Information Bulletin

Solar photovoltaic installations

The following is a guide to solar photovoltaic (PV) installations and permit requirements for wall mounted, roof mounted and ground mounted installations for both housing and commercial applications. This document attempts to address all scenarios however, solar PV system designs and equipment can vary greatly for each installation, so it should not be considered an all-inclusive document.

Building and electrical permits are required for solar PV installations in the City of Winnipeg. Documents submitted for permits must be clear, legible and good quality.

Development permit information

A development permit confirms the structure is located on the property in accordance with the zoning bylaw and other City department's requirements.

A development permit is not required for solar photovoltaic installations if the installation is:

1. located on a building and is mounted 8 feet or greater above grade, or
2. ground mounted.

Your building permit application must be accompanied by a Declaration Form for Development Permit Exemption. See winnipeg.ca/developmentpermits.

Building permit information

A building permit confirms the structure meets code requirements. Documents submitted for building permit applications must be sealed by a structural engineer licensed to practice in the Province of Manitoba. They must be accompanied by a completed Required Professional Designer's Certificate (commercial) (winnipeg.ca/ppd/permits/Commercial/Resources.stm) or a Professional Designer's Certificate for Housing (winnipeg.ca/ppd/permits/Residential/Resources.stm), as applicable.

Wall and roof-mounted systems

A building permit is required for all wall and roof-mounted solar PV installations and may be applied for by the licensed installer or homeowner/building owner.

The installation of solar panels will result in additional weights that the existing structure may not have been designed for. Structures are designed for specific loads. When combined with the solar

panel and racking system weight, total loads can increase significantly which can compromise the structural integrity of the building. Winnipeg weather is variable resulting in roofs that may be subject to full design wind and snow loads, and therefore a building permit is required for all roof-mounted solar PV installations.

An engineering report assessing the existing structure is required under the seal and signature of a structural engineer licensed to practice in the Province of Manitoba. The engineer must certify that the existing structure can safely support all Code required design loads and increased loading due to the addition of the solar PV system, in compliance with the structural requirements of the Manitoba Building Code (MBC). Engineers must consider the structure as a whole in the report and not just the roof. A similar engineering report is required for wall mounted installations.

Submissions for building permits for wall and roof mounted solar PV systems must include the following items:

- [ ] Dimensioned site plan
- [ ] A completed Required Professional Designer's Certificate (commercial) or Professional Designer's Certificate for Housing, as applicable
- [ ] Declaration Form for Development Permit Exemption
- [ ] Owner Statement for Housing (not required if owner is the applicant)
- [ ] Letter of Owner Authorization (commercial) or Owner Statement if professionals are involved

A sealed engineer's report, including:

- [ ] Framing plans, roof and/or wall, as applicable
- [ ] Locations of solar panels on a roof plan or wall elevation, including dimensions
- [ ] Attachment spacing including connection details
- [ ] Solar panel type, including weight
- [ ] Mounting system specifications, including weight
- [ ] Existing designs loads (dead, live, wind, snow)
- [ ] Additional loads imposed by the solar panel installation (dead, live, wind, snow)
- [ ] Strengthening details to the existing structure, as required
- [ ] Confirmation of responsibility for the structural aspects of the installation
- [ ] Confirmation that the existing structure will retain its integrity after the installation

Ground mounted systems

A building permit is required and may be applied for by the licensed installer or homeowner/building owner. Applications for building permits must include:

- ☐ A dimensioned site plan indicating the location and size of the solar PV installation.
- ☐ A completed Required Professional Designers Certificate (commercial) or a Professional Designer's Certificate for Housing, as applicable
- ☐ Declaration Form for Development Permit Exemption
- ☐ Owner Statement for Housing (not required if owner is the applicant)
  Note: For greenfield locations, provide a Letter of Authorization instead of the Owner Statement.
- ☐ Letter of Owner Authorization (commercial) or Owner Statement if professionals are involved

A sealed engineer's report including:

- ☐ Foundation type and layout*
- ☐ Mounting system specifications, including weight
- ☐ Design loads (dead, live, wind and snow)

*If your foundation requires digging below grade, visit clickbeforeyoudigmb.com or call 1-800-940-3447.

Engineering certification letter

A professional certification letter must be provided by the structural engineer upon completion of the project. Acceptable wording can be found at winnipeg.ca/ppd/permits/Commercial/Resources.stm.

Electrical permit information

General

Electrical permits for solar PV installations may only be obtained by an electrical contractor licensed by the City of Winnipeg. View an updated list of licensed electrical contractors. Installations by homeowner applicants are not permitted.

Except for solar PV systems with a capacity less than 10 kW serving a single detached dwelling, all documents for electrical permit applications are required to be submitted under the seal of an electrical engineer licensed to practice in the Province of Manitoba. They must be accompanied by a Required Professional Designer's Certificate and Owner Statement for commercial applications, or a

Professional Designer's Certificate for Housing for housing applications. These forms are available under "Forms and documents" on the Electrical Information Centre at winnipeg.ca/electricalcentre. At the completion of the project, an engineer's certification letter must be provided.

Supply utility approvals and coordination of grid connection and metering should be directed to the utility, Manitoba Hydro. Any energy efficiency rebate information must be directed to the appropriate rebate entity.

Permit application description of work

On the permit application, it is required that a brief description of work be provided. The description must include the following:

- The type of system, i.e.: micro-inverter, string inverter with optimizer, or string inverter.
- The total dc capacity of the installation in kW.
- The PV system dc source circuit voltage (i.e.: string voltage) or, in the case of micro-inverters, the AC output voltage.

Limitations for housing installations

The source or output circuits voltage for solar PV installations on houses and their accessory structures are not allowed to exceed 600 V dc *[MEC Subrule 64-202 4)]* and:

- The installation is on the roof of a single dwelling and serves only that single dwelling and its accessory structures (i.e.: detached garage, gazebo, etc.), or
- The installation is on the roof of an accessory structure and serves only the single dwelling and that accessory structure (examples as mentioned above), or
- The installation is ground-mounted within the property lines of a single dwelling and serves only that single dwelling and its accessory structures (examples as mentioned above).

Electrical permit application requirements

All permit applications for solar PV installations require review by electrical plan examination. Documents required to be submitted, and the information required to be contained on them are listed on the checklists below.

Single line diagram

Items listed in the checklists below must be shown on the single line diagram, as applicable for the specific system type.

Micro inverter systems

- ☐ The number of solar panels per micro inverter & the total number of output circuits
- ☐ Micro inverters

- [ ] Combination panel c/w bus rating and overcurrent device ratings, incl. main breaker rating
- [ ] Utility interactive point of connection
- [ ] Utility disconnect switch
- [ ] Solar PV beaker c/w rating
- [ ] Panelboard bus rating and main breaker rating
- [ ] All conductor and raceway sizes and types
- [ ] Bonding details
- [ ] Rated output circuit current and the rated short circuit current
- [ ] Rated output circuit voltage
- [ ] Rodent protection method or dc AFCI protection provided if rooftop installation
- [ ] Energy storage systems and charging controllers, if applicable
- [ ] Equipment labels (see Appendix A)

String inverter and string inverter/optimizer systems

- [ ] The number of solar panels for each string & the total number of strings
- [ ] DC optimizers, where applicable
- [ ] DC combiners
- [ ] Junction boxes
- [ ] Inverters
- [ ] Utility interactive point of connection
- [ ] Utility disconnect switch
- [ ] All solar PV system disconnects c/w ratings, ac & dc
- [ ] Solar PV breaker c/w rating
- [ ] Panelboard bus rating & main breaker rating
- [ ] All overcurrent protection sizes and types, ac & dc
- [ ] All conductor and raceway sizes and types
- [ ] DC system grounding details (if a grounded system)
- [ ] Maximum PV output circuit dc current & the rated short circuit current

- [ ] Bonding details, ac & dc
- [ ] Rated dc output circuit voltage
- [ ] Rodent protection method if rooftop installation
- [ ] Energy storage systems and charging controllers, if applicable
- [ ] Equipment labels (see Appendix A)

Site plan

Locations of the following must be clearly shown:

- [ ] Electrical service, splitter, panels & metering
- [ ] Arrangements of the solar PV arrays
- [ ] Utility disconnect
- [ ] Rapid shutdown switch
- [ ] All solar PV system disconnects (ac & dc)
- [ ] Combiner
- [ ] Inverters
- [ ] Energy storage system
- [ ] Charge controllers

Manufacturers' product data sheets

The specific model must be clearly identified via highlighter, arrow, circled or otherwise so marked for the following:

- [ ] Solar panels
- [ ] Racking system
- [ ] Optimizers or micro-inverters, as applicable
- [ ] DC combiners
- [ ] Inverters
- [ ] AC & DC disconnects
- [ ] AC combination panels
- [ ] Utility disconnect
- [ ] Rapid shutdown switch
- [ ] Charge controllers
- [ ] Energy storage system

Installation information

This section clarifies the requirements for metering facilities and busbar ratings, AC equipment disconnects with utility interactive inverters, locations of array installations, combiners, disconnects, utility disconnect, labelling and utility interactive point of connection.

Rodent protection

If dc arc-fault protection is not an integral part of the module, photovoltaic source and output circuit insulated conductors and cables installed on or above the building require mechanical protection in the form of an enclosed raceway or other acceptable material to protect against damage from rodents as required by MEC 64-210 5).

Metering facilities and busbar ratings

Metering facilities permitted for the subdivision of the consumer's service and supplied simultaneously by a primary power source and one of more utility-interactive inverters shall comply with the bus bar requirements of MEC 64-112 and the following:

1. Customer Service Termination Enclosure (CSTE)
   For calculating the busbar rating of a CSTE, the ampere rating of the CSTE shall be used for the utility source overcurrent device ampere rating. The ampere rating of the CSTE shall be deemed the bus bar rating on an existing CSTE that is not marked with a bus bar ampacity. The CSTE may also be re-labelled with a bus bar ampacity rating by an approved certification organization. The sum of the connected solar cannot exceed the ampere rating of the CSTE.
2. Transformer Rated Meter Mounting Device (TRMMD)
   The sum of the ampere rating of the overcurrent devices for connected consumers' services shall not exceed the ampere rating of the TRMMD. E.g.: a 400A TRMMD is permitted one 400 Amp or two 200 A consumer's services.
3. Dual-Lug Meter Sockets (DLMS)
   The sum of the ampere rating of the overcurrent devices for connected consumer's services shall not exceed the ampere rating of the DLMS. E.g.: A 200 A rated DLMS is permitted two 100 A consumer's services.

Inspections

City of Winnipeg Inspectors do not perform sloped roof-top inspections. On-site photos* of the following must be submitted via Permits Online prior to inspection of sloped roof mounted solar PV installations:

- Supports and mounting platform
- Rodent protection
- Bonding

*Photos must be date stamped, clear and legible, and compiled into one document for review.

A professional certification letter must be provided by the electrical engineer, where applicable, upon completion of the project and prior to call for final inspection. Acceptable wording can be found under "Forms and Documents" on the Electrical Information Centre at winnipeg.ca/electricalcentre utilizing the "No Occupancy" version.

For projects that do not require an engineer's seal (i.e.: those less than 10 kW for single detached dwellings) installed on a sloped roof, an installation declaration from the licensed electrical contractor must be submitted. The document can be obtained upon request to ppd-hepx@winnipeg.ca.

Common defects

The following is a list of common defects that have caused delays in either permit issuance or permit closing. Ensure your submission and installation meets all the following requirements.

Submission deficiencies causing delays in permit issuance

Electrical	Incomplete information provided
	Spec sheets don't show specifically which piece of equipment is being installed
	Feeder descriptions – wiring types and installation methods are not detailed
Building	Documents aren't sealed by a Professional Engineer licensed to practice in the Province of Manitoba
	Statement is missing on the engineer's report re: declaration that the structure will retain its integrity after the installation is complete
	Information on the connection of the solar panels to the existing structure is missing

Inspections defects

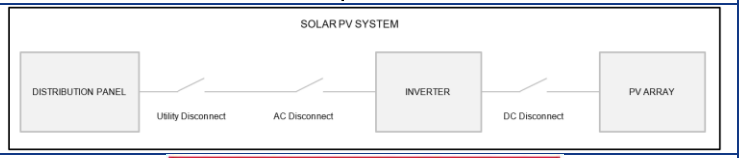
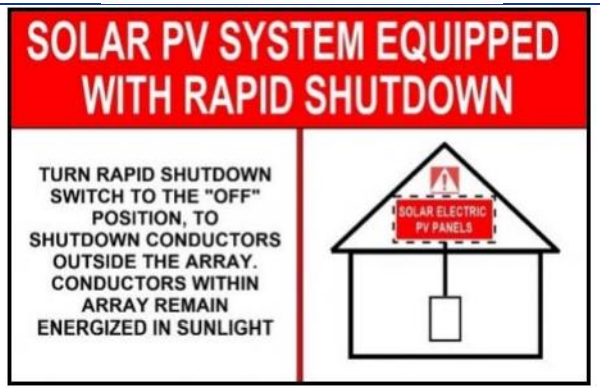
Defect	Potential consequences
1. Installation is substantially different from the documents that were reviewed and accepted for permit issuance	▪ Revised documents must be submitted for review ▪ Re-review fees may apply
2. Photos for sloped roof-mount installations are not available on site for the Inspector	▪ Additional call for inspection is required ▪ Fees for additional inspections may apply
3. Labelling has not been installed	▪ Additional call for inspection required when labelling is installed ▪ Fees for additional inspections may apply
4. Engineer's certification letter for the project completion or contractor declaration has not been submitted	▪ Inspections unable to close the permit

Appendix A

Solar PV labelling requirements

The following are common solar PV system labels; this is not an exhaustive list. All labels must be engraved lamicoid, red background with white lettering.

Equipment	Code rule(s)	Details	Sample label
Inverters and equipment fed from two sources	62-112 4) d) & 14-414 3)	Provide one label for each source disconnect or one label on equipment indicating that multiple disconnects must be opened.	
AC disconnect switches	64-060 1) g) & 84-024 1) i)	Locate at the inverter, utility and isolation AC disconnect switches. Wording must be verbatim per Appendix B.	
DC combiners, DC junction boxes, DC disconnect switches and inverters	64-068 1) b) Appendix B	Ungrounded systems only. Wording must be verbatim per Appendix B.	
All PV interactive points of interconnection with other sources	64-074	Locate at AC disconnects for inverters, panelboards, splitters, etc.	

Equipment	Code rule(s)	Details	Sample label
Meter location and service box diagram	64-076 3)	Locate at the supply meter and service box.	
Backfed breaker – do not relocate	64-112 4) c)	Wording must be verbatim per Appendix B.	
DC disconnect switch	64-200 1)	Locate at the PV output circuit disconnect at an accessible location.	
Rapid shutdown	64-200 2)	Locate at the disconnecting means for the PV output circuit.	
Rapid shutdown	64-218 7)	Locate at the supply meter and at the consumer's service equipment.	

Equipment	Code rule(s)	Details	Sample label
Utility disconnect	84-024 1) i)	Wording must be verbatim to that shown.	UTILTY DISCONNECT DO NOT LOCK
Meter socket	84-030	Provide location of utility disconnect when permitted to be not adjacent.	WARNING INTERCONNECTED PHOTOVOLTAIC POWER SOURCE WARNING UTILITY DISCONNECT LOCATED ON THE NORTH EAST CORNER OF HOUSE
Utility disconnect	84-030 1) & 2)	Warning label and diagram required. Will accept the diagram located on an adjacent meter socket.	WARNING INTERCONNECTED PHOTOVOLTAIC POWER SOURCE