

Performance-Based Incentive (PBI)

Various programs under the **California Solar Initiative** offer rebates for solar power systems. A performance-based incentive is one in which payments are made at periodic intervals based on actual system performance at those intervals. For clarity, contrast this type of rebate structure with others which are based on an estimate of expected production (EPBB, Expected Performance Based Buydown), and where a one-time payment is made at the time of system commissioning. To register for and receive PBI rebates, you'll need an approved performance monitoring system to measure monthly production. In this document, we briefly describe the equipment and setup required for PBI participation for Enphase system owners.

Enphase System Communications

Each Enphase Microinverter regularly transmits operating status and production data over the power lines at the solar installation site to the Enphase Envoy. The Envoy collects data from all the microinverters within its network and forwards the information to the Enphase Enlighten website. The Envoy communicates with Enphase via its LAN (Local Area Network) cable, which is connected to the broadband connection at the site. The Enphase Envoy provides a reporting accuracy of $\pm 5\%$, for energy. While this level of accuracy is sufficient for non-monetized reporting, a PBI rebate program requires an increased level of metering accuracy at the solar-generation site in order to qualify for the rebate program.

Revenue-Grade, Web-Enabled Meter

To satisfy the requirements of a performance-based incentive, an additional meter must be installed to verify system production measurements. This meter must be a revenue-grade, web-enabled meter. The term "Revenue-Grade" indicates an accuracy of $\pm 2\%$.

Enphase recommends the Energy Tracking LLC meter to meet this requirement. This meter can be purchased from Energy Tracking LLC at <http://www.energytracking.com/wem.htm>.

Enphase as the Performance Data Provider

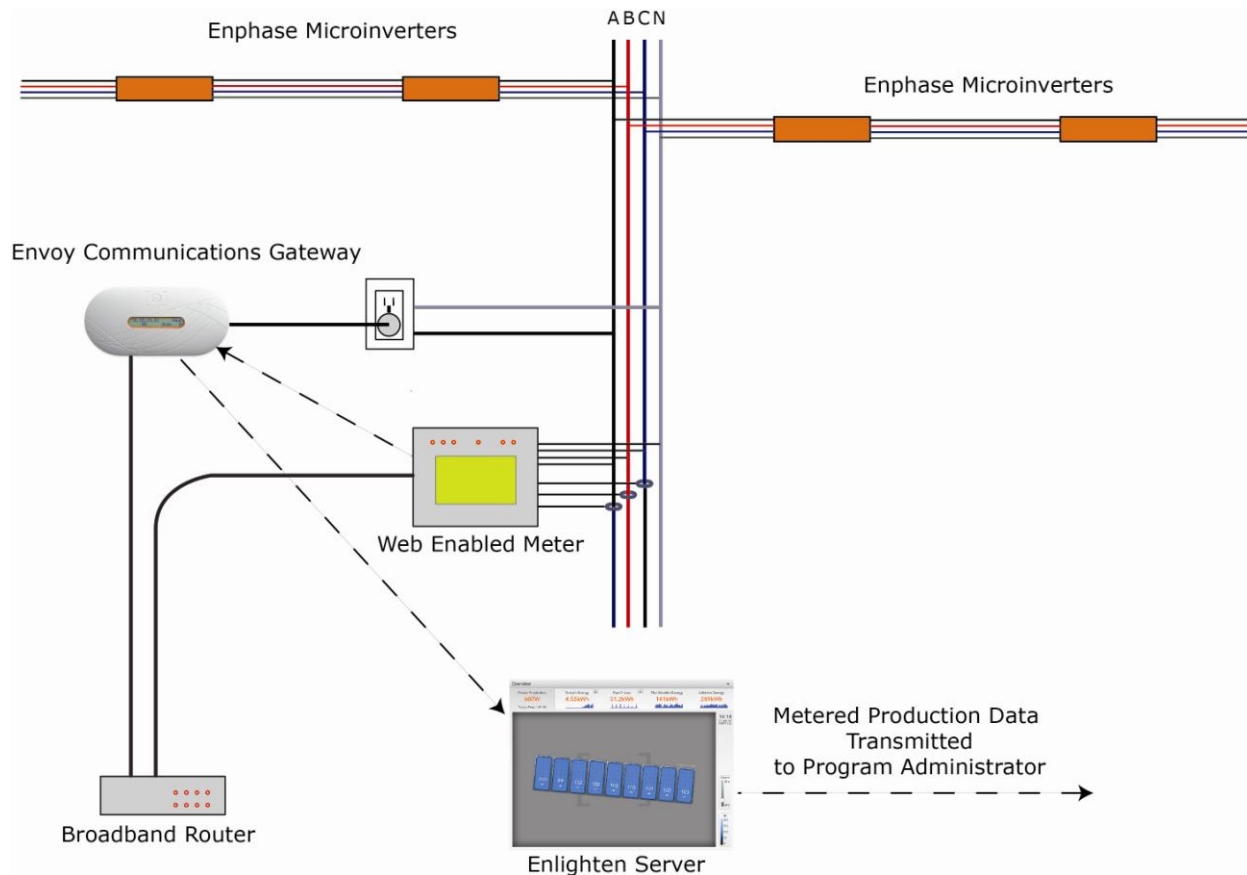
The metered data is sent to an approved Performance Data Provider (PDP) and then delivered to the participating utility (CSI Program Administrator) at predetermined intervals.

To accomplish this, the Envoy communicates directly with the Energy Tracking LLC Web Enabled Meter (WEM). The WEM transmits the metered production data to one of the Envoys in the network (provided the configuration between the two is set up beforehand). The metered data along with the inverter status and production data are then forwarded to the Enphase Enlighten web server. Enphase Energy is an approved PDP and forwards the accumulated data to the utility at regular intervals, usually monthly. A current Enlighten web monitoring subscription is required for PDP services.

Requirements

To set up this system, you'll need the following:

- A revenue-grade, web-enabled meter
- An Enphase Envoy Communications Gateway
- An active subscription to Enlighten
- An always-on broadband Internet connection
- A broadband router with spare Ethernet port.
- An up-to-date web browser to view Enlighten. Supported browsers are Internet Explorer 8 or higher, Firefox 3.6 or higher, Chrome 5 or higher, and Safari 4 or higher. Enlighten requires Adobe Flash Player 10 or higher.



Setup and Configuration

Configuration includes both adding the power meter (WEM) to the Envoy database and configuring the power meter through the power meter's web interface. Both of these can be done from the Envoy and require manual intervention. For assistance with any of the steps below, please contact Enphase Energy at commercial@enphaseenergy.com.

Add the Power Meter to the Envoy Database

To add the power meter to the Envoy Database, do the following:

1. Configure the Envoy for a static IP address either in the router or on the Envoy. This is required for the power meter to always know how to send reports to Envoy. Please see Appendix A for instructions on how to configure your Envoy for a static IP address.
2. Go to the Administration tab on the Envoy Web Page and login (username:admin; password:admin)
3. Go to the **Power Meter Configuration** by using the link in the navigation window.
4. Under the **Power Meters on the Network** heading, select the power meter(s) to associate with the Envoy, then click **Accept Selected Meters**

Configure the Meter

Next the meter needs to be configured by performing the following steps. For more information, refer to the Energy Tracking, LLC *WEM-MX Installation and Operation Manual* at http://www.energytracking.com/download/WEM_Manual.pdf.

1. Click on the IP Address link under the power meter's entry in the associated power meters table.
2. Login to the meter. The default username is **em200**, and the password is **PW**. After logging in, you can change the username and password by going to *Setup->Change (Admin) Password*.
3. To configure the meter time zone, association with the Envoy:
 - a. Navigate to **Setup->Main Configuration**
 - b. Under **FTP Server IP** put in the IP address of the Envoy
 - c. Under **FTP Account Name** enter: **energytracking**
 - d. Under **FTP Password** enter: **enphasepmu**
 - e. Make sure the **FTP Directory** is blank.
 - f. Under the *Meter Setup*: Change the CT Ratio according to the ratio indicated on the CT. For instance, a 200:5A ratio would equate to 40 in the CT Ratio field. If the meter is a 333mV model, simply enter the CT primary size (e.g., 200 for a 200A CT).

NOTE: The CT ratio is the ratio of primary (input) current to secondary (output) current. A CT with a listed ratio of 4000:1 would provide 1A of output current, when the primary current was 4000A. The Energy Tracking, LLC *WEM-MX Installation and Operation Manual* states:

". . .enter the appropriate CT and or PT ratio to get the actual measurement values. If you are using a CT with a 200 Amp primary to 5 Amp secondary, then your CT Ratio is $200 / 5 = 40$."

- g. Under the *SNTP And Time Zone Setup*: Change the DST and STD Zone offset for your local. Refer to the time zone table on the following page.
 - i. Enter the DST Zone Offset: Daylight Savings Time (**18** for PDT).
 - ii. Enter the STD Zone Offset: Standard Time (**17** for PST).

NOTE: The meter clock automatically adjusts based on the values entered for DST and STD zones. Values from 1 to 12 represent positive hour offsets from UTC (Universal Coordinated Time), where a value of 1 indicates 1+ hour from UTC. Values from 13 to 24 represent negative hour offsets from UTC, where a value of 13 indicates -12 hours from UTC. An entered value of 24 indicates -1 hour from UTC.

Although this brief addresses California installations, all time zone setting possibilities are shown in the following table.

Time zone	Name	Relative to UTC	STD Zone Offset
UTC	Universal Coordinated Time	UTC	0
ECT	European Central Time	UTC+1:00	1
EET	Eastern European Time	UTC+2:00	2
EAT	Eastern African Time	UTC+3:00	3
NET	Near East Time	UTC+4:00	4
PLT	Pakistan Lahore Time	UTC+5:00	5
BST	Bangladesh Standard Time	UTC+6:00	6
VST	Vietnam Standard Time	UTC+7:00	7
CTT	China Taiwan Time	UTC+8:00	8
JST	Japan Standard Time	UTC+9:00	9
AET	Australia Eastern Time	UTC+10:00	10
SST	Solomon Standard Time	UTC+11:00	11
NST	New Zealand Standard Time	UTC+12:00	12
		UTC-12:00	13
MIT	Midway Islands Time	UTC-11:00	14
HST	Hawaii Standard Time	UTC-10:00	15
AST	Alaska Standard Time	UTC-9:00	16
PST	Pacific Standard Time	UTC-8:00	17
MST	Mountain Standard Time	UTC-7:00	18
CST	Central Standard Time	UTC-6:00	19
EST	Eastern Standard Time	UTC-5:00	20
PRT	Puerto Rico Time	UTC-4:00	21
AGT	Argentina Standard Time	UTC-3:00	22
		UTC-2:00	23
CAT	Central African Time	UTC-1:00	24

- h. Click the **Submit** button. This will cause a reboot of the meter, which takes about four minutes. The meter's web page shows reboot progress.
4. After the meter has started up again, do the following to configure the FTP transfer and reporting interval.
 - a. Navigate to **Setup->Schedule Reporting Setup**.
 - b. Uncheck the box under **Disable FTP Client** (enables FTP).
 - c. Change both the **Periodicity for email** and **Logging Interval** to **5** min.
 - d. Check **Send report upon end of interval**.
 - e. Uncheck **Disable Load Profile**.
 - f. Uncheck **Do not save to file**.

NOTE: This allows up to 55 days of interval data backup by the meter in the event of extended network failure.
 - g. Select the type of current transformers (CT) used in the installation.
 - h. Uncheck **Enable LP Reporting by Phase**.
 - i. Check **Enable 4 Quadrant Measurement** only if the solar power plant will be exporting energy to the grid.
 - j. Click **Submit**. This configuration change does not require a reboot.
 5. Validate that the FTP setup is correct:
 - a. Navigate to **Setup->Test FTP**.
 - b. Select **Yes**, and the system will report that the transfer was successful. If anything else is reported, review the configuration.

CSI Compliance and Paperwork

The California Solar Initiative (CSI) handbook states the following:

"4.11.3.4 **Copy of Executed PDP Contract**

All PBI systems are required to have a PDP and therefore a copy of the executed contract for a PDP, a letter from the PDP stating the Host Customer has purchased its service, or an invoice from the Solar Contractor clearly showing the PDP information must be provided. Whichever document is submitted must clearly identify the PDP information, including the name of the PDP, the product or service purchased and the term of agreement, along with the address of the associated solar energy system Site. A separate contract is not required if the same company is providing both the PMRS and PDP services as long as the contract specifies they are providing services that satisfy both requirements."

Enphase is a qualified PDP (Performance Data Provider) and offers PMRS (Performance Reporting and Monitoring Service) services per the price list available to distributors. The Enphase Energy Enlighten web monitoring service is a qualified PRMS. An invoice will be provided upon purchase of the Enlighten web monitoring and PDP services from an Enphase distributor. Once the system (including the power meter) has been configured and verified on Enlighten, Enphase Energy will (upon request) provide the customer with a letter stating that the "Host Customer" has purchased the service. (A current Enlighten web monitoring subscription is required for PDP services.) This proof of executed contract is required to complete Rebate Claim paperwork under CSI.

To obtain a letter from Enphase Energy, please send a request to commercial@enphaseenergy.com.

CSI Acronyms

CSI roles and services are defined as follows:

Performance Data Provider (PDP):

The PDP is the service provider (in this case, Enphase) that monitors and reports solar production data from individual sites to the PA. This data provides the values used to generate monthly PBI payments. The PDP may or may not be the same entity as the PMRS provider. Enphase is qualified as both.

Performance Monitoring and Reporting Service (PMRS): This service, from a qualified provider, allows the system owner to monitor and evaluate the performance of their solar system. Such a system is Enphase's Enlighten web-based monitoring and analysis system.

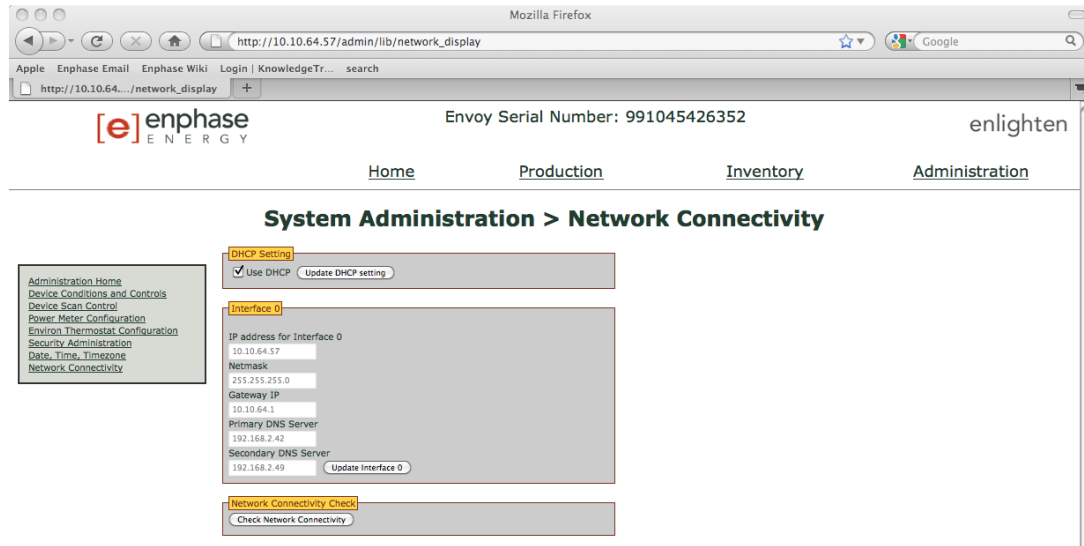
Program Administrator (PA):

For purposes of the CSI Program, this is the local utility: PG&E, SCE & CCSE (which administers the program on behalf of SDG&E).

Appendix A: Configuring the Envoy with a Static IP Address

To configure the Envoy with a static IP address:

1. From the Admin menu, choose **Network Connectivity**.



2. Uncheck the check box for Use **DHCP** and click **Update DHCP Setting**.
3. Enter static IP settings appropriate for your network, subnet, and name server. Note that the setting for Secondary DNS Server is optional.
4. Click **Update Interface 0**.

NOTE: The Envoy is now set for the static IP settings specified; you will no longer have connectivity to it. This is because after changing the address from DHCP to Static, your browser will still be pointed at the old IP address.

5. Plug the Envoy into the network router.
6. Unplug the Envoy for 10 seconds and then plug it in again.

