

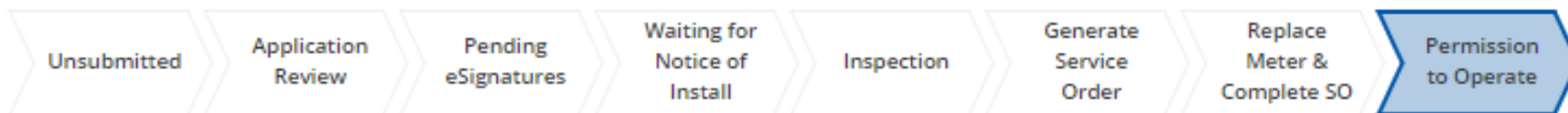


# **Permission to Operate (PTO) Guidelines for DG System Installers**



# Permission to Operate (PTO)

- These Guidelines to Installers are provided to facilitate the efficient and timely processing of Interconnection Applications, from Notice of Installation through Permission to Operate (PTO).



- Installer will have already progressed the customer's Interconnection Application via the TNMP website and PowerClerk system:

[Use TNMP's online distribution generation application system to submit applications.](#)

## ***THE INTERCONNECTION PROCESS***

- *Customer selects an installer.*
- *Installer sends the customer a tariff application for signature.*
- *Installer submits the solar installation via the web-based installer portal.*
- *TNMP reviews the solar project and required documentation, performs a study, and prepares an interconnection agreement.*
- *Once the interconnection agreement is signed by all parties and installation is completed, TNMP inspects and approves the DG installation, then schedules installation of its DG meter.*
- *TNMP installs its DG meter.*
- *Installation of TNMP's DG meter is your authorization to connect your DG system.*
- *Surplus generation is provided to the customer's retail electric provider within 30 to 60 days of installation of TNMP's DG meter.*
- *Customers can see the daily and monthly energy data recorded in 15-minute intervals by their smart meter at [smartmeter.texas.com](http://smartmeter.texas.com)*



# PTO Process Overview

- Installer completes Notice of Installation Form in PowerClerk
- TNMP progresses the Interconnection Application to the Inspection Phase
- Installer follows TNMP guidelines and completes the Inspection Form in PowerClerk, answering the listed questions and uploading the required photos (pdf format recommended)
- TNMP reviews the Inspection Form, together with required installation photos, one-line diagram, layout sketch, and system specifications previously provided.
- The Installer must also record completion of any local city/county inspection if required
- TNMP sends any inspection corrections or clarifications required back to installer
- When no further corrections or clarifications are required, TNMP progresses the Interconnection Application to “Generate Service Order”
- TNMP will issue a meter exchange order and notify customer if any further corrections are required to replace the existing customer meter
- TNMP installs the new DG meter, signaling Permission to Operate has been granted to the customer. The Applicant will also receive an automated email notification that the Interconnection Application is complete, and that they have authorization to connect the DG system.



# Installer Inspection Checklist

- ✓ The TNMP meter is readily accessible by service technicians
- ✓ AC disconnect has physical handle, is properly labeled and the disconnect is open
- ✓ Installation matches the one-line diagram and site layout sketch provided in the application
- ✓ AC disconnect is within 10 feet of the TNMP meter, and there is a site map placard at the AC disconnect and the TNMP meter
- ✓ Line and load are not crossed at the TNMP meter box
- ✓ Installation has been properly labeled (dual source, AC disconnect, rapid shutdown, nominal voltage, placard depending upon layout, reference NEC)
- ✓ PowerClerk 5 picture limit – priority photos installers must upload for inspection:
  1. Installed PV Array showing all panels
  2. Overview of the system matching one-line diagram; photo(s) capture physical layout between the TNMP meter, visible lockable labeled disconnect with external handle, and combiner panel/load center box
  3. If the AC disconnect is out of sight or greater than 10 feet from TNMP meter, requires additional picture for inspection of both the meter and AC disconnect locations. Make certain you have included a clear picture of your visible lockable labeled AC disconnect between the pictures you have uploaded
  4. Close-up of the TNMP meter and box with proper labeling
  5. Picture of inverter(s)

*TNMP will not approve the inspection, install the DG meter, or grant Permission to Operate without suitable quality photos uploaded into PowerClerk by the installer*



# PV Array

- Upload a photo showing all panels
- Must be countable (preferably an overhead picture / drone shot)
- If more than one photo is required to count all panels, installer can place multiple photos on one sheet and upload into PowerClerk as a single pdf file.





# Overview of the System

- Upload photo(s) that capture the physical layout between the TNMP meter, visible lockable labeled AC disconnect with external handle, and combiner panel/load center box
- Photo(s) must be sufficient to validate that the installation matches the one-line diagram and example site layout sketch provided in the Interconnection Application
- TNMP will review photo(s) to validate that the installation has been properly labeled
- If the AC disconnect is out of sight or greater than 10 feet from TNMP meter, requires additional picture for inspection of both the meter and AC disconnect locations (incl. placard)





# TNMP Meter

- Identify the TNMP meter and take a close-up so that the meter number is readable
- Take a picture of the meter can with proper labeling visible





# Inverter(s)

- Take an overview picture of the installed inverter(s), or a picture of a single microinverter, in order to validate actual installation matches design and equipment information previously provided in the Interconnection Application








# Common Inspection Failures

- Installer uploaded photos must visibly meet current NEC labeling requirements (including but not limited to dual source, AC disconnect, rapid shutdown, nominal voltage, layout placard, etc.)
- TNMP will not approve the inspection, install the DG meter, or grant Permission to Operate until corrected by the installer

2020 NEC Labeling Requirements					
Section	Location of Label	Label Text and Appearance	Section	Location of Label	Label Text and Appearance
690.54	All interactive system(s) points of interconnection with other sources shall be marked at an accessible location at the disconnecting means as a power source and with the rated ac output current and the nominal operating ac voltage.	<b>PHOTOVOLTAIC AC DISCONNECT</b> MAXIMUM AC OPERATING CURRENT: _____ NOMINAL OPERATING AC VOLTAGE: _____	705.12	Permanent warning labels shall be applied to distribution equipment	<b>WARNING</b> THIS EQUIPMENT FED BY MULTIPLE SOURCES. TOTAL RATING OF ALL DISCONNECT DEVICES, INCLUDING MAIN SUPPLY DISCONNECT DEVICE, SHALL NOT EXCEED AMPACITY OF BUSBAR.
690.56(B) 690.4(D) 705.10 705.12	A permanent plaque or directory, denoting all electric power sources on or in the premises, shall be installed at each service equipment location and at locations of all electric power production sources capable of being interconnected.	<b>WARNING DUAL POWER SOURCE</b> SECOND SOURCE IS PHOTOVOLTAIC SYSTEM	705.12	A permanent warning label shall be applied to the distribution equipment adjacent to the back-fed breaker from the inverter.	<b>WARNING</b> INVERTER OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE.
690.13(B)	Each PV system disconnecting means shall plainly indicate whether in the open (off) or closed (on) position and be permanently marked:  "PV SYSTEM DISCONNECT"  Or equivalent.	<b>MAIN PHOTOVOLTAIC SYSTEM DISCONNECT</b>  <b>PHOTOVOLTAIC DC DISCONNECT PHOTOVOLTAIC</b>  <b>AC DISCONNECT</b>	690.56 (C)	(1)(a) For PV systems that shut down the array and conductors leaving the array: The title "SOLAR PV SYSTEM IS EQUIPPED WITH RAPID SHUTDOWN" shall utilize capitalized characters with a minimum height of 3/8 in. in black on yellow background, and the remaining characters shall be capitalized with a minimum height of 3/16 in. in black on white background.  (2) A rapid shutdown switch shall have a label located on or no more than 3 ft from the switch that includes this wording. The label shall be reflective, with all letters capitalized and having a minimum height of 3/8 in., in white on red background.	<b>SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN</b>  TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUTDOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN ARRAY 
690.53	A permanent label for the direct-current PV power source indicating the information specified in (1) through (3) shall be provided by the installer at the PV disconnecting means.	MAXIMUM VOLTAGE: _____ MAXIMUM CIRCUIT CURRENT: _____ MAX RATED OUTPUT CURRENT OF THE CHARGE CONTROLLER OR DC TO DC CONVERTER (IF INSTALLED): _____			<b>RAPID SHUTDOWN SWITCH FOR SOLAR PV</b>
690.31 (D)(2)	The following wiring methods and enclosures that contain PV power source conductors shall be marked: (1) Exposed raceways, cable trays, and other wiring methods (2) Covers or enclosures of pull boxes and junction boxes (3) Conduit bodies in which any of the available conduit openings are unused	<b>WARNING: PHOTOVOLTAIC POWER SOURCE</b>		The labels in 690.56(C) shall include a simple diagram of a building with a roof. Buildings with PV systems shall have a permanent label located at each service equipment location to which the PV systems are connected or at an approved readily visible location and shall indicate the location of rapid shutdown initiation devices.  (1) <b>Buildings with More Than One Rapid Shutdown Type.</b> For buildings that have PV systems with more than one rapid shutdown type or PV systems with no rapid shutdown, a detailed plan view diagram of the roof shall be provided showing each different PV system with a dotted line around areas that remain energized after rapid shutdown is initiated.	
690.13(B) 690.15	Where all terminals of the disconnecting means may be energized in the open position, a warning sign shall be mounted on or adjacent to the disconnecting means.	<b>WARNING</b> <b>ELECTRICAL SHOCK HAZARD</b>  TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION			



# Common Existing Condition Failures

Violations must be corrected prior to acceptance of the DG system or installation of TNMP's DG Meter

TNMP does not allow crossing of line and load wiring at the meter box



The customer is responsible for installation and maintenance of the meter can and service riser pipe at the house



Exposed Service Wire  
No Slip Collar  
Riser Conduit is Schedule 40

The Service Entrance is not permitted to be installed within a covered patio area or enclosed area



# Final Installer Inspection Check

- Check that the uploaded installation photos match the one-line diagram and layout sketch provided earlier in the Interconnection Application process
- Upload a corrected one-line diagram and layout sketch to match actual installation as necessary
- The inspection will be rejected by the TNMP reviewer until the actual installation matches the design information provided earlier in the Interconnection Application process
- When no further corrections or clarifications are required, TNMP progresses the Interconnection Application to “Generate Service Order” (see PTO Process Overview)

