

Best Practices – Enphase Energy System Storage Commissioning

Enphase Training and Education

Learning objectives

Learning objectives

- After completing today's session you should be able to:
 - Describe the best Enphase efficiency practices when commissioning Enphase storage
 - Identify common field issues and recommended resolution steps

Commissioning steps - Review

Commissioning guide for Ensemble systems

Update with new workflow

- Access existing site
- Replace Envoy if required
- Add Encharge and Enpower Units
- Ensure Cell modem and wireless comms kit is installed

TECHNICAL BRIEF – North America 

Ensemble Commissioning via Installer Toolkit 3.0

Overview
This document is intended for Ensemble certified installation professionals who are commissioning Ensemble systems in the field. Follow the steps below to establish successful communication between Ensemble components and validate the system is operating as designed.

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Preparing for Installer Toolkit Communications

The following process assumes all Ensemble equipment has been installed in a code compliant manner, tested for appropriate voltages and are ready to be energized.

- For all products, always follow the SAFETY INSTRUCTIONS and instructions in the Enphase quick install guides and installation manuals.

DANGER! Risk of electric shock. When energizing equipment in step D, check that Encharge units are properly wired as prompted. Miswiring can result in a safety hazard. Note that the ground connection does not have a L1 or L2 connection as this introduces a safety hazard.

- Ensemble is commissioned using Installer Toolkit. Ensure Installer Toolkit is updated to version 3.X or later:

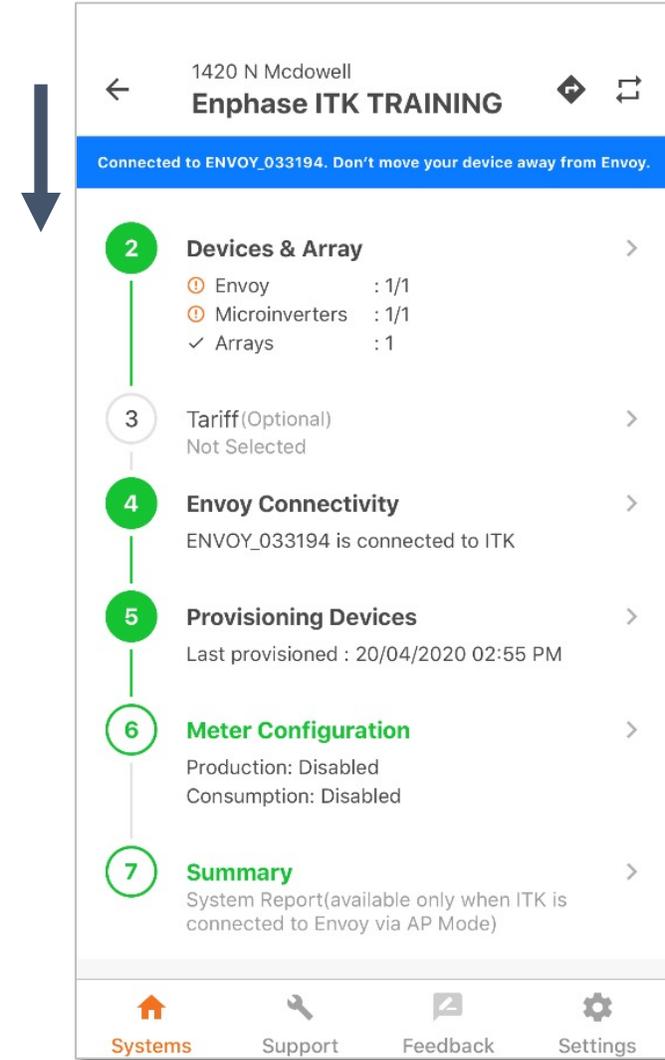
- You can install the application using the below links
 - [iOS](#)
 - [Android](#)
- Enable Bluetooth communication on the smart phone or tablet you will use for commissioning.

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Upgrading firmware in an M-series system to support Enphase Storage

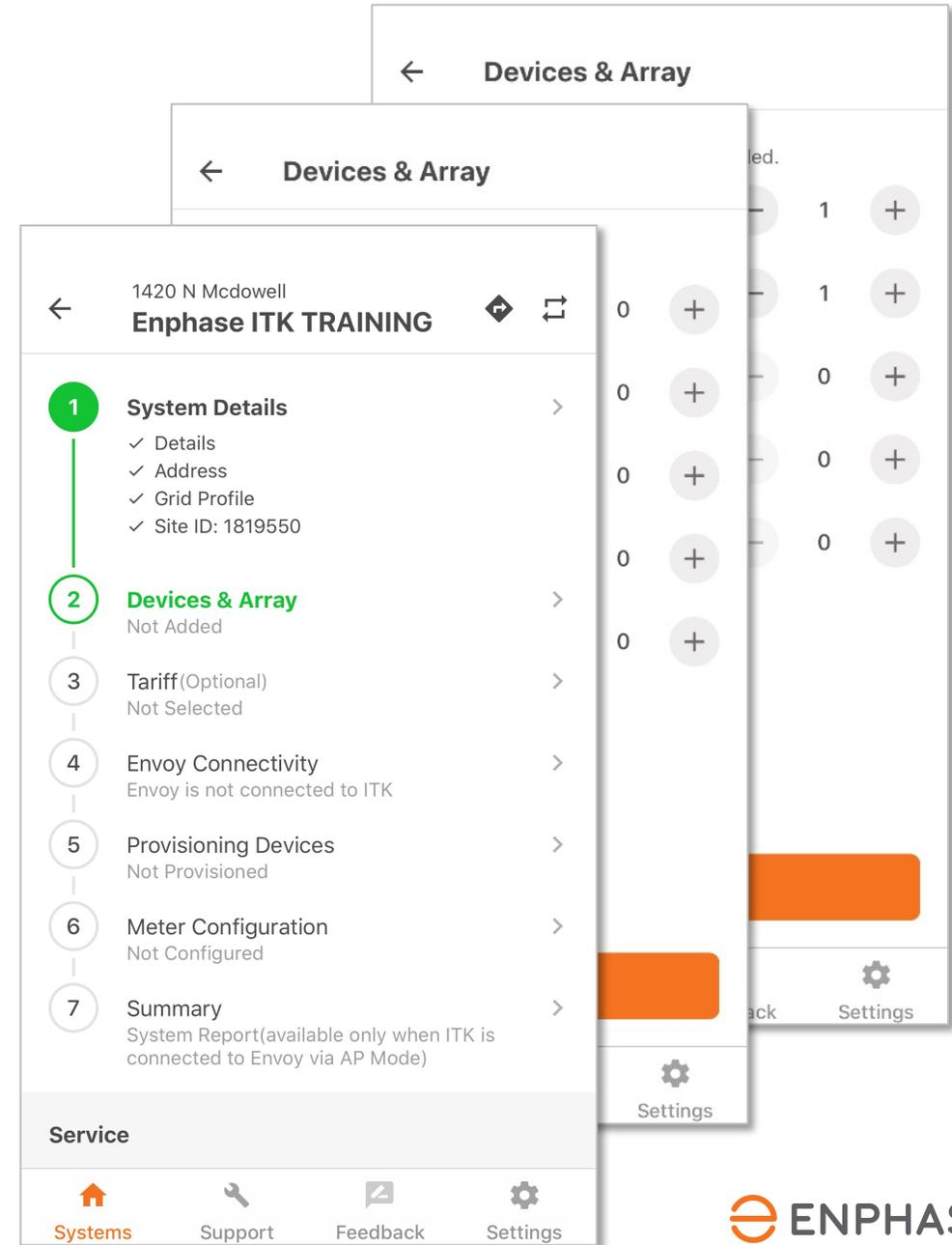
Enphase Installer App

- Guided workflow steps
 - Easily track your progress through the commissioning stages
 - Indicators tell you what is complete and what needs attention



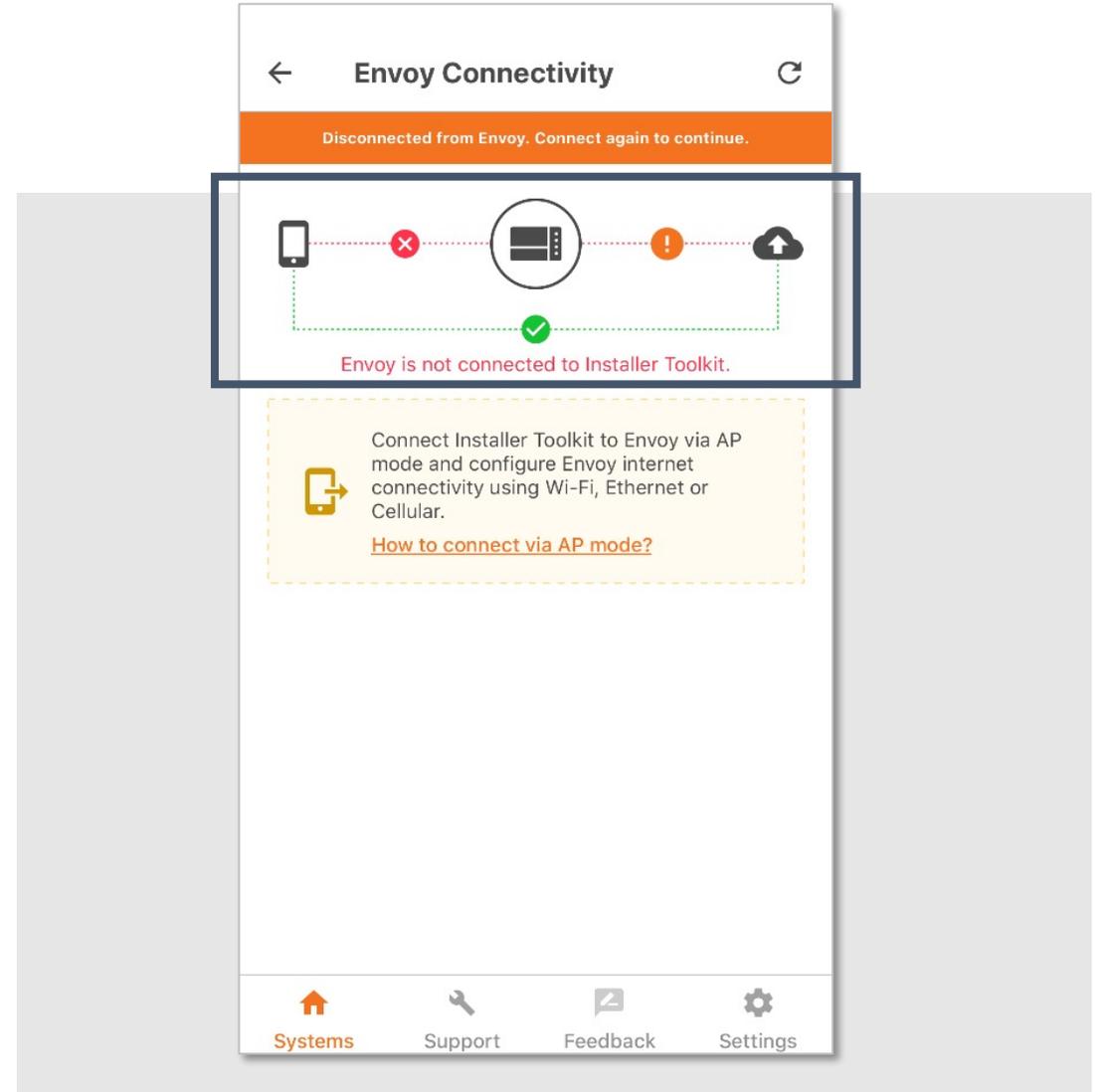
Devices and Arrays

- Add devices
 - Enter expected count for each device
 - Scan each device serial number using camera
 - Create arrays by assigning microinverter serial numbers



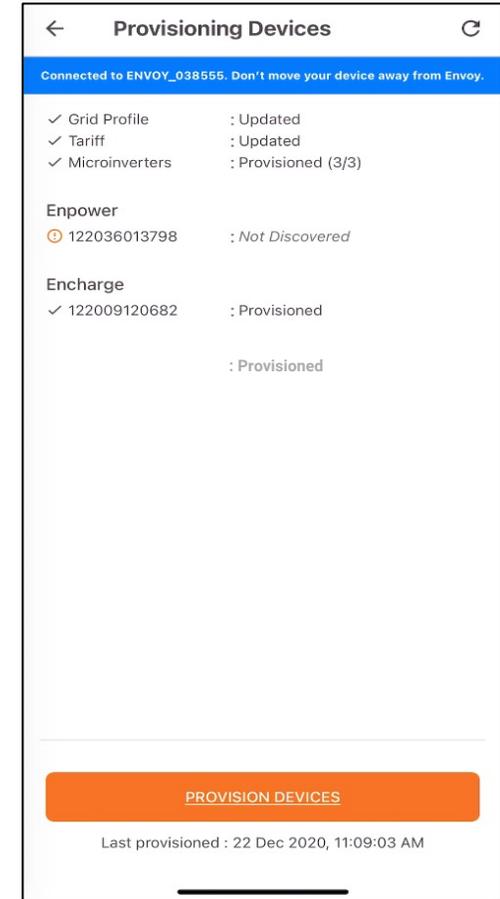
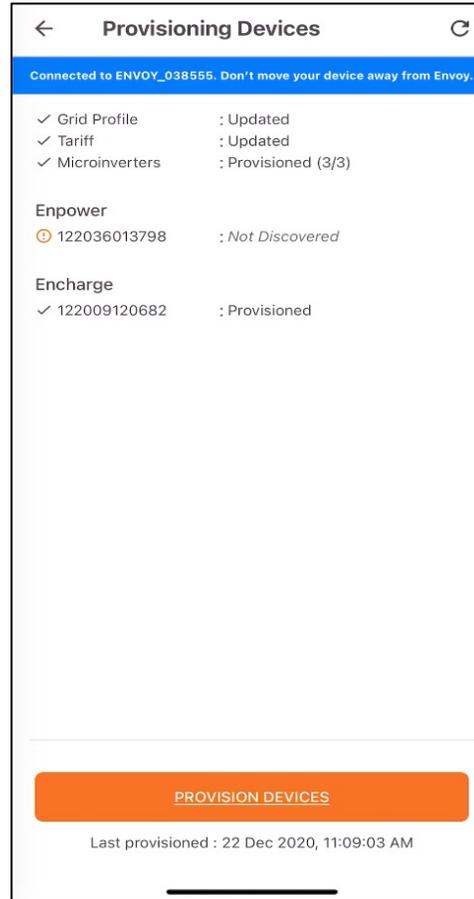
Envoy Connectivity

- Connecting your device to the Envoy using AP mode
 - Connect to the Envoy under your Wi-Fi settings
 - Provision all devices
 - Make sure the system is ready for functional validation



System Provisioning

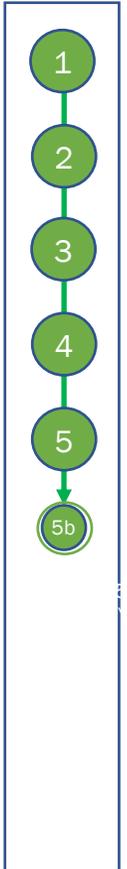
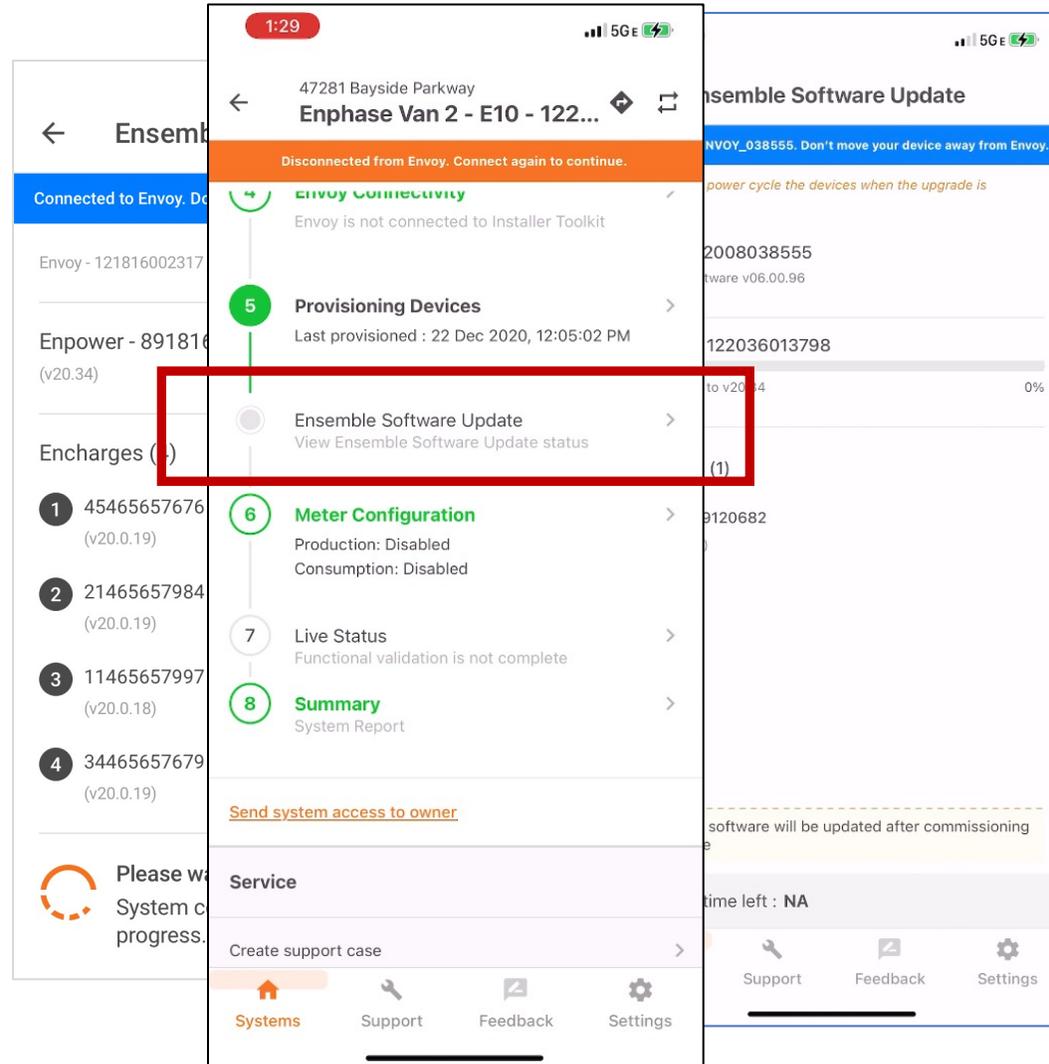
- System software configuration



System Controller software updates for base commissioning

Installer Toolkit – Ensemble software update

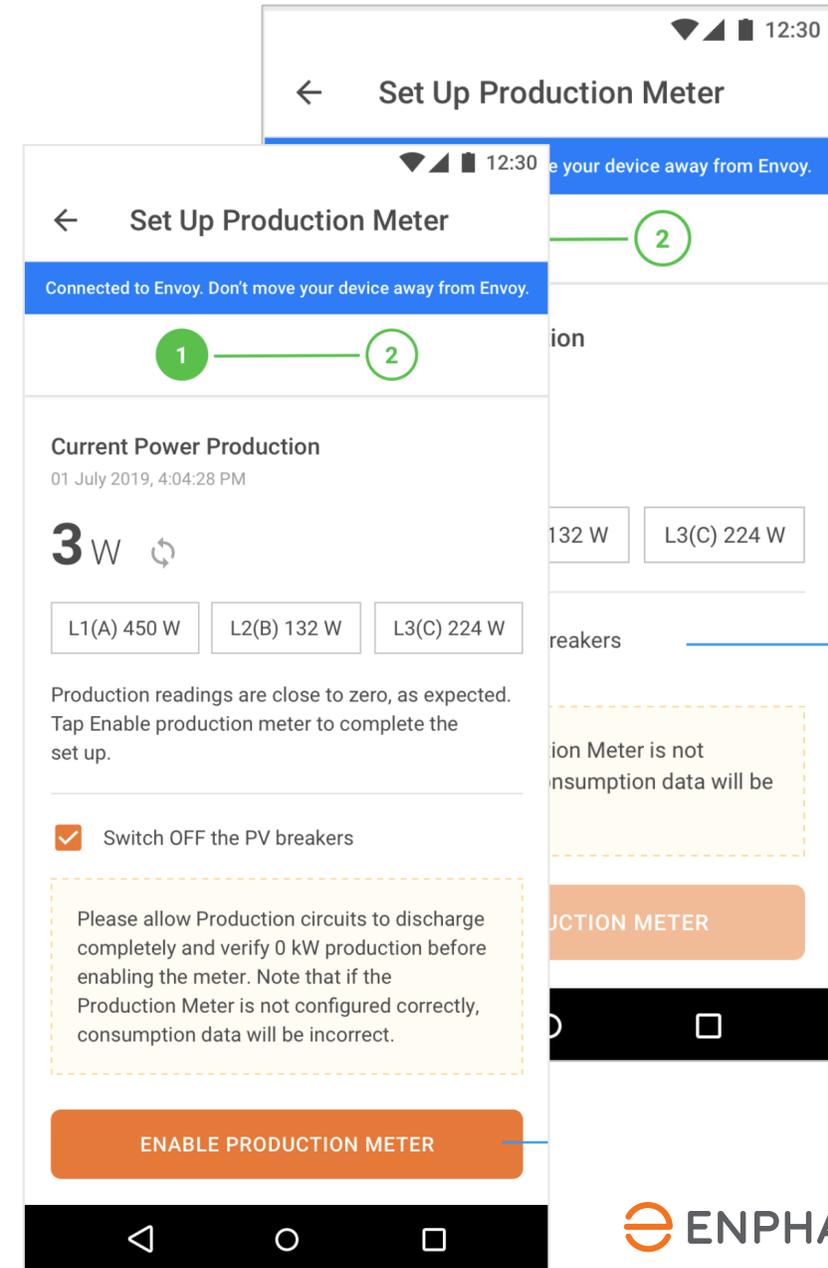
- Encharge and Enpower will auto update
- In ITK step 5b – **Ensemble software update** you can check the update status
- Base software update ~ 5-10 minutes
- Enpower will then update ~ 30 minutes



Step 5B – Ensemble software update

Meter Configuration

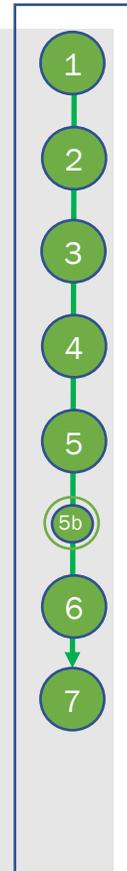
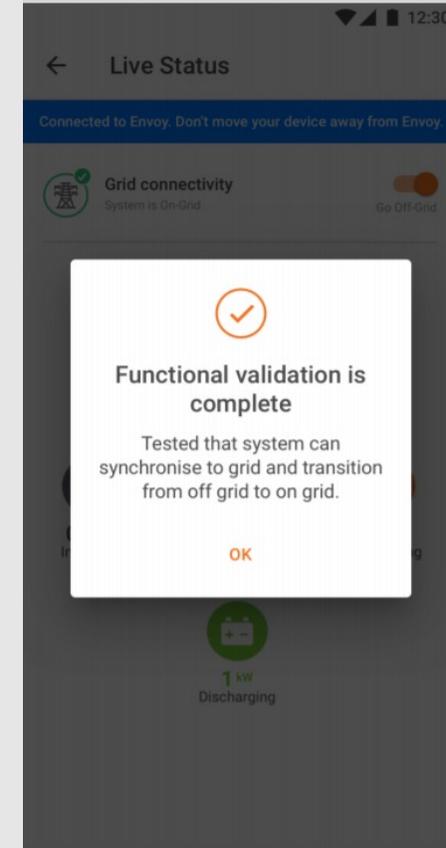
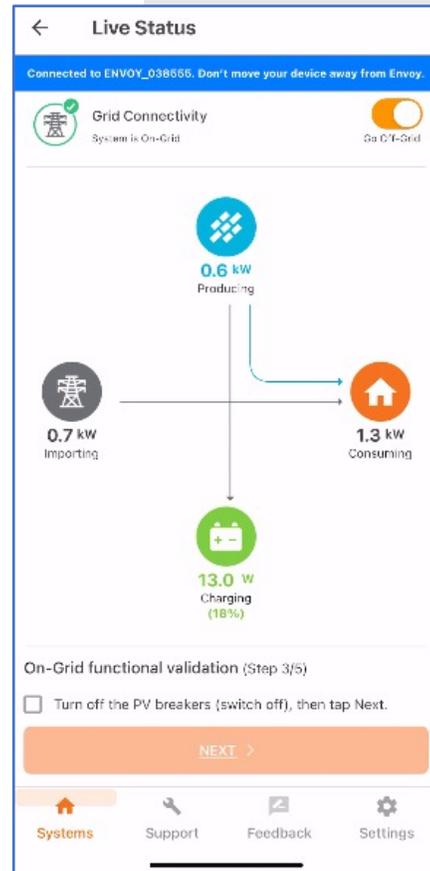
- Critical for proper system operation
- Set up production and consumption meter



Run through the Installer Toolkit functional test

Installer Toolkit – Functional Test

- ITK Step 7 – **Live Status** with the Functional test wizard
- On grid and off grid transition test
- Load and power flow tests



ITK Steps

System functional validation

Best Practices

Prepare before going to the install site

Get trained and certified

- Complete ENPHU for EES training
- Be familiar with the Installer app process
- Make sure to Install Cell Modem
- Ensure Comms Kit is installed before commissioning.

ENPHASE. | University

Get started How it works Course catalog Get help

Introducing Enphase University

Our expanded training program makes it easy to become an Enphase expert.

How it works
Manage your education, progress, and Enphase certifications in one place.

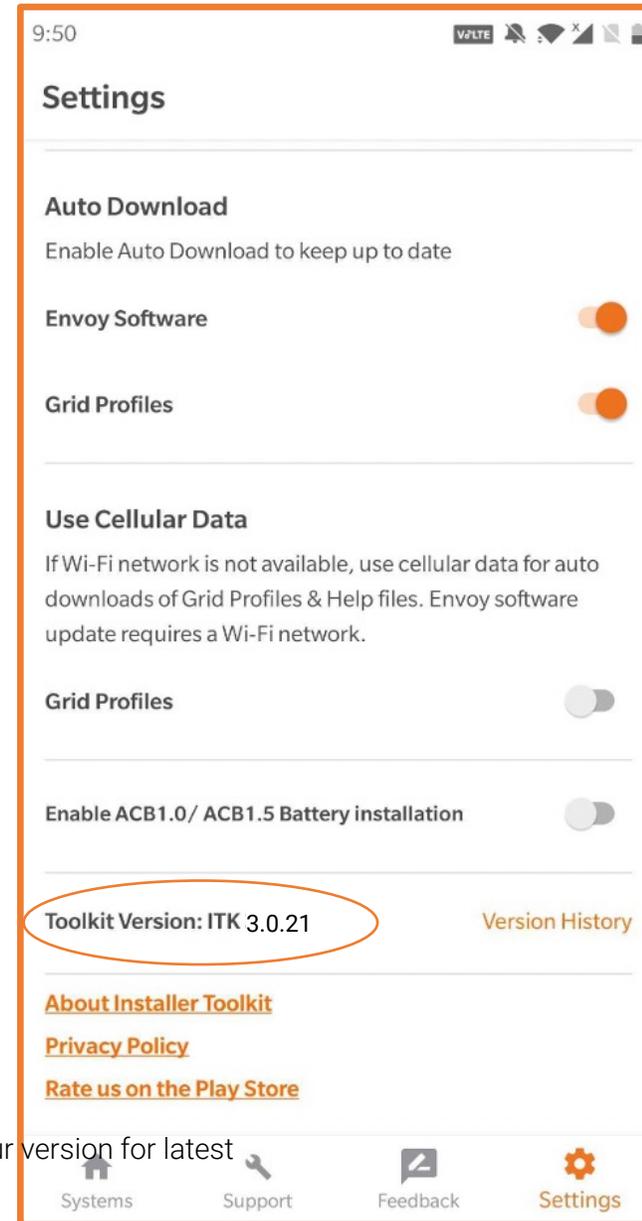
Get started
Everything you need to start your training in just a few simple steps.

Get help
Our support team is available any time you need help with your progress.

LEARN MORE LEARN MORE LEARN MORE

Load latest version of Installer app

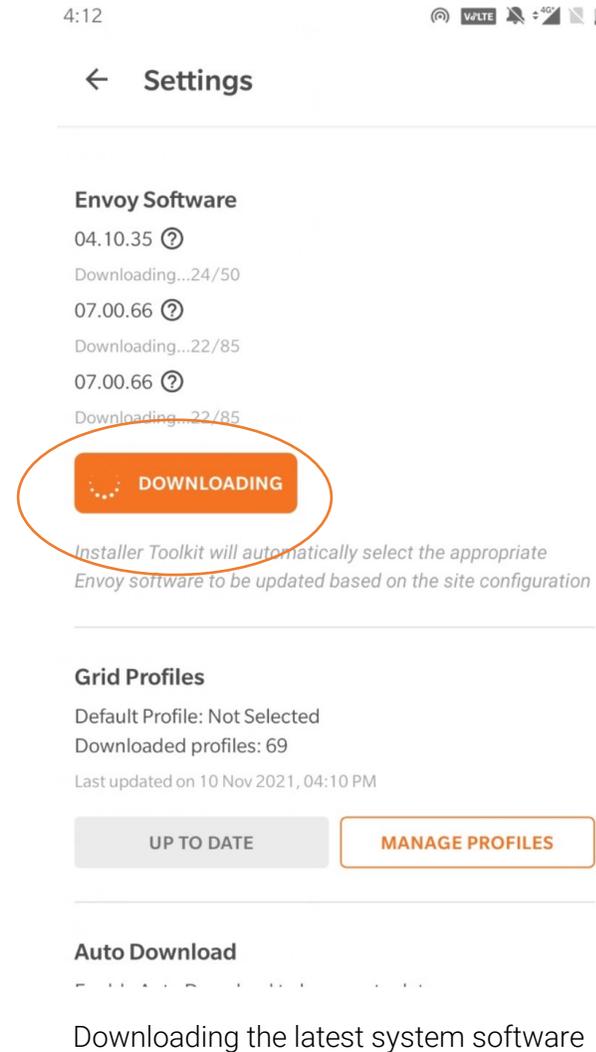
- Update to the latest version
 - [iOS](#) – Apple app store
 - [Android](#) – Google play store
- Log in the Installer app, using company Enlighten credentials,



Check your version for latest

Download latest system software

- Verify latest system software is loaded in the Installer app



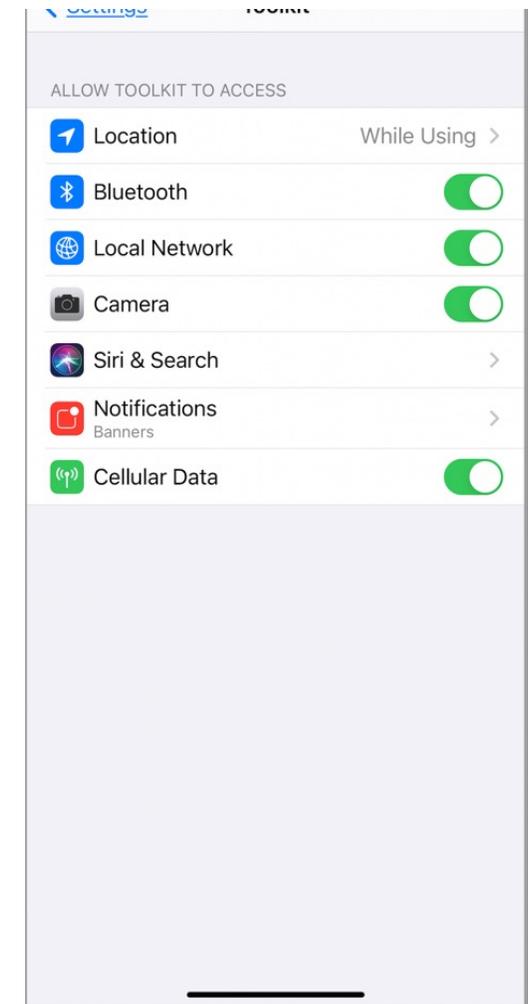
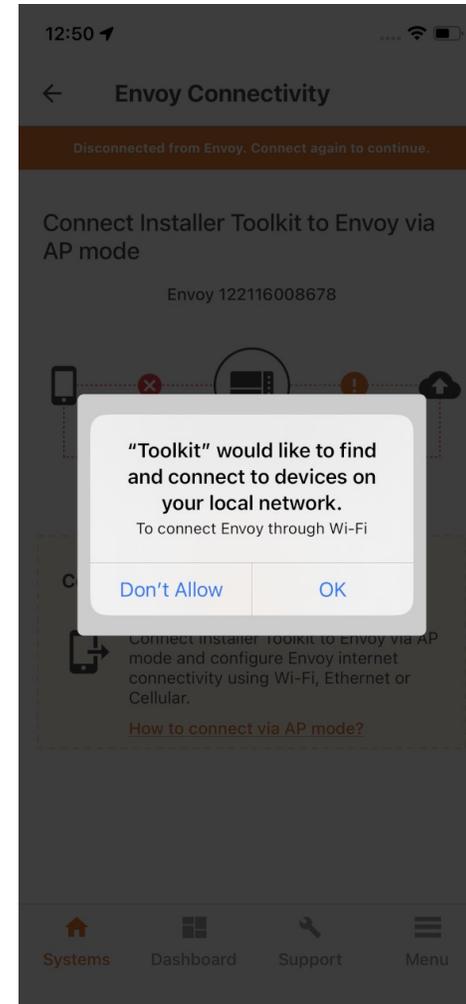
Checking **permissions** on phone

- Ensure the below permissions are give to the app

1. Location

2. Bluetooth

- You can go to phone settings to change the permission if denied initially



Create a system activation

- **Efficiency hint** - Create the site in Enlighten
 - Before going onsite.
 - Ensure the Site is set to an Ensemble approved grid profile.

Activations

System

*Name Installer Reference

*Type

Third Party Owned (ex: PPA or Leased)

PV Installer

Owner

First Name

Last Name

Email

Phone

Owner will receive MyEnlighten for system performance monitoring.

Change Enlighten Version

Location

*Street Address

Street Address 2

*City

*State/Province

*Zip/Postal Code

*Country

Latitude

Longitude

Envoy

Grid Profile

N/A

Add Another Envoy

PV System

Installing third party String Inverter?

*Total Number of Enphase Microinverters

PV Module

Don't see your manufacturer/model? [Let us know](#)

Installation

Microinverter Attachment Type

Array Type

Enter array-level details on the [system settings](#) page.

Tariff Editor

[Tariff Editor](#)

Installation Map

Scan or photograph installation map(s) and upload the file(s) here.

[Upload A File:](#)

Array Builder

Use Array Builder to create the virtual solar array.

[Array Builder](#) [Feedback](#)

Production Estimate

Provide estimated system production data to enable production threshold and compare estimated to actual system performance. You may enter estimated production values for each array individually or for the system as a whole.

Array-level production estimates (enter on the [system settings](#) page)

System-level production estimate

Annual Degradation Factor

Percentage to reduce estimate each year to account for aging of PV modules.

%

[Save](#)

Enphase provides guidance and resources to assist installers in designing a system within appropriate parameters. The installer and qualified electrician are responsible for final design and implementation.

Creating a system activation

M-series pre-install software update

- The software for M-series microinverters (M250, M215) need to be updated before upgrading the system to Ensemble.
- Since, the update may take up to 1 hour, it is recommended to update the firmware in Enlighten manager before leaving for the site

The screenshot displays the 'Systems' page in the Enlighten Manager interface. The main content area is titled 'System' and shows details for 'Enphase System Five'. The system is marked as 'System Active'. The 'System Host' section indicates that the user has logged in and cannot be edited, with contact information for Abhinav S. The 'Location' section includes fields for Street Address (25th Street North), City (Fargo), State/Province (North Dakota), and Zip/Postal Code (90001). The 'Owner' section shows the email prarora@enphaseenergy.com. The 'Envoy' section lists the Envoy Serial Number (121820004230) and Envoy Status (Reporting Status: Device Online). A blue button labeled 'Make this M series site Ensemble compatible' is highlighted with a red arrow pointing to a yellow box that says 'Click here to pre-download M series Ensemble Microinverter Firmware'. The 'Activation Checklist' on the right shows a progress bar at 100% Complete, with four stages: 1. Started (12/11/2019 10:42 PM PST), 2. Connecting (12/11/2019 10:42 PM PST), 3. Verifying (12/11/2019 10:42 PM PST), and 4. Ready (12/11/2019 10:42 PM PST). The checklist items include Owner Entered, Location Entered, Envoy(s) Entered, Envoy(s) Reported, Good Communication Established, System Operation Verified, Arrays Built, System Operational, and Access Granted to Owner.

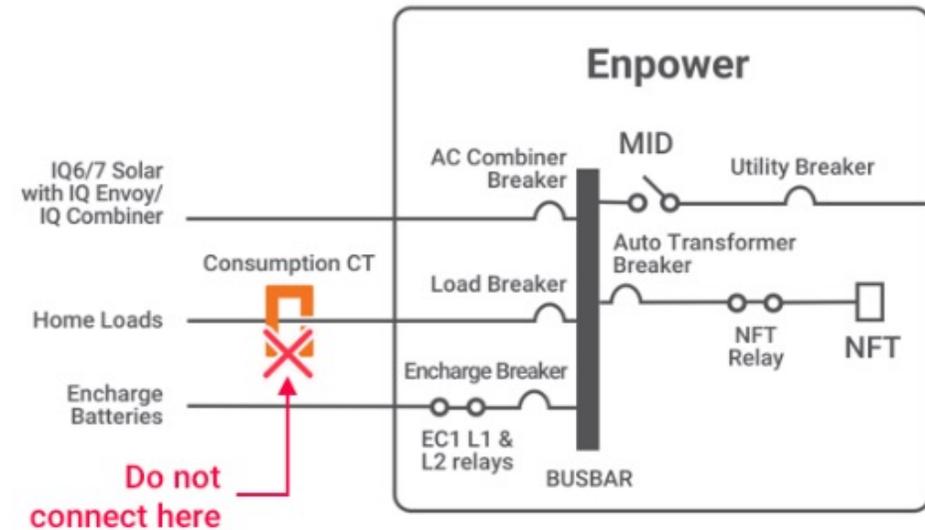
Array map at the site for retrofits

- For retrofit sites, bring the array map of the site containing the microinverter positions on the roof.
- If the site has PV shedding, keep the list of micros handy which should be the part of branch circuit.



Verify Consumption CT Installation location

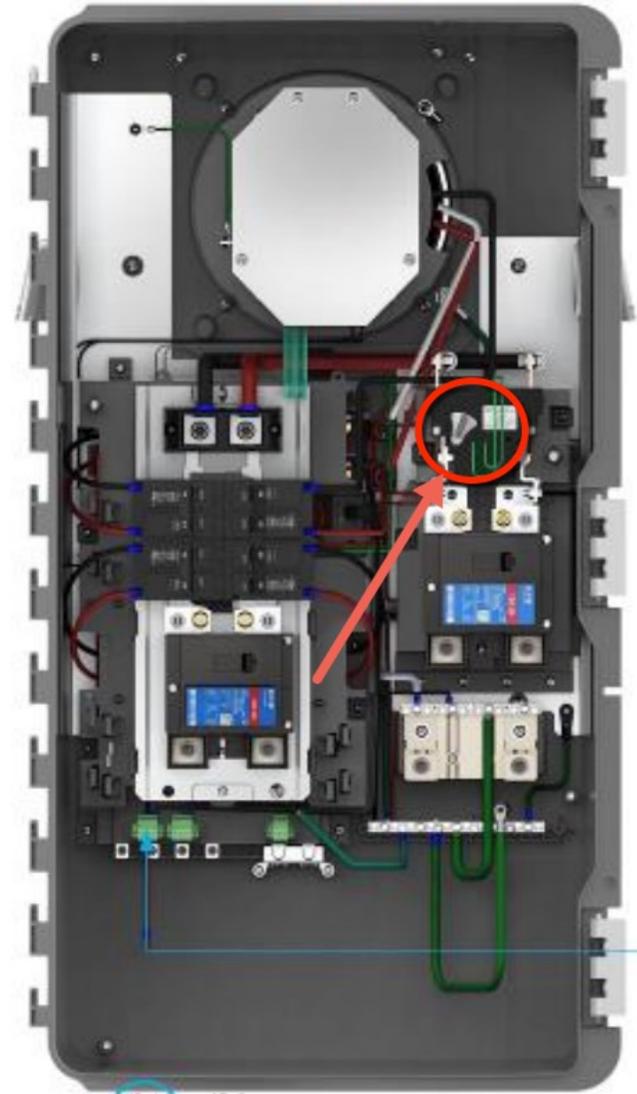
- Ensure the pair of consumption CTs are always placed on the grid side of Enpower and not on the load side.



Disabling manual override

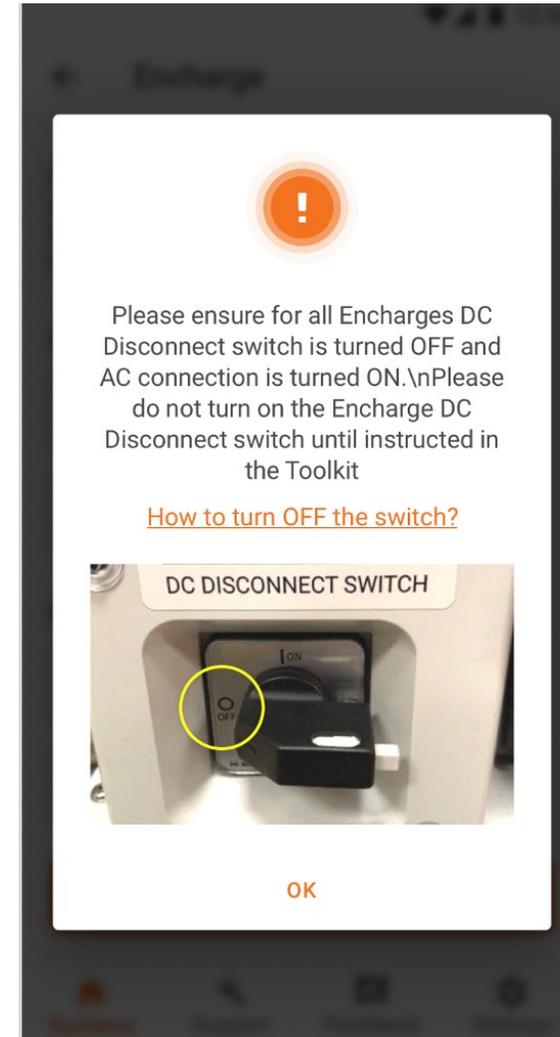
When you are ready to commission the system

- Disable before system commissioning
- Disable before energizing system
- Disabled – Switch to the RIGHT



IQ Battery DC switch

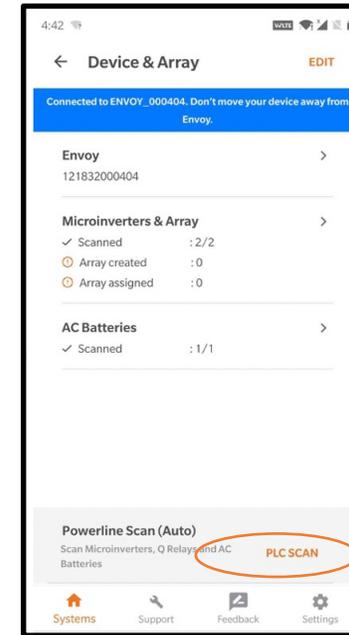
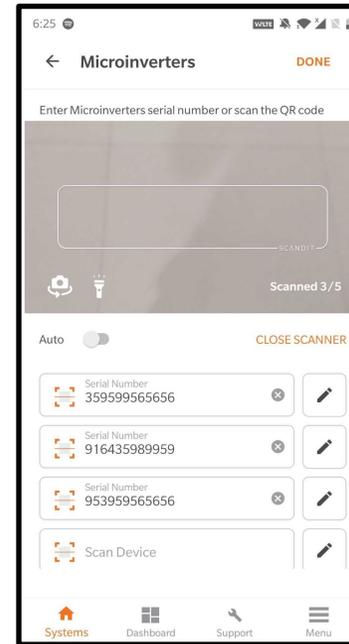
- Keep the IQ Battery DC disconnect switches turned OFF before provisioning
- Allow system controller time to close AC connection to the batteries
- Turn ON the DC disconnect switch only when instructed by the app



Use manual scan

To provision microinverters into the system

- Don't use PLC scan
- Scan manually
- Avoid poaching

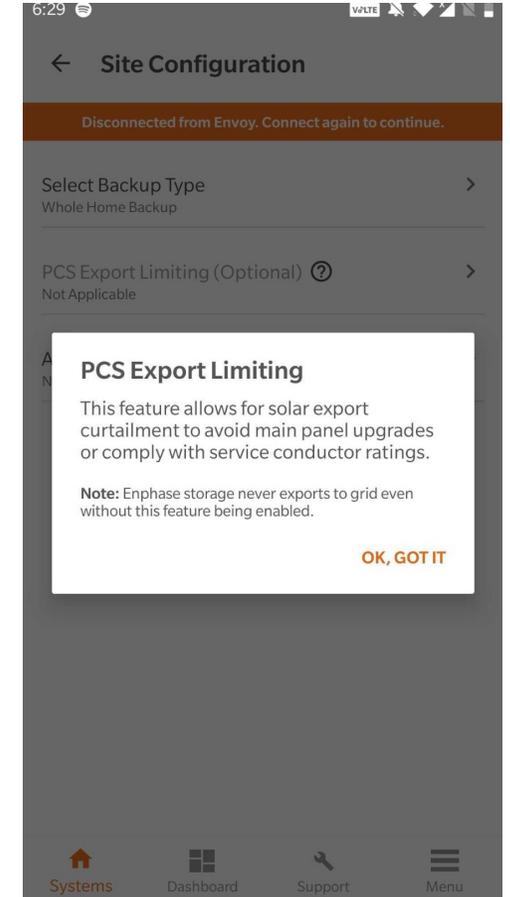
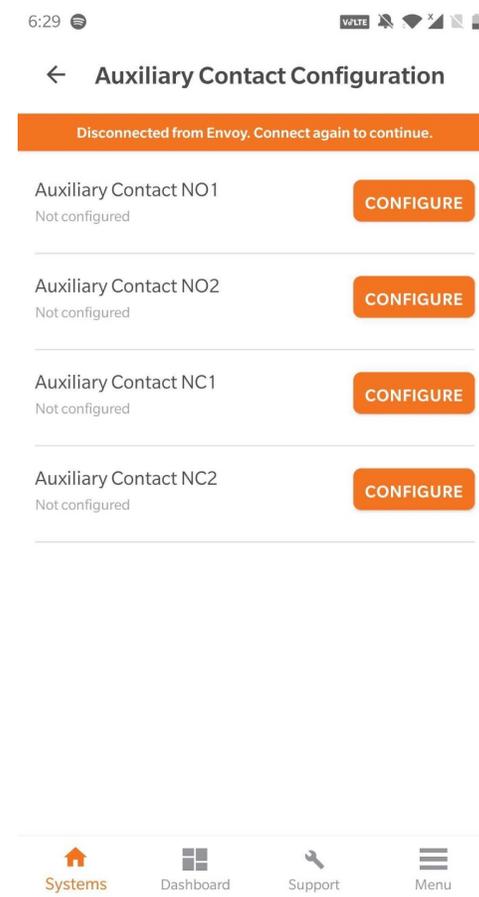


Configure PCS/Aux contact before Envoy update

Do not start provisioning the devices or updating the Envoy software until all the below steps are configured (applicable only if these features are required for the site)

- PV shedding
- Load Shedding
- PCS

This will ensure that you do not have to update the Envoy software twice



Troubleshooting practices

Updating Envoy Software

- Turn OFF mobile data when connected to Envoy over AP mode to ensure better connectivity
- Once the software update is complete, Envoy may restart multiple times. Please wait until all the lights on the Envoy are flashing green.

Envoy is updating

Envoy update process consists of following steps

- 1** Uploading files to Envoy
(No change in the LEDs)
- 2** Installing files on Envoy
(LEDs turn green forming a ripple pattern - Blinking in sequence)
- 3** Restarting Envoy
(All LEDs blinking red)
- 4** Envoy restart complete
(LEDs back to original state)

Legend:

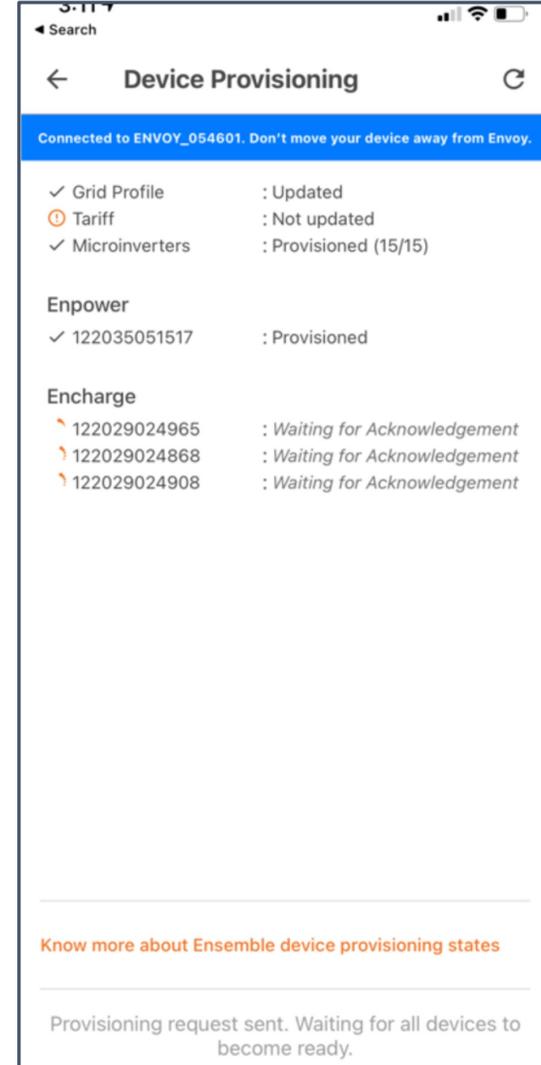
- Enlighten communication LED
- AP mode LED
- Power production LED
- Device communication LED

Based on Envoy connection via Wi-Fi, one or two LEDs may turn red after restart

OK, GOT IT

Stuck in provisioning screen

- Always stay closer to Envoy when starting provisioning. But, if one or more devices are stuck in 'Not discovered' state, move closer to the non-discovered devices.
- If one or more devices are stuck in 'Waiting for acknowledgement' state, please retry provisioning before reaching out to customer support.



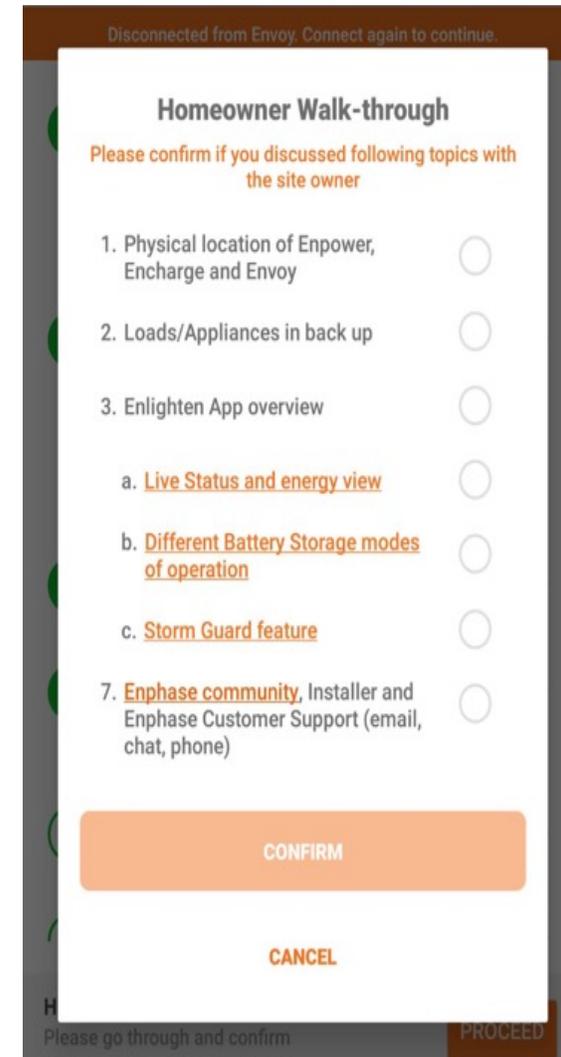
Functional Validation

- Ensure batteries are sufficiently charged (above 15%) but not completely calibrated (100%) before starting the test
- Follow the instructions in the functional test and wait for loads and IQ Battery to stabilize in each step before moving forward
- When going Off-Grid or On-Grid, wait until you hear the breaker opening/closing sound to confirm the grid transition

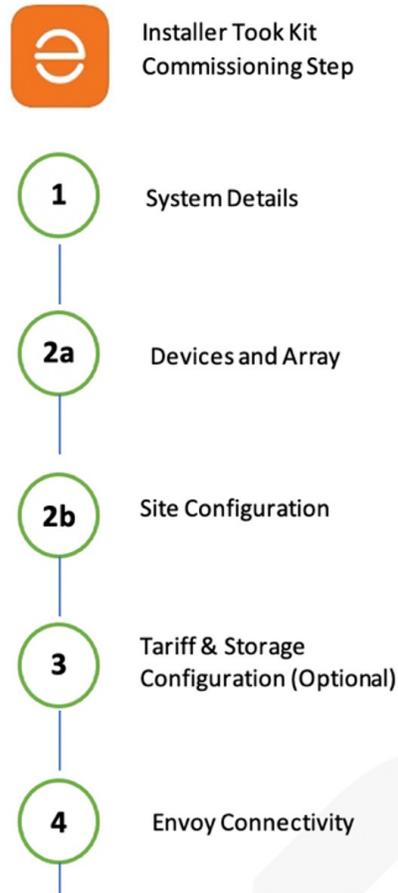


Others

- Post commissioning, follow the homeowner walkthrough instructions on the app, to ensure you have informed the owner about all the functionalities
- If you are stuck on any screen on the toolkit, please close and restart the application.
- If you are not able to connect to Envoy in AP mode,
 - turn OFF and turn ON the AP mode button and retry
 - Ensure you do not have VPN app installed on your phone
- For any assistance, either reach out to customer support or create a support case for the site. You can also go through FAQs and Video library under support for real time assistance.

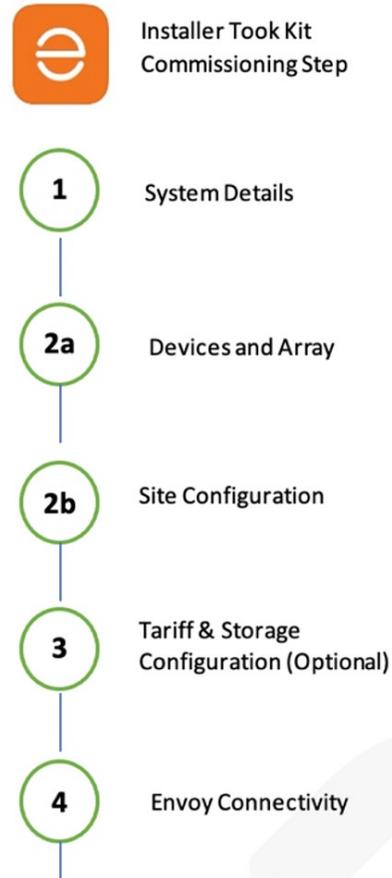


Impacts of best practices – Before provisioning



Step Description	On-Site ITK Step duration with Best Practice (hrs.: min)	Best Practice
Where System Name, Owner Details, Site Address and Grid Profile are entered	Done from office	Create the Commissioning Site from the office using Enlighten Manager or ITK before going to the job site
Where all devices are scanned: MI's, Enpower and Encharge	0:10	Have a physical copy of the MI S/N map at the site. Get familiar with the bar codes to be scanned in the Enpower and <u>Encharges</u> before this activity.
Where <u>MI's</u> are assigned to the Contactor (Auxiliary contact configuration)	0:05	Always enable the PCS and Aux contact configuration before moving forward
Where client's battery mode and rate schedule are selected	Done from office	Complete this step from office in Enlighten Manager/ITK
Where Envoy is connected to home network, and SW is upgraded	Done from office	Remotely update the Envoy using Enlighten Manager before going to the site if possible. Or if at site: Locate the phone close to the Envoy Make sure that your phone is charged

Impacts of best practices = after provisioning



Step Description	On-Site ITK Step duration with Best Practice (hrs.: min)	Best Practice
Where System Name, Owner Details, Site Address and Grid Profile are entered	Done from office	Create the Commissioning Site from the office using Enlighten Manager or ITK before going to the job site
Where all devices are scanned: MI's, Enpower and Encharge	0:10	Use the PLC Scan Function to automatically scan all MI's. Have a physical copy of the MI S/N map at the site. Get familiar with the bar codes to be scanned in the Enpower and Encharges before this activity.
Where <u>MI's</u> are assigned to the Contactor	0:05	Have a physical copy of the MI S/N map and bar codes at the site to avoid to manually enter MI Serial Numbers. Always enable the PCS and Aux contact configuration before moving forward
Where client's battery mode and rate schedule are selected	Done from office	Complete this step from office in Enlighten Manager/ITK
Where Envoy is connected to home network, and SW is upgraded	Done from office	Remotely update the Envoy using Enlighten Manager before going to the site if possible. Or if at site: Locate the phone close to the Envoy Make sure that your phone is charged

- **Videos**

https://www.youtube.com/channel/UCxb2TygGAhXRIx_J97XhHkQ

- **Enphase Training**

<https://enphase.com/events>

- **Docs**

Planning and Installing consumption monitoring

https://enphase.com/sites/default/files/downloads/suppo/Installing_Consumptions_CTs_Tech_Brief_EN_NA.pdf

