Objective: To reduce or eliminate the time it requires to perform a main service panel upgrade for one and two family dwelling solar PV installations while ensuring the safety and reliability of the electric grid.

1. Issue Statement:

The deployment of solar energy systems on one and two family dwellings can take months to accomplish. One of the delays experienced is upgrading a customer’s existing main service panel, in order to support the addition of the PV System.

2. Background:

The need for a main service panel upgrade can impact a PV install project in several ways.

- A customer may require more time to consider the project due to the cost of the main service panel upgrade or may not approve the project moving forward.

- The PV installer can cause delays by not understanding or properly executing the multitude of steps required to perform a main service panel upgrade.

- Inconsistent requirements of some AHJs can also create confusion for installers thus impacting the process and time to perform a main service panel upgrade.

- Utilities can also be a source of delays to complete a main service panel upgrade depending on procedures that they have in place and/or the resources they have available to dedicate to the process.

3. Current Status:

Delays associated with a main service panel upgrade can sometimes account for almost half of the time when the PV system is sold and the time that it can be turned on. This is one of the most common complaints from PV system customers at this time.
4. Key considerations:

The State of California continues to set far-reaching climate and energy goals. There are many state policies and laws promoting and encouraging the use of solar energy systems.

Many cities are vowing to use more renewable energy and to cut greenhouse gas emissions. Utilities, regulators, technology providers, and customers need to work together to build the greatest electricity system that delivers value and affordability to customers and society.

5. Recommendation(s):

The following are practices and processes to consider when main service panel upgrades are required:

1) The first line of defense should be to avoid the main service panel upgrade completely. This can be accomplished in different ways by different entities:

   a. PV Installer - If the panel upgrade is required simply due to the size of the existing main service panel not being sufficient to handle the PV system addition, the Installer may be able to avoid the panel upgrade simply by downsizing the size of the PV system until the upgrade is no longer required. This may not be attractive to the customer but cannot be overlooked as an option.

   b. AHJ - if the AHJ allows alternate means of load side connections, a main service panel upgrade can sometimes be avoided. For instance, if the panel upgrade is being required by the AHJ simply because the existing main service panel is no longer being manufactured, the AHJ may be able to approve replacement breakers for that existing main service panel and a load side connection may be made possible.

   c. AHJ - if the AHJ allows alternate means of load side connections, a main service panel upgrade can sometimes be avoided. For instance, if the panel upgrade is being required by the AHJ simply because the existing main service panel has no additional physical breaker spaces, the AHJ may be able to approve the addition of a subpanel in order to relocate some of the breakers out of the existing main service panel and make space available for the PV breaker.

   d. Utility - if the utility allows alternate means of connecting the PV system to the existing meter which do not require a main service panel upgrade then the panel upgrade can be avoided. For instance, both SDG&E and SCE have recently launched a device which allows connection of the PV system via an adapter installed between the meter and the meter base. SDG&E has a product called the Renewable Meter Adapter (RMA) and SCE has a device called a Generation Meter Adapter (GMA). These devices allow the PV installer or customer to purchase the device, have the utility install it and avoid the panel upgrade completely.
e. Utility - if the utility and AHJ are willing to allow other alternate methods of connection such as PV installers have gotten approved by SCE, a main service panel upgrade can be avoided entirely. One method of connection is referred to as a Field Line Side Supply Connection and involves a splice into the utility feed which is field listed to ensure safety. This effectively eliminates the need for the panel upgrade.

f. AHJ's may explore the option of allowing a 120% of the bus allowance on center fed panels. As the 2017 NEC Code has been revised to allow this practice in Section 705(D)(4). This will reduce the need for many main service panel upgrades.

2) If a main service panel upgrade cannot be avoided, here are some suggested best practices which can ease the process to accomplish the panel upgrade:

i) When a lock ring removal must occur, the PV installer should be allowed to request permission from the utility. Ideally, the contractor would be allowed to perform lock ring removal with the utility’s permission.

ii) Some utilities are requiring scheduled shutdowns to perform work on the service in preparation for PV Installations that require a main service panel upgrade. This requires the utility to schedule a visit the day of the work (such as when performing a panel upgrade), pull the meter to allow commencement of work de-energized, then return to the site AFTER AHJ Inspection to re-insert the meter and lock ring. If the contractor was allowed to pull and re-install the meter it might take some of the pressure off the utilities and the installer. This could remove two utility personnel visits. With advanced notification from the installer, and a timely visit by the Electric Service Representative (ESR) (suggest within 24 hrs. After the request), this problem can be solved. Additionally, the utility will need to develop a procedure to allow the installer to make that request. It would be advisable to allow an online request.

iii) Utilities could dedicate specific staff to the handling of main service panel upgrades associated with PV Installations. Recently, LADWP dedicated ESRs to provide efficiency of PV installations in their territory. In doing so, the ESRs have an opportunity to become much more efficient at PV Installations whereas previously they handled many different types of equipment installations and reasons for a main service panel upgrade.

iv) Solar Contractors should educate themselves on the utility processes in order to avoid delays when a utility service i.e. main service panel upgrade is needed, i.e. eliminate unnecessary re-work for electrical contractor to satisfy the utility.

6. Benefits:

The above recommendations aim to streamline interconnection processing and procedures. The recommendations will help reduce time and costs in the completion of solar installation
processing, and will help accelerate customer adoption of residential rooftop solar. All of these improved practices help the State of California reach its renewable and environmental goals and in turn, transform our communities for the better.

7. **Applicable to whom:**

   The recommendations would apply to utilities, contractors and AHJs. The implementation of these recommendations would also benefit end customers.

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