_\_

Wires Service Provider: \_\_\_\_\_

**Electric Distribution System**

Wires Service Provider's revenue meter

Single bi-directional meter

or  Two one-way meters

and \_\_\_\_\_

Cumulative meter

or  Interval meter

Point of Common Coupling

\_\_\_\_\_ VAC

\_\_\_\_\_ A

1 phase

3 phase

Main Breaker Panel or Sub-Breaker Panel \_\_\_\_\_

Main Breaker

Breaker Panel Load Circuits

Grid Disconnect

Will not be installed

Will be installed

Location on site: \_\_\_\_\_

Breaker with no "line" and "load" markings

	Site Name: _____	Drawn by: _____
Single Line Diagram for Grid-Dependent, Mini Micro-Generator Connected to the Wires Service Provider'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.		Site Description: _____
DRAWING NO. _____	REV _____	Site Location: _____
SCALE: NOT TO SCALE		

**NOTE:** The 2018 Canadian Electrical Code Rule #64-218(5) also requires the location of the device to initiate rapid shut down to be shown on the single line diagram.

## **A Guide to the Requirements for Building Permits for Solar Systems on Residential Buildings in the Town of Cochrane**

This guideline provides assistance in determining when a building permit (structural) may be required for installing solar PV systems on the roofs of residential (Alberta Building Code Part 9) buildings in the Town of Cochrane.

It is the responsibility of the owner to ensure the building is capable of withstanding the loads from the system being installed and the array will not be torn off in the wind. The solar PV array will add loads (such as from its weight and from wind) onto the building onto which it is installed. The building structure must have the ability to support those loads and/or reactions. In most cases these loads are relatively small.

In general, the weight footprint and height of a solar system determine the need for involving an engineer to design structural support elements. Engineers are to be involved where there is a need to reinforce the roof, the method of attaching the solar racking system onto the roof is by use of ballast (versus a direct connection) or the installation is on a flat roof where there is a major obstruction such as a parapet or wall around the edge. A building permit and inspection are required when reinforcement elements are required and constructed.

**If the installation of solar modules on a roof of a residential building falls within the following conditions, then the addition of the solar array should not require additional structural support. This applies to both flat roof and sloped roofs and roofs of rafter or truss construction. Permit applicants are to confirm loads by completing (and bring along when you apply for your electrical permit) a Structural Review Checklist attached on pg. 6.**

1. The roof must have been designed in compliance with Part 9 of the Alberta Building Code. Modern structures are built with factors of safety large enough to account for the relatively small loads imposed by a PV array. For older buildings or those built with non-standard construction practices, the structural members would need evaluation to ensure structural integrity.
2. The solar array's distributed (dead) weight is less than 5 pounds per square foot (24.4 kg/m<sup>2</sup>) and the roofing is a single layer of lightweight material (such as asphalt shingles, cedar shakes, or metal).
3. The solar module's connections to the roof result in the array's weight being uniformly distributed. The maximum point load shall be less than 50 pounds (22.7 kg) per roof connection.
4. The solar array will be mounted close to the surface of the roof with a maximum height of 18" (46 cm) above the roof surface. Modules must be below or flush to the roof ridge on sloped roofs and they cannot extend beyond the roof edges (i.e. eaves) on all sides of the building. Solar modules must not be installed on the overhang area of the roof.
5. The mounting structure is an engineered product specifically designed to mount solar modules to roofs. Racks must be installed with full compliance to the installation instructions provided by the supplier of the mounting structure.

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### Structural Review Checklist of PV Array Mounting System

Is the array to be mounted on a defined, permitted roof structure?

*If No due to non-compliant roof for a ground mount structure, submit engineered worksheet.*

#### Roof Information:

1. Is the roofing type lightweight?

(Yes = shingles, shakes, metal, lightweight masonry)

*If No, provide engineered worksheet for roof structure (No = heavy masonry, slate, etc.).*

2. Does the roof have a single roof covering? *If No, provide engineered worksheet for roof structure*

3. Provide method and type of weatherproofing roof penetrations (e.g . flashing, caulk)

#### Mounting System Information:

1. Is the mounting structure an engineered product designed to mount PV modules with no more than an 18" gap beneath the module frames?

*If No, provide details of structural attachment certified by a design professional.*

2. For the manufactured mounting systems, fill out information on the mounting system below:

- Total Weight of PV Modules and Rails lbs
- Total Number of Attachment Points
- Weight per Attachment Point ( $a \div b$ ) lbs  
(if greater than 50 lbs., provide engineering)
- Maximum Spacing Between Attachment Points on a Rail inches  
(see product manual for maximum spacing allowed based on maximum design wind speed)
- Total Surface Area of PV Modules (square feet)  $\text{ft}^2$
- Distributed Weight of PV Module on Roof ( $a \div e$ )  $\text{lbs./ft}^2$   
*If distributed weight of the PV system is greater than 5  $\text{lbs./ft}^2$ , provide engineering.*

# TOWN OF COCHRANE

## Building Safety Codes

101 RancheHouse Rd.  
 Cochrane, AB T4C 2K8  
 Phone: 403-851-2572 Fax: 403-932-2935  
 Email: [safety.codes@cochrane.ca](mailto:safety.codes@cochrane.ca)



Fields marked with an \* are required

Contractor Electrical Permit Application	
CONTRACTOR INFORMATION	
CONTRACTOR*	Phone *
MAILING ADDRESS*	Email *
CITY & POSTAL CODE*	
OWNER INFORMATION	
Property Owner Name *	Phone *
Mailing Address *	Email *
City&Postal Code *	
Project Address*	Legal Description
	Lot/ Unit                      Block                      Plan
Construction Type *	Building Permit #
Volts	Amps
Service Connection Required                      Yes                      No	Installation Cost *
PERMIT FEES	
Residential Developed Floor Area	sq. ft.
<small>(NB Fees for new single family, semi-detached residential and accessory suites are based on the combined finished floor area. If the basement is developed that area is to be added.)</small>	
PROJECT DETAILS	
Estimated Completion Date	(mm,dd,yyyy)
Description of Work *	
APPLICANT INFORMATION	
<p><b>APPLICANT DECLARATION</b> I certify that this installation will be completed in accordance with the Alberta Safety Codes Act and Regulations and will commence within <b>90 days</b>. I understand contractor permits are to be completed within <b>180 days</b>.</p> <p>I also understand that by choosing the declaration checkbox I am applying for an electrical permit in the Town of Cochrane</p> <p>The personal information requested is collected under the Safety Codes Act, Section 63, The Municipal Government Act, Section 301.1, the Alberta Freedom of Information and Protection of Privacy Act (FOIP) Section 33(c) and will be protected under Part 2 of the FOIP Act. The information is used for issuing permits, safety codes compliance verifications, monitoring and property assessment purposes. Information collected by public bodies forms part of a file that may be available to the public. Please direct any questions about this collection to: FOIP Coordinator, 2nd Floor, 101 Ranchehouse Road, 403-932-2674 or FOIP@cochrane.ca.</p>	
Trade*	Master No. *
<p>I have read and understand the declaration</p> <p style="text-align: center;">_____</p> <p style="text-align: center;"><b>Master Electrician Name(Print)</b>                      <b>Application Date(mm,dd,yyyy)</b></p>	

## TOWN OF COCHRANE

101 RancheHouse Rd.  
Cochrane, AB T4C 2K8  
P: 403-851-2500 F: 403-932-6032  
[www.cochrane.ca](http://www.cochrane.ca)



### Solar Photovoltaic Electrical Permit Application Requirements List

The following minimum requirements are required to expedite the permit review and approval process.

Plans Examination Reviews will only be completed on Solar Photovoltaic systems rated more than 5KW

#### Required items

1. System Type (choose one of the following below)
  - Micro-inverter
  - String inverter/optimizer
  - String Inverter
  
2. Please provide specification sheets for:
  - Solar modules
  - Inverters
  - Racking
  - Controllers
  - Storage/backup power
  - Grounding/bonding method and conductor sizes
  
3.  Please provide schematics or a sketch of the system layout showing the components and indicating the electrical circuits, ratings and total KW capacity of the modules and marking as required with Rules 64-072, 64-200 and 84-030 of the Canadian Electrical Code.
  
4.  Rapid shut down as approved by CSA Standard C22.2 No. 330.
  
5.  Rodent protection provided as required by CEC Rule# 64-21-(5). If not provided for, please specify that the installation has been reviewed with the property owner. Refer to Section 64 of the Alberta Electrical Standata.

**Note: System components and their installation must comply with all applicable codes, standards, and regulations.**

**Additional information for grid tie-in systems:** Get your utility approvals in place from Alberta Utilities Commission and from Fortis. For the best and most current information go to <http://www.hme.ca/connecttothegrid/>

**Operating the new system:** You can operate your system once you have received authorization from Fortis Alberta. Fortis may require a copy of your final electrical inspection report and copy of your application to your electrical Energy Retailer prior to installing a bi-directional meter.