City of Loveland Building Division
410 E 5th Street Loveland, CO 80537
(970) 962-2505
Commercial and Residential Photovoltaic Systems Checklist as of 10/13/2023

Photovoltaic (PV) Distributed Energy Resources (DER) applications are reviewed by the City of Loveland through a parallel, multi-department process.

Prior to applying for the DER building permit, the installation contractor must contact the Power Division at PowerDevelopment@cityofloveland.org to schedule a site walk with a Distribution Designer.

The steps required for the **site walk**:

1) An email requesting a site walk must be sent to PowerDevelopment@cityofloveland.org
    a. The subject line of the E-mail submission must include the address and *DER Site Walk*, and attach an Electric Service Worksheet (ESW-R), or Electric Service Worksheet-Commercial (ESW-C) . The applicant must sign the proper ESW and fill in all of the appropriate information. In your request for a Site Walk, please make it clear whether it is for a commercial or residential property. If sufficient photos are supplied in the email, a site walk may not be needed. Please provide the following photos:
        - Photo of the meter with the meter number visible and legible
        - Photo of the disconnect noting its size
        - A larger-view photo of the entire metering set-up

    You will be notified if the photos were acceptable or if something more is needed.

2) The site walk will be scheduled with a Designer. The applicant does not necessarily need to be present for the site walk (unless it is a commercial property). During the site walk, the Designer will determine if the service entrance meets the City of Loveland's current code and examine the existing equipment.

****No Service Change or Upgrade required - Residential:**

1) The Designer will provide the applicant with the fully signed ESW noting that the equipment meets current code.
2) The applicant will submit the ESW with the rest of the documentation package (as listed below in "Plan Submittal Requirements") for DER Permit to Eplan-res@cityofloveland.org.

****Service Change or Upgrade required - Residential:**

1) The Designer will provide the applicant with the amount that Power requires for the Service Change/Upgrade and a description of the work needed to bring the equipment up to code.
2) The applicant will make payment to the Power Division. Mail or drop off payment to the Water and Power Department located at 200 N. Wilson Ave., Loveland, CO, 80537. Make sure to include a copy of the ESW with your payment.
3) When the payment is received, the Designer will send fully signed ESW to applicant.
4) The applicant will submit signed ESW with Service Change or Upgrade electrical permit application (form found on the Building Division's "Residential Forms" page, FastTrack tab) to Eplan-res@cityofloveland.org.
5) The applicant will perform Service Change or Upgrade and complete permit through Final Electrical Inspection.
6) When the Final Electrical Inspection on the electrical permit is approved, the applicant will submit

previously signed ESW and the documents described below in the "Plan Submittal Requirements" section as a full package to Eplan-res@cityofloveland.org for DER Permit.

7) For Commercial upgrades, the process will be fully explained during the site walk and followed up with a written list of needed actions.

Use the following checklist to determine if your package is complete. Check each item on the list to verify it is part of the submittal. **Incomplete information will result in delay in the review and issuance of your building permit.** Design shall meet all applicable conditions of *Requirements for Electric Service*.

Plan Submittal Requirements

Submit the following documents for review:

- ☐ A completed building permit application form as found on the Building Division's "Residential Forms" page. Include the requested DER System capacity in both AC and DC watts, as well as whether the system is a stand-alone, grid-tied, or hybrid system.
- ☐ A plan review fee deposit (the balance of fees are due at the time of permit issuance)
- ☐ Output of NREL's PVWatts Calculator, https://pvwatts.nrel.gov/, to verify estimated, annual energy output. Add this value to the Interconnection Agreement in section 3.
- ☐ An Interconnection Agreement signed by the customer (owner of the system). Applicant must complete all fields.
- ☐ ESW from above.
- ☐ Proof of insurance. For facilities of less than 100 kW, either homeowner's or building owner's insurance is an acceptable form of insurance without any specific minimum amount of coverage. For larger systems:

  System size 100kW and above, and less than 500kW - A combined single limit for bodily injury and property damage of not less than $300,000 (three hundred thousand dollars) for each occurrence.
  System size is 500kW or greater - A combined single limit for bodily injury and property damage of not less than $2,000,000 (two million dollars) for each occurrence.

- ☐ Construction plans containing the documents listed below.
  - ☐ What to Include in the Site Plan – Equipment Outside of StructureType of isolation device
  - ☐ Location of the existing service disconnect
  - ☐ Location of all roof-mounted equipment, including ridgeline and edge setbacks
  - ☐ Location and connection of all grounding electrode conductors
  - ☐ Dimensions between equipment and property lines
  - ☐ Location of AC disconnect (must be within 10 ft. of the meter). Disconnect must be lockable in open position and provide a visible break.
  - ☐ PV labeling per 2023 NEC guidelines, show location and content of labels. Clear signage must be located at the meter and on the PV system itself – both High Voltage Danger and Emergency Shut-Off.

  Note: See the ***Pole or Ground-Mounted Panels*** section for additional site plan requirements.

Elevation drawings for Exterior and Interior Equipment

☐ Elevation drawing detailing location of service entrance equipment, meter equipment, DER AC disconnect, DER inverters/combiner boxes, and all other added equipment on structure with horizontal and vertical clearances shown from ground level, windows, doors, other utilities, other equipment, etc.

Floor Plan – Equipment within the Structure

☐ Location of all disconnects and isolation device
☐ Type of isolation device (AC Disconnect must still be on the outside of the structure within 10 feet of the meter.)
☐ Location of all batteries (if applicable)
☐ Location of inverters
☐ Location and connection of all grounding electrode conductors
☐ Location of all equipment within structures
☐ Label the use of the room in which the equipment is placed

Stamped Electrical One-Line Diagram

☐ Label whether the system is stand-alone, grid-tied, or hybrid
☐ Conductor sizes
☐ Conductor insulation types (i.e., THHN, THWN, direct burial cable, etc.)
☐ Conductor material types (i.e., copper/aluminum)
☐ Conduit sizes
☐ Conduit materials (i.e., non-metallic, EMT, etc.)
☐ Over current device ratings
☐ Existing and new panel amperage ratings (buss ratings)
☐ Series and parallel configuration of the module connections

Note: The City of Loveland does not allow line-side connections.

Equipment Requirements

☐ Module short circuit current ratings
☐ Module open circuit voltage ratings
☐ Module series fuse ratings
☐ Inverter output circuit current rating
☐ **Inverter must be IEEE 1547 2018 and UL 1741 SA17 certified**
☐ Manufacturer specification sheets for all equipment (i.e. batteries, inverters, disconnects, modules, charge controllers, over-current devices etc.)
☐ Method of grounding for modules and array

Note: Voltage correction factor is based on 2023 NEC guidelines in the FPN.

Panels

Provide the following for **Roof-Mounted Panels**:

☐ A Colorado licensed design professional's evaluation regarding the dead-load capability of the existing roof structure and its ability to support the added weight of the PV panels

☐ For flat roof installations, provide method of repair for roof penetration

Provide the following for **Pole or Ground-Mounted Panels**:

☐ A Colorado licensed design professional footing design

☐ Site Plan Review Waiver approval (as of January 1, 2011)

☐ Site Plan to include the following:

- Location of panel(s) on property
- Dimensions for panel(s) to property lines
- Dimensions from panel(s) to other structures on the property and property easements