Solar Installer Meeting

August 2024 updates 1:30 – 3:30 pm

We want to hear from you! Please use the Question & Answer Feature for any questions.

Agenda

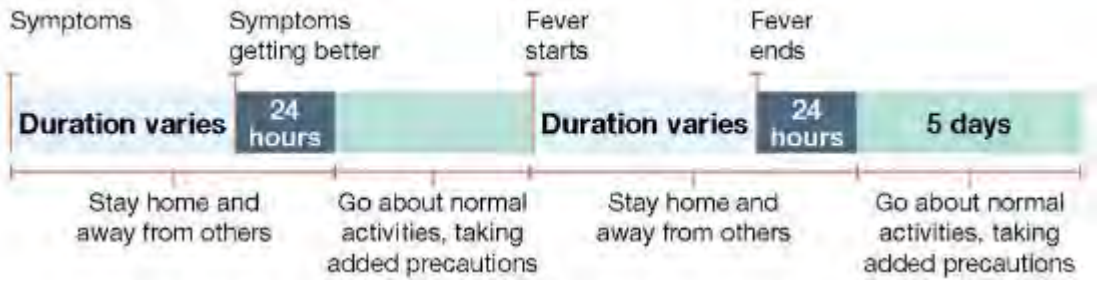
- Team Introductions
- Safety Moment
- Technical Services Updates
- Administrative Review
- Questions

Technical Services Team

Renewables Team

Back Row: Blanka Anderson, Doreen Ortega, Anthony Lombardi
Front Row: Allison Smart, Patricia Gallegos Duran, Kayla Randall

SAFETY MOMENT: RESPITORY ILLNESSES



PROGRAM UPDATES AND GUIDANCE

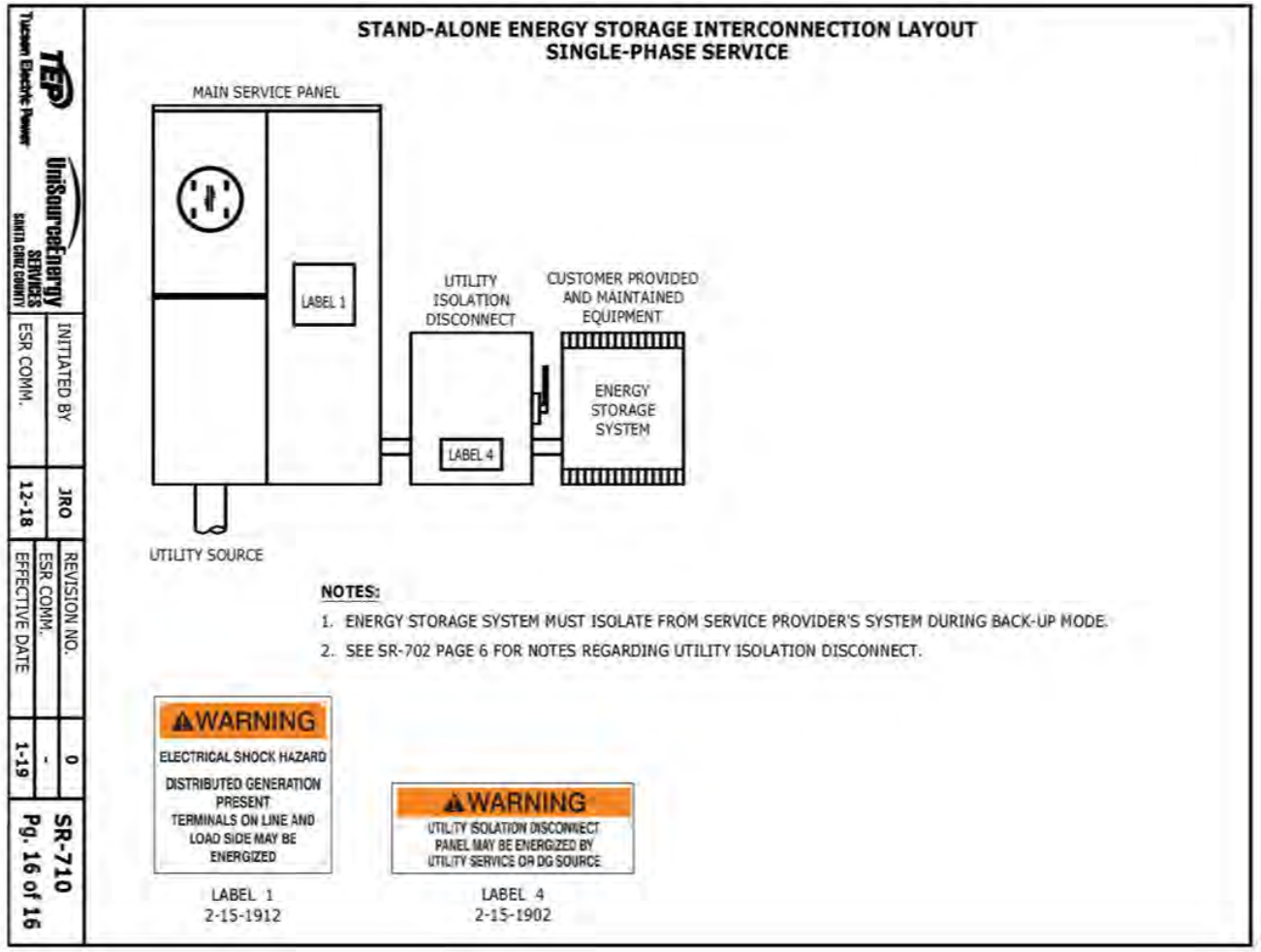
METER SOCKET ADAPTER - MARWELL

- New meter socket adapters:
  - Need to be reviewed by several teams within TEP
  - Installers shall provide documentation showing MSA's make and model
  - Installer shall provide documentation showing product is UL listing

- Marwell Meter Socket Adapter:
  - No external wiring compartment
  - Overcurrent protection required outside MSA
  - DG Disconnect shall have a N-G bond

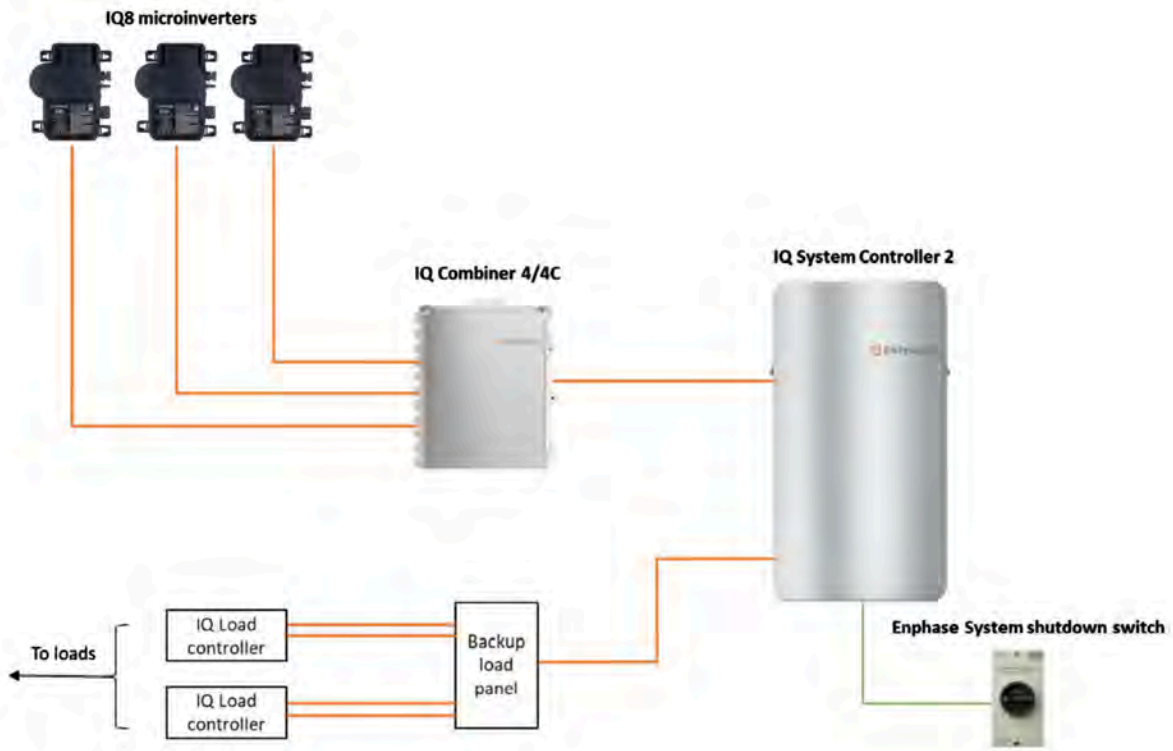
HOME BACKUP WITH EV'S

- Systems using the battery from an EV to provide backup into a residential service, require an Energy Storage application and compliance with SR-710

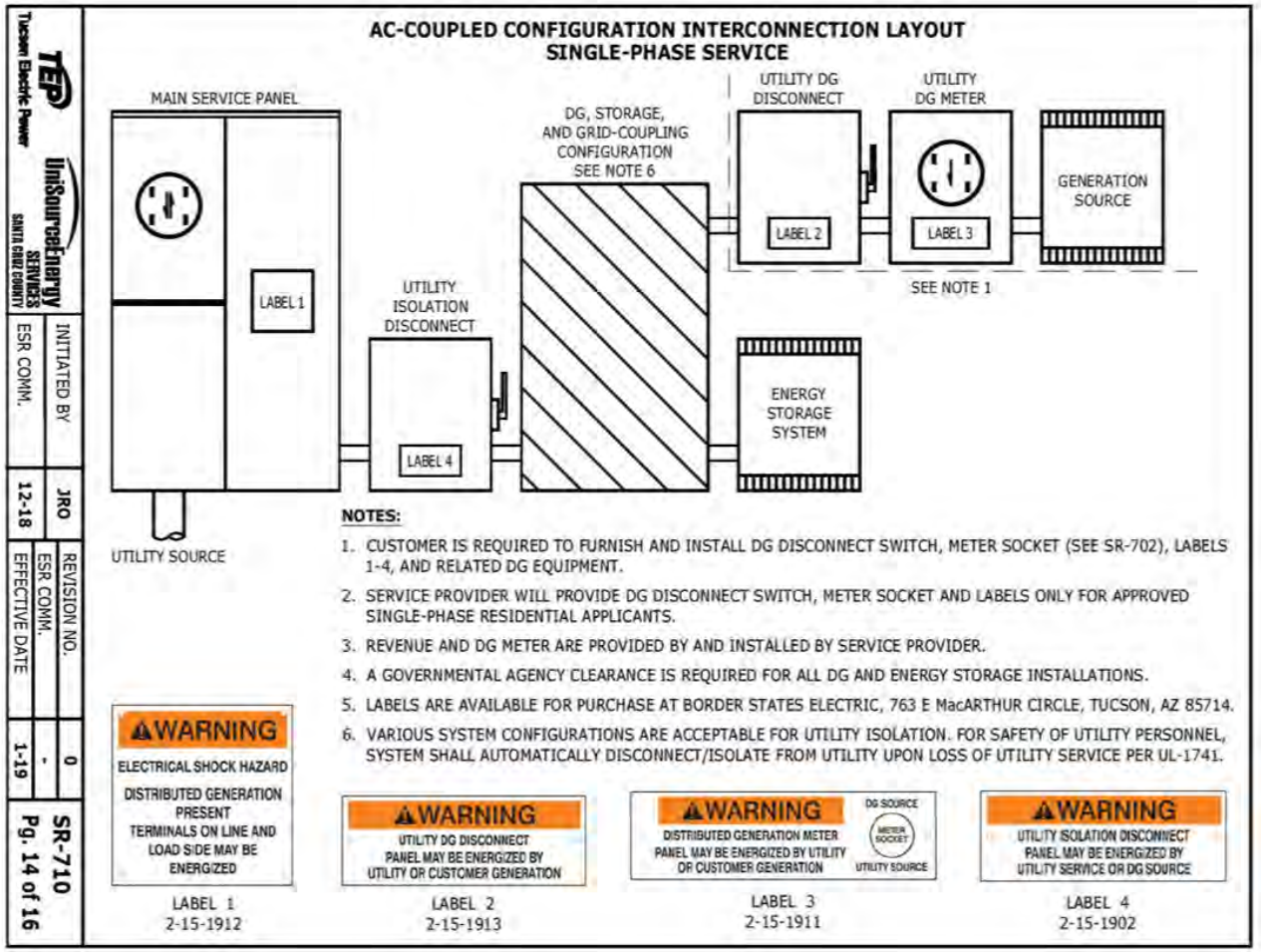


DAYLIGHT BACKUP AND SMART-SWITCHES

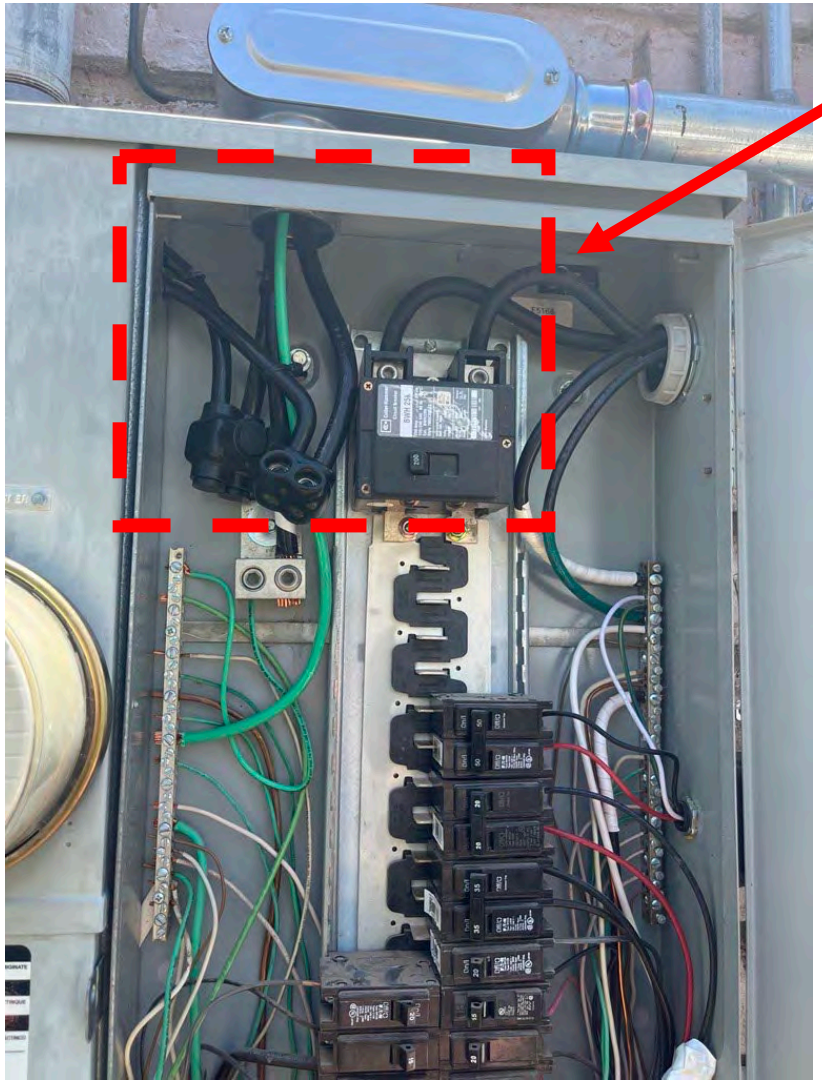
Enphase Daylight system:



AC coupled configuration from SR-710:

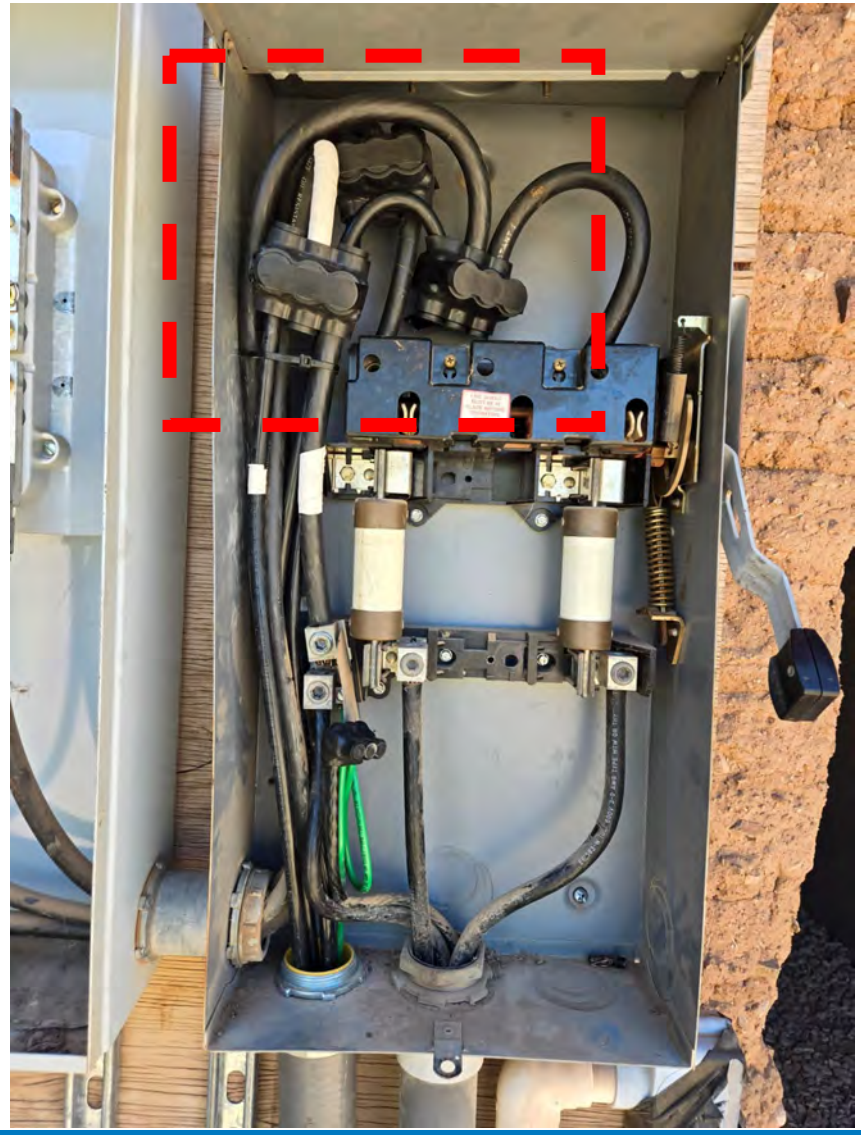


MODIFYING UL LISTED ELECTRIC EQUIPMENT



- Modifying an all-in-one service panel, as shown in the photo to the left, with the intention to interconnect a PV system on the line-side of the service, violates the UL listing of the equipment.

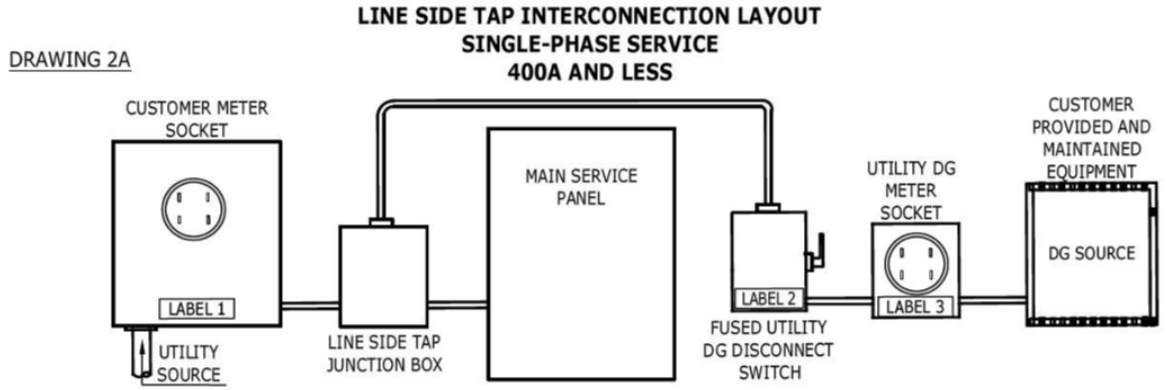
- Line side taps are not allowed inside customer main service disconnect or main service panel, as described in TEP's SR-702.



LINE-SIDE TAPS REQUIREMENTS REVIEW

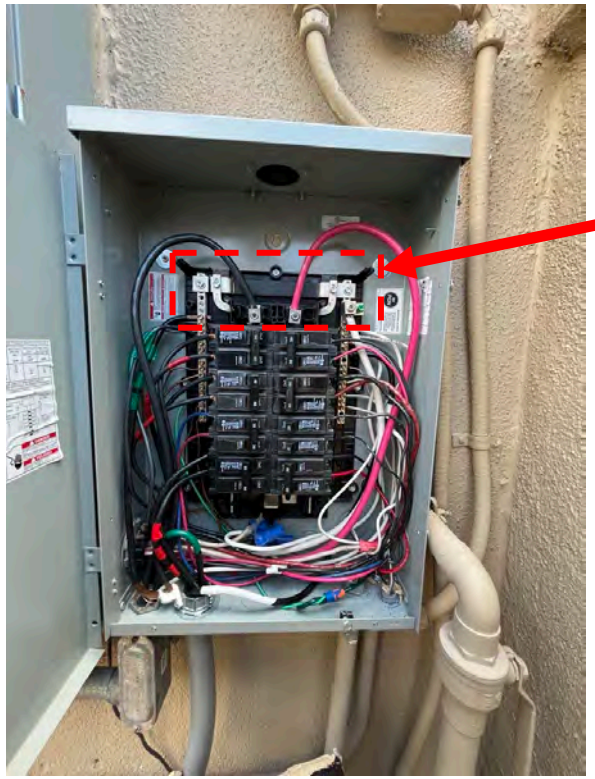
TEP INTERCONNECTION MANUAL FOR DISTRIBUTED GENERATION

- Any supply side connection shall be made without modifications to any factory installed and/or UL listed equipment or components, unless expressly authorized by the panel manufacturer and/or listing agency. Any authorized modification must be performed in strict accordance with the panel manufacturer's directions and specifications. If panel manufacturer authorization is granted to perform a supply side connection, proof of such authorization and AHJ approval shall be provided to TEP as part of the Interconnection Application process.
- Rigid metal conduit (RMC) shall be used between the supply side connection in the SES and an external fused service disconnect for the DG output circuit. (Exception: A short length of flexible conduit may be used to connect a meter socket adapter (MSA)
- The supply side connection fused service disconnect shall be mounted within 10', and in the line of sight, of the SES as per NEC Article 705.31
- A neutral to ground (N-G) bond must be established in the supply side connection fused service disconnect. Note however, that if the supply side connection is made via a protective device located within the SES (i.e. not an external fused service disconnect), then the existing N-G bond in the SES will suffice. Such bonding shall conform to NEC requirements.



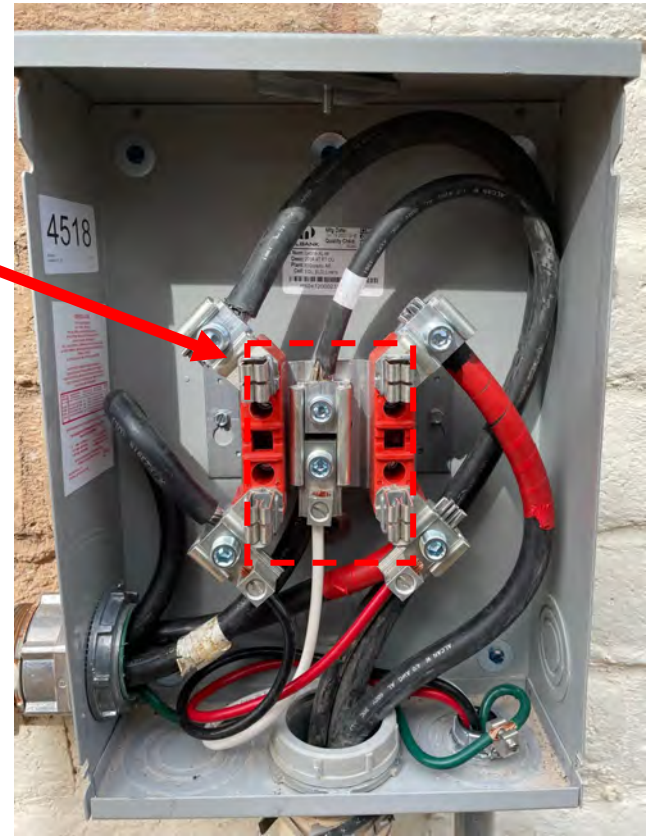
NEUTRAL TO GROUND BOND – GENERAL REMINDERS

- N-G bond shall be required for line side tap interconnections, where the OCPD of the tap conductor is located at the utility DG disconnect.
  - If multiple N-G connections exist at multiple locations, this represents a safety hazard and a direct violation of NEC article 250.142.



N-G bond at subpanel

VIOLATION OF NEC ARTICLE 250.142



N-G bond at Copper B-line Meter Socket

DG METER PULL AND OR RELOCATION COMMUNICATION

Partnering for a successful meter reset or project closure

- A DG meter pull should be selected, when the scope of work requires access to the existing completed DG meter enclosure.
- It is the responsibility of the installation company to identify this situation and choose this option on the application. TEP should not be making this determination.
- TEP understands that most of the reasons a DG meter pull is required are for upsizing/changing of conductors, upsizing/changing the meter enclosure and for relocation purposes. But for other scenarios that may come up, the Installation company must, at their discretion, request a DG meter pull if deemed necessary.
- When a PV project includes an existing PV system and a DG meter pull is required or not required as part of the scope of work, it is important, on the application and the drawings, to communicate the reason for this.

TECHNICAL GUIDANCE LETTER

Taking our best review advice - Project specific

Thank you for your patience while we completed a thorough review of your project. Technical Review of your project is now complete.

In order to pass Notice of Installation of Completion (NIC) to successfully exchange your meter as we work toward energizing your system, the following criteria must be met:

- **Labels must be placed on the meter base; the dg disconnect and the main service panel. TEP Label 1, TEP Label 2, TEP Label 3. Referenced labels may be purchased at Border States at 763 E MacArthur Circle., Tucson AZ 85714.**
- **Please ensure the following conditions are met for your installation: ---For a more efficient review process at NIC, please include a photo(s) of the interior wiring and bonding of the Dg meter, Dg disconnect and Utility Isolation Disconnect.**
  ---Please include a photo of the interior of the new main service panel.

Project approval pending final administrative review.

We look forward to working with you as your project begins construction.

The Energy Programs Team

TEP'S SERVICE REQUIREMENTS – REMINDERS

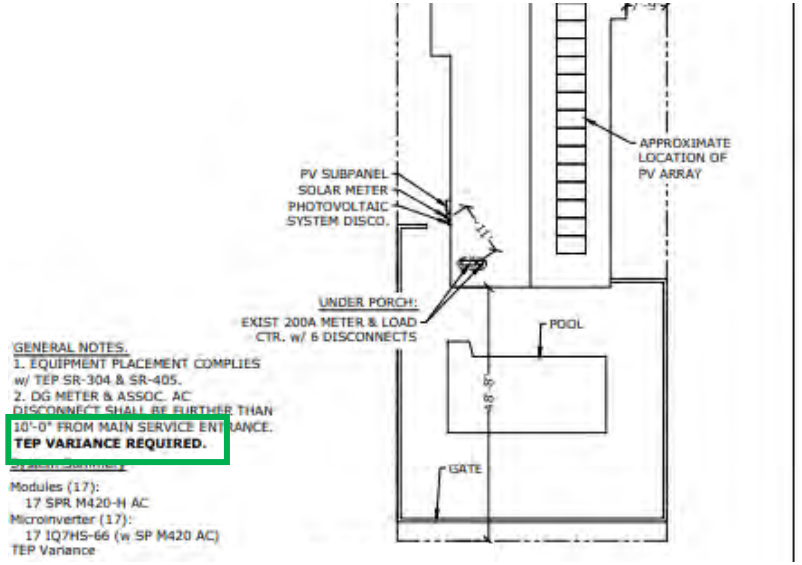
EQUIPMENT LOCATION REQUIREMENTS

(b) Arrangement and Location:

4 The DG meter shall be located within 10 feet of the revenue meter, within line of sight and not separated by walls, gates or obstructions. Variances are not granted based on convenience or preference and must be submitted in the DG application and subsequently approved prior to construction. Meter sockets shall be accessible to Service Provider personnel at all times.

MAIN SERVICE – DIRECTORY LABEL

VARIANCE REQUEST DRAWINGS NOTE



DG EQUIPMENT– DIRECTORY LABEL

SR-405 – PROHIBITED LOCATIONS

10. PROHIBITED METER AND/OR INSTRUMENT TRANSFORMER CABINET LOCATIONS

In the interest of providing service to our customers and safe working conditions for our employees, certain locations for equipment installations shall be prohibited. Meters and associated equipment shall not be installed in the following locations **unless prior approval is given by Design Services.**

A. In any rest, bath, shower, or toilet room.

B. Directly over any door, window, stairway, ramp, or steps.

C. In any hazardous location.

D. On any roof, attic, or place not in general use.

E. In any basement.

F. In any equipment room.

G. Approval of locations D, E, and F will be based on the following facts:

1) The meter and metering equipment are readily accessible for reading and testing, and access to them does not require procuring a key from the customer or permission to enter on each occasion. If, for any reason the customer (original or future) decides to stop Service Provider access to a metering location, the meter and metering equipment must be moved to a new approved location at the customer's expense.

2) The location shall not be used to store valuable merchandise, equipment, etc.

3) The location does not require Company employees to take hazardous or time consuming methods to gain access.

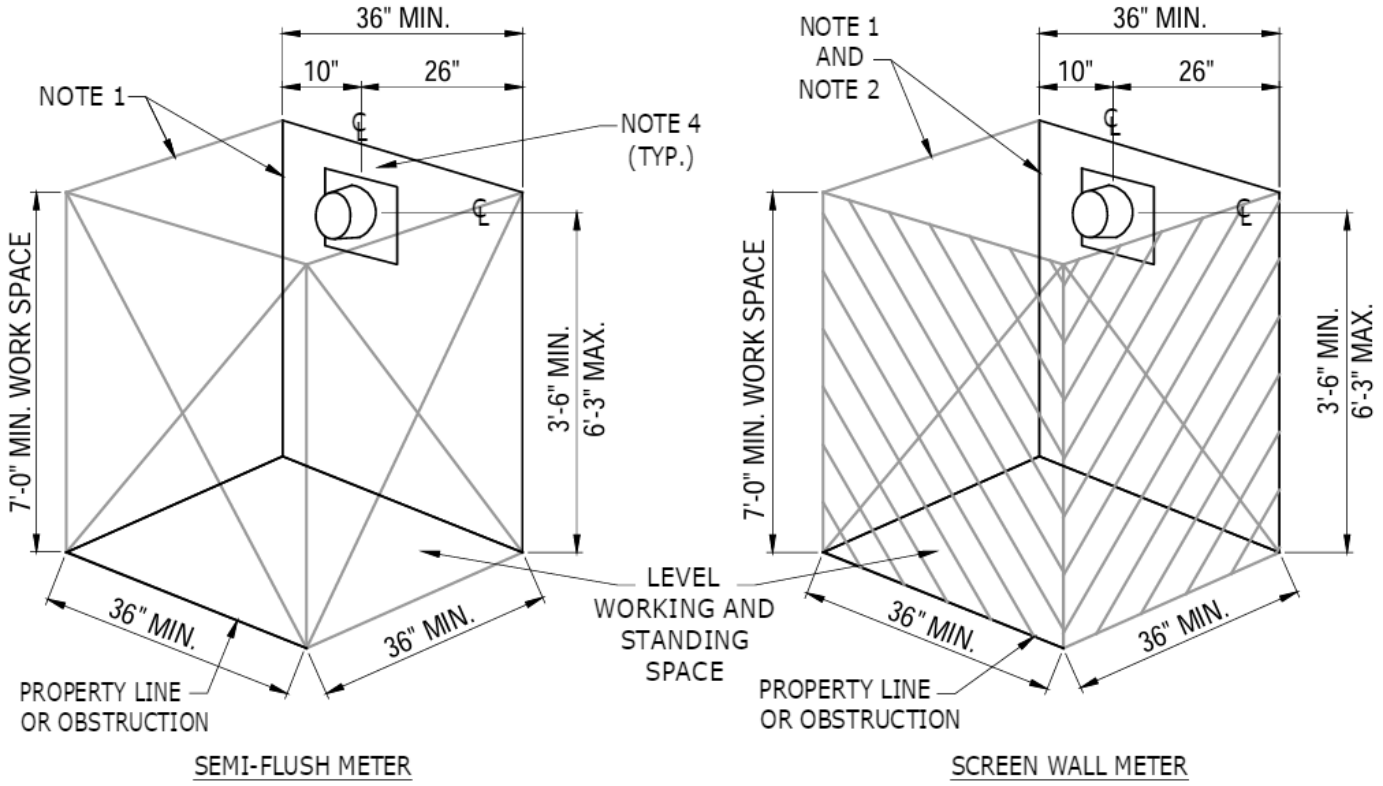
4) The location is not a high security area with restricted access.

13 L. Under any carport, breezeway, patio, porch or area that can be enclosed with building expansion. Existing overhead type service entrances may remain under a carport, breezeway, patio or porch unless the area is to be enclosed. Underground type service entrances must be relocated if the service is upgraded. All residential service types must be relocated if the service entrance is enclosed within any room, garage, screened in area, etc..

SR-405 – WORKING SPACE

11. WORKING SPACE

A level standing and working surface shall be provided and maintained in front of each metering installation. The service trench will be backfilled to final grade before calling for a metering inspection. The meter height is to be 3'-6" minimum and cannot exceed 6'-3". A clear and unobstructed working space shall be provided above the surface. The width of the working space shall be sufficient to permit ready access to the metering equipment and in no case less than 3 feet. The height of the working space shall be no less than 7 feet. The working space shall extend at least 3 feet in front of the surface on which the metering equipment is mounted and no less than 10 inches from the meter centerline to any obstruction such as walls, plants or trees, see SR-405, Page 10, for additional information.



SEMI-FLUSH METER

SCREEN WALL METER

NOTES:

1. NEAREST SIDE WALL OR OTHER OBSTRUCTION.
2. ONE SIDE OF SCREEN WALL TO REMAIN OPEN.
3. SR-405, PAGE 5, NOTE 11.
4. NINE (9) INCH MINIMUM TO ANY OBSTRUCTION ABOVE METER.

SR-405 – ADDRESS LABELS, MULTI-METER INSTALLATIONS

5. METER SOCKET AND METER SWITCH IDENTIFICATION

Residential, apartments and commercial service entrances shall have the complete street address of premises where new service is required plainly displayed. The address is to be placed on the front of the building and at each apartment or suite in plain view. For individual residential homes permanent addressing is required at the service entrance (See below for permanent identification requirements).

Permanent identification for switches, meter sockets and interior distribution panels shall be made with metal tags with raised letters and/or numbers no smaller than 1/2 inch. Identification labeling must maintain identity after being painted and shall be attached with rivets or screws. Apartment and commercial unit door labeling will be no smaller than 3/4 inch.

SR-600 – GROUNDING AND BONDING

NFPA 70 NEC

1. Customer wire shall not be run through utility sealed areas.
2. Weatherproof hubs, etc., shall be used on any penetrations of equipment at the same height or above energized areas. A good rule of thumb is; that unless the penetration is on the bottom surface of a can, it shall be done with a weatherproof connection. Indoor equipment is an exception to this requirement.
3. Bonding hubs (Meyers or equivalent) shall not be used on multi-centric knockouts, unless the largest knockout is used.
4. Interior metal water piping systems, complying with NEC requirements are permitted for grounding and shall be bonded to the service entrance enclosure with conductors sized per NEC. In multiple occupancy buildings where the interior metal water piping system for the individual occupancies is isolated from all other occupancies by the use of non-metallic pipe, each water system may be bonded to the panel board or switchboard enclosure supplying that occupancy, sized per NEC.
5. Other metal piping systems (e.g. gas pipe) shall be bonded to the service equipment enclosure with a conductor sized per NEC.
6. Nonconductive paint must be removed at threads, contact points and contact surfaces of any ground/bond lugs, terminal strips, etc., to assure a good electrical connection.

GROUNDING

The grounding electrode conductor may be either bare or with green insulation. Ground electrode conductors not encased in conduit shall be a minimum size of No. 4 copper or larger and must be securely fastened to the building or structure with approved fastening devices. The spacing of such devices shall not exceed 2 feet. If a ground rod is used as an electrode, they shall be at least 6 feet apart and at least 8 feet shall be in contact with the soil.

Grounding Electrode conductors smaller than size No. 4 copper shall be solid copper wire, or shall be attached to the ground rod using the exothermic welding process.

Note 3 - Meyers Hub

Ground wires

SR-709 – GENERATORS

USE: Residential

BACKUP GENERATOR CONNECTION REQUIREMENTS

1. PURPOSE

These electric service requirements include information for use by the Service Provider and customers for connection and operation of customer-owned backup generation. The requirements presented are to ensure the safety of both utility and customer personnel and property.

2. APPLICABILITY

This document applies to all single-phase residential backup generation operating as optional standby systems as defined by the National Electrical Code (NEC) Article 702. Emergency generation systems and legally required standby systems are more complex and will require individual review by Service Provider engineering.

USE: Residential

BACKUP GENERATOR CONNECTION REQUIREMENTS

CONFIGURATION WITH BACKUP LOADS PANEL

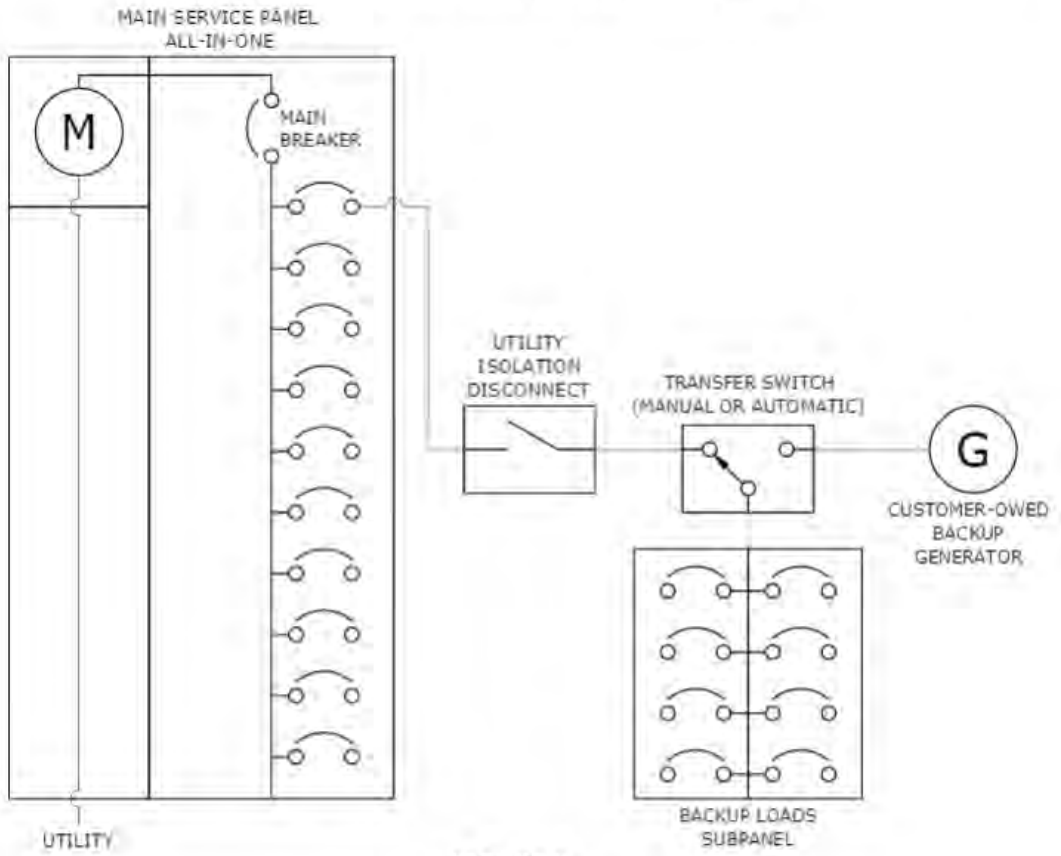


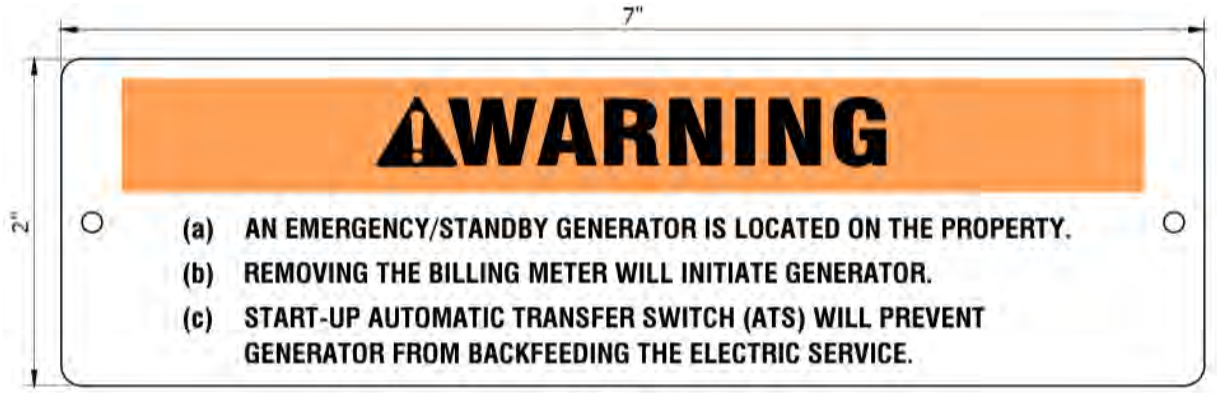
FIGURE 3

SR-709 – GENERATORS – PLACARDS/WARNING SIGNS

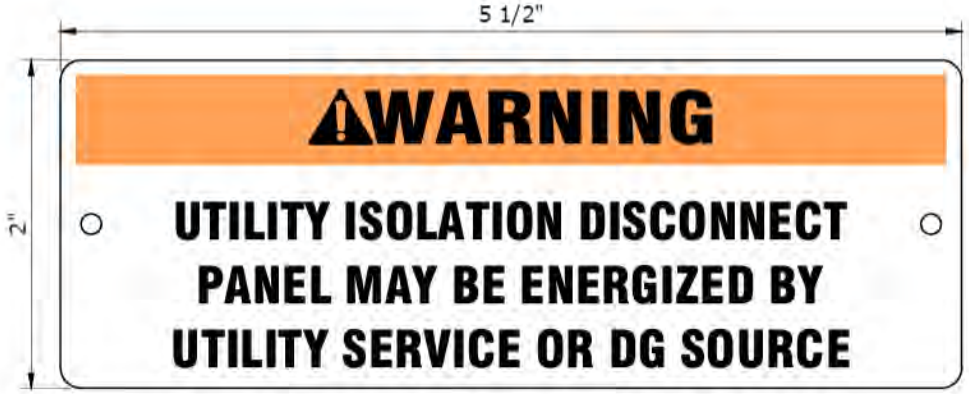
7. PLACARDS/ WARNING SIGNS

a. Backup generators that operate in open transition mode by means of an automatic transfer switch as described herein are required to include a warning sign located at the customer service entrance. The warning sign (LABEL 1) is available at Border States Electric. Customer will be responsible for purchase and installation. Inspection of sign installation will be completed by Design Services prior to energization of the system.

b. The utility isolation disconnect switch installed between the transfer switch and the utility supply source shall be required to include a warning sign located at the disconnect switch. The warning sign (LABEL 2) is available at Border States Electric. Customer will be responsible for purchase and installation. Inspection of sign installation will be completed by Design Services prior to energization of the system.



LABEL 1



LABEL 2

ADMINISTRATIVE PROCESS REMINDERS

Working together for a smooth solar journey

ESTABLISHING PHOTO

The last photo taken of the project tells the complete story

DG METER PULL AND OR RELOCATION COMMUNICATION

Facilitating a smooth path for a successful meter reset, or project closure

PV Meter Wiring (meter not pulled)

The installer confirmed at NIC that the meter was not pulled, which clearly informs TEP that no further action is required by our metering department and PTO may be granted.

The installer informed us on the application that the DG meter needed to be pulled. Our photo still shows the DG meter is installed? In most cases, the reason for this error is the timing of the establishing photo. This causes confusion and delays.

When it comes to existing solar projects, either the first or this last photo is what we expect to see. They both clearly paint the picture of next steps.

POTENTIAL VARIANCE CONDITIONS

1st Opportunity: Distance

Is the distance from the DG Meter Socket and Utility DG Disconnect to Utility Billing Meter **within 10 feet of each other?**

2nd Opportunity: Wall, Gate, or other Obstruction

You may have answered the preceding question in the affirmative:

The DG meter shall be located within 10 feet of the revenue meter. However, does the following also apply?

The equipment is within line of sight and not separated by walls, gates or obstructions.

3rd Opportunity: Special Circumstance

Is there **a special circumstance** that prevents you from meeting any TEP Service Requirements?

This is the last opportunity to explain that unique circumstances might exist, related to any Service Requirement or standard operating procedure.

Submitting a request for variance does not imply approval.

TOP THINGS TO KNOW

Partnering for a successful end of the year

Meter Set Assurance Date **October 17, 2024**

- Submit an approved application and all required documents in PowerClerk.
- Ensure that the customer has returned a signed Interconnection Agreement and any amendments, if applicable.
- Submit a complete and accurate Notice of Installation Completion (NIC) form in PowerClerk.
- Adhere to all TEP Electric Service Requirements standards (702, 703, 710 etc.), including use of approved utility warning labeling and any required facility map placards, if applicable.
- Establishing photos showing equipment layout and label placement.
- Complete all project inspections required by TEP and the Authority Having Jurisdiction (AHJ).
- Verify that all required clearances, including a final Distributed Generation Clearance (DGC) from the AHJ, have been transmitted by the AHJ to TEP's New Service Department.

BARRIER TO ENTRY: Avoiding a failed meter set attempt

A Barrier to Entry can prevent the TEP Metering Department from setting the DG alternative energy meter.

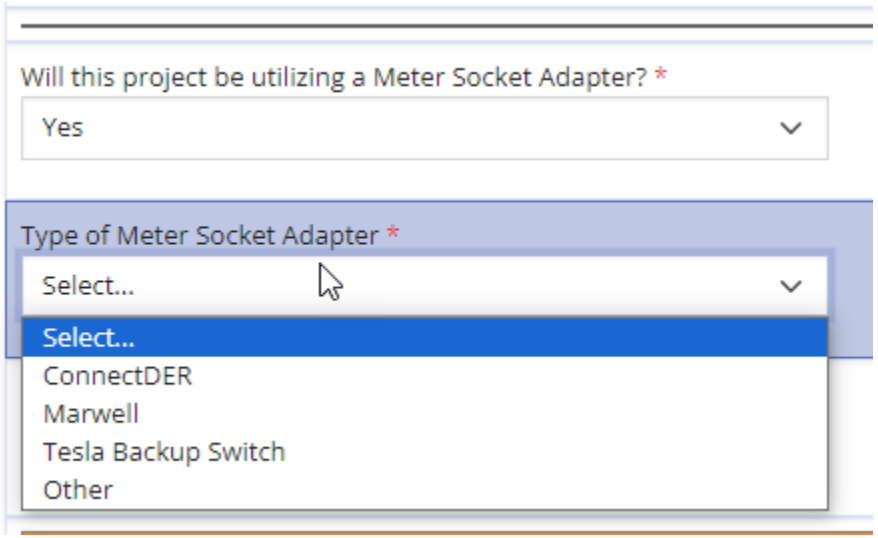
NO METER ACCESS 108 | 4.2% of YTD Installations

Rejection Reason	Count
Existing Solar Customer with Multiple Production Meters	0
Incomplete Project	0
Missing 702 Placards	0
Missing 710 Placards	0
Multiple Issues	3
Open Holes/Loose Equipment	7
Other	3
PV Breaker Issue or Missing Breaker	1
SR-405 Violation	0
SR-452 Violation/Ring less DG Meter Socket	0
SR-710 Violation	0

A Barrier to Entry is also any reason that requires scheduling of the DG meter set.

QUESTIONS FOR CLARITY

Meter Socket Adapters (MSA)



ADMINSTRATIVE STEPS

Communicate use of MSA in PowerClerk
Submit permit to TEP for Work Order Creation
Work Order Number is updated in PowerClerk
A power kill is scheduled with TEP Design (520-918-8300)
Schedule with AHJ inspection based on TEP schedule date

FIELD/INSTALLATION STEPS

TEP de-energizes service and removes billing meter
Installer terminates the ground inside the meter enclosure and installs MSA
AHJ completes inspection and issues clearance (as required)
TEP seals MSA and reinstalls the billing meter and energizes service

For efficiency, if your project requires multiple tasks; for example, an MSA, a derate and has energy storage, we need to be prepared to complete all work during the initial power kill.

MAJOR MODIFICATIONS

Unexpected Changes Happen Sometimes

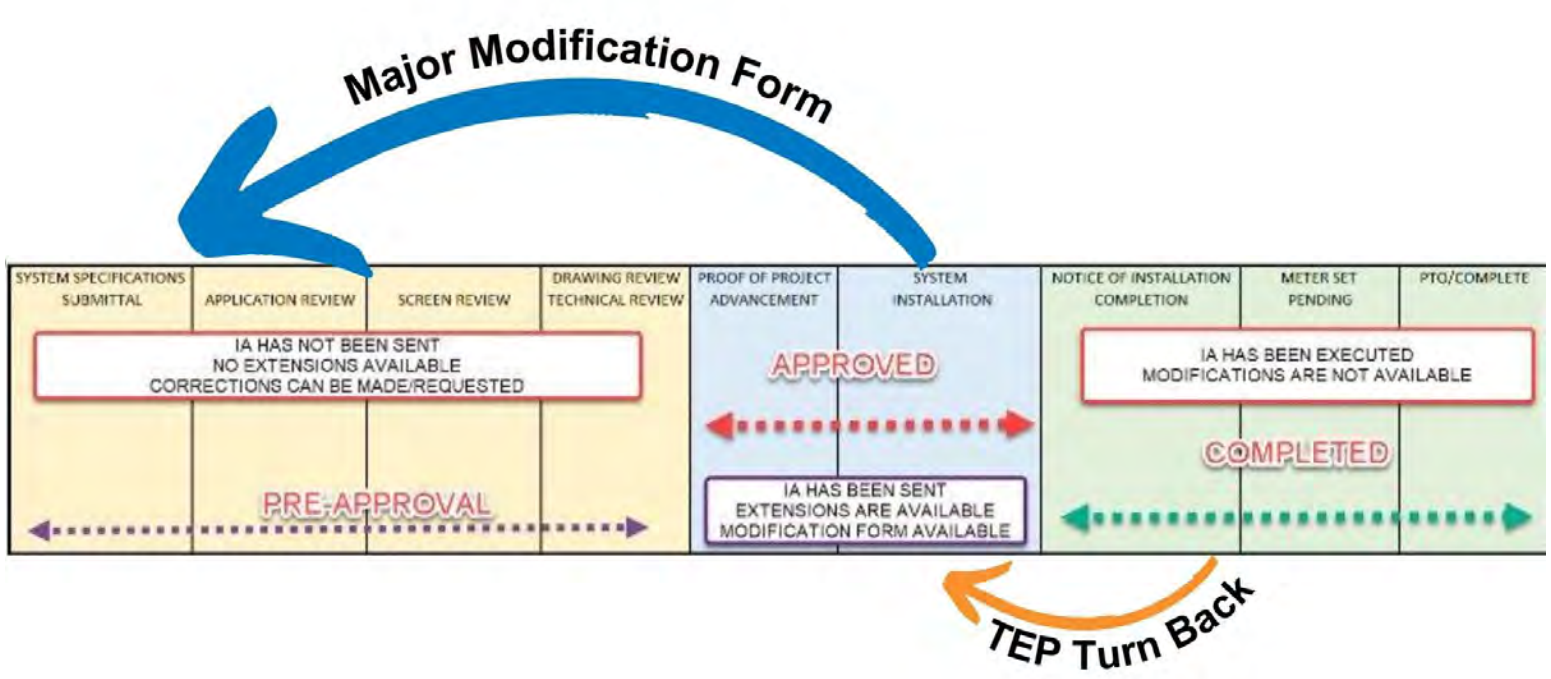
Submit what you intend to build in the field

Unexpected changes turns project back to the beginning

Major Modification Request form only available in two statuses

If Major Change discovered during NIC review:

TEP will move project back to a status where form is available



ORPHANED CUSTOMERS

TEP is here to help & we appreciate YOU for helping our Customers

- Submit New Project through Power Clerk
- Email Renewables@tep.com when status is System Specifications Submittal
- TEP will verify orphaned project is withdrawn
- TEP will reset RCP Reservation Date on new project to match orphaned project
- Upon receipt of the Records Release Form, TEP will email drawings from orphaned project
- TEP will work as quickly as possible to review and approve project

Key Resources

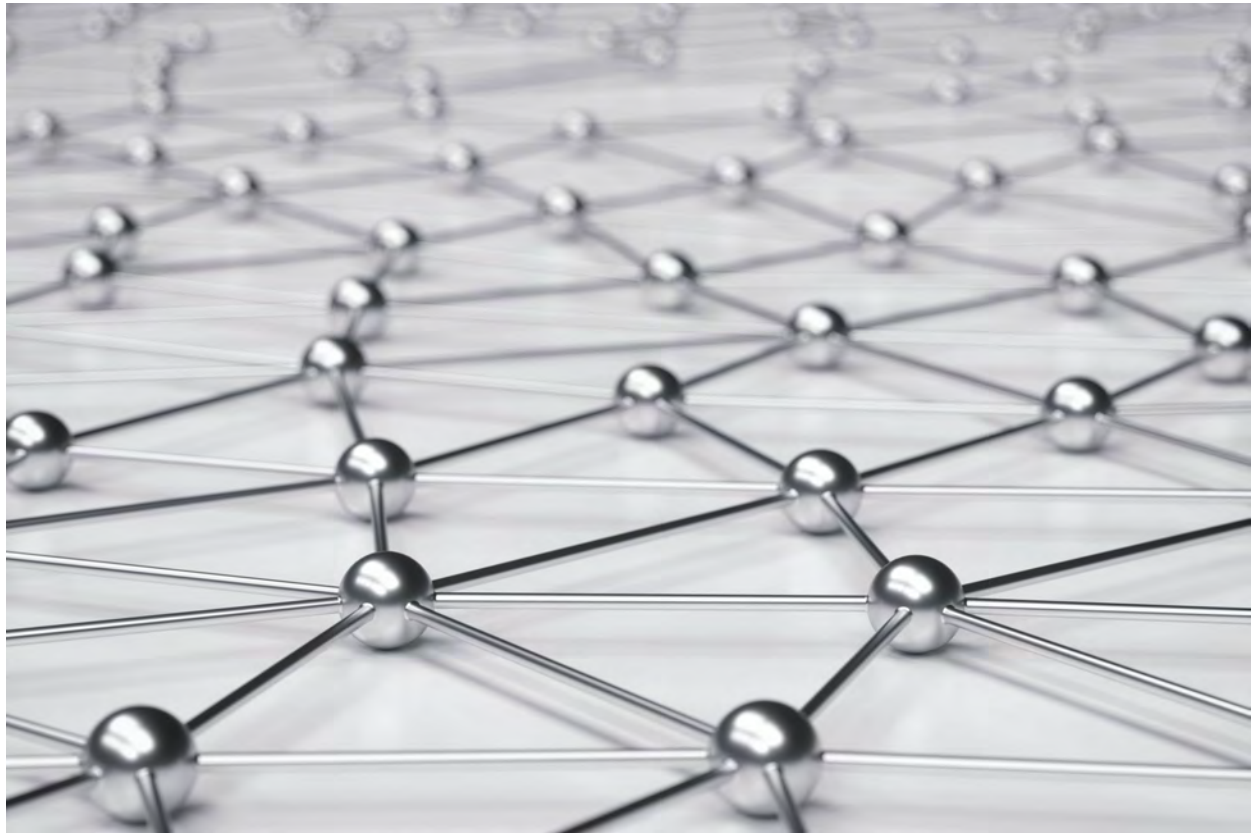
Thank you for serving our mutual customers

At your fingertips: Visit the solar installer page on tep.com for everything from our interconnection manual to our service requirements.

A direct connection: Email Renewables@TEP.com if you would like to schedule some time to meet with our coordinators.

Status updates: Follow along in PowerClerk at tepdg.powerclerk.com

Power kill scheduling: 520-918-8300




TEP
QUESTIONS