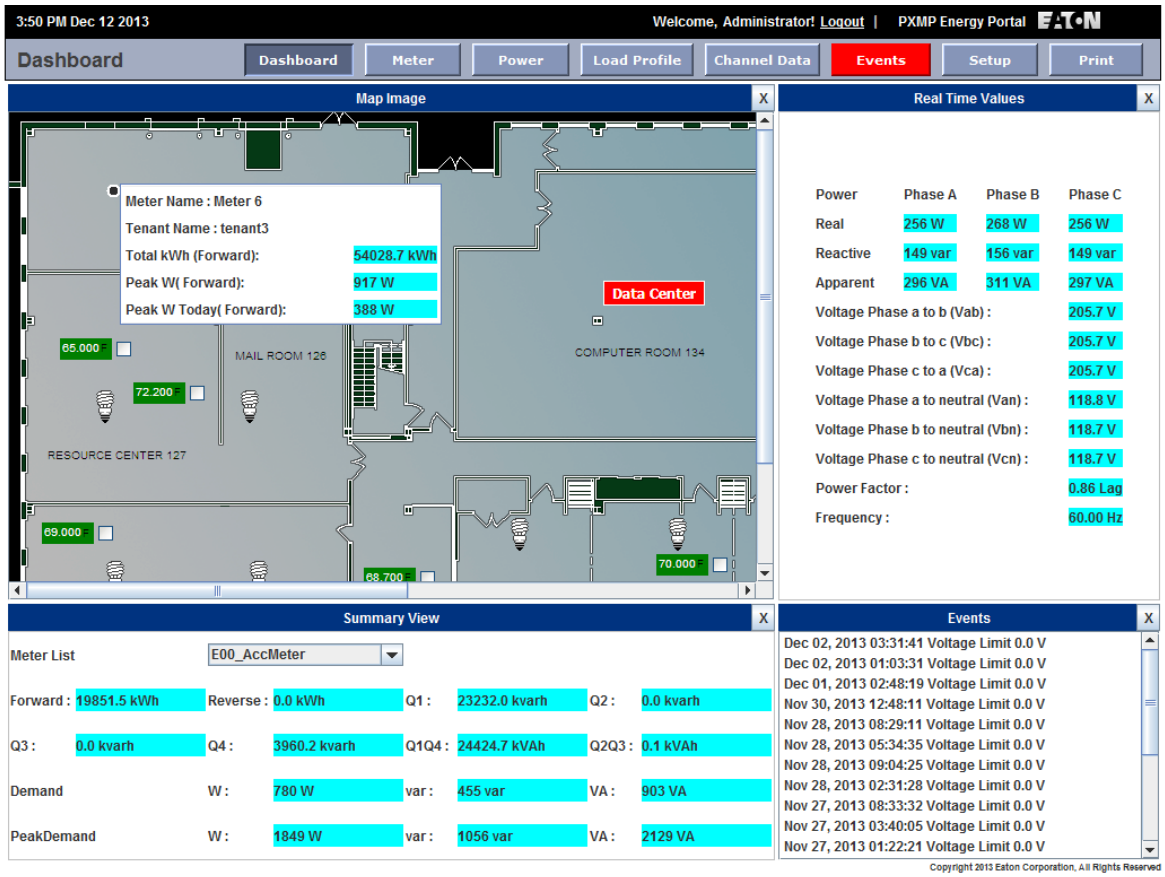
MN150003EN

Power Xpert® Multi-Point (PXMP) Energy Portal Module Web Interface and User Manual



Powering Business Worldwide

Contents

1. Introduction

1.1 Safety Precautions

All safety codes, safety standards, and/or regulations must be strictly observed in the installation, operation, and maintenance of this device.

⚠ WARNINGS

THE WARNINGS AND CAUTIONS INCLUDED AS PART OF THE PROCEDURAL STEPS IN THIS DOCUMENT ARE FOR PERSONNEL SAFETY AND PROTECTION OF EQUIPMENT FROM DAMAGE. AN EXAMPLE OF A TYPICAL WARNING CALL-OUT IS SHOWN ABOVE. THIS WILL HELP TO ENSURE THAT PERSONNEL ARE ALERT TO WARNINGS THAT MAY APPEAR THROUGHOUT THE DOCUMENT. IN ADDITION, CAUTIONS ARE ALL UPPER CASE AND BOLDFACED AS SHOWN BELOW.

⚠ WARNING

COMPLETELY READ AND UNDERSTAND THE MATERIAL PRESENTED IN THIS DOCUMENT BEFORE ATTEMPTING INSTALLATION, OPERATION, OR APPLICATION OF THE EQUIPMENT. ONLY QUALIFIED PERSONS SHOULD BE PERMITTED TO PERFORM ANY WORK ASSOCIATED WITH THE EQUIPMENT. THE WIRING, INSTALLATION AND APPLICATION USE INSTRUCTIONS PRESENTED IN THIS DOCUMENT MUST BE FOLLOWED PRECISELY.. FAILURE TO DO SO COULD CAUSE PERMANENT EQUIPMENT DAMAGE, BODILY INJURY, OR DEATH.

⚠ WARNING

DO NOT ATTEMPT TO INSTALL OR PERFORM MAINTENANCE ON EQUIPMENT WHILE IT IS ENERGIZED. DEATH, SEVERE PERSONAL INJURY, OR SUBSTANTIAL PROPERTY DAMAGE CAN RESULT FROM CONTACT WITH ENERGIZED EQUIPMENT. ALWAYS VERIFY THAT NO VOLTAGE IS PRESENT BEFORE PROCEEDING WITH THE TASK, AND ALWAYS FOLLOW GENERALLY ACCEPTED SAFETY PROCEDURES.

EATON IS NOT LIABLE FOR THE MISAPPLICATION OR MISINSTALLATION OF ITS PRODUCTS.

1.2 Product Overview

The Power Xpert® Multi-Point Energy Portal Module (PXMP-EPM) is designed to be used with the PXMP-MB (-AB) Meter Base. The PXMP Energy Portal Module (EPM) adds sophisticated Web enabled metering capability to the PXMP Meter. A typical application would be for storing the results of metering utilities (electric, gas, water, or steam) and for serving an apartment complex. The EPM provides a graphically rich web user interface to help the User easily understand their energy usage patterns and make informed decision on conservation. The EPM combined with Eaton's E-Allocation software provides a Facility Manager with tools required to allocate cost of the energy in facilities.

The PXMP-EPM makes metered data available to individual tenants via an embedded web server. The EPM enables each tenant to view graphical comparisons of their day-to-day and month-to-month power usage to help them understand their usage patterns. Tenants can be provided with unique logon credentials that permit them to see only their own power and energy consumption data. The JAVA applet loads automatically into a standard internet browser when the browser is directed to the EPM IP address.

The EPM also supports a variety of protocols including Modbus TCP, SMTP, SNMP, SFTP, HTTP, HTTPS, BACnet/IP[1], and more. In addition to Ethernet, the EPM supports an optional dial-up telephone connection for interface with remote billing software. A Touch Screen Display is available for local display of metered data from any circuit.

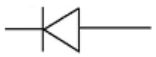
Once the EPM is configured with an IP address, the JAVA Applet can be accessed over a Local Area Network (LAN). Metering data can be viewed for each tenant, as well as an aggregated sum of the tenant meters. PXMP Meters equipped with the EPM also support the use of the Eaton E-Allocation software. E-Allocation software is available for download from the Eaton website. This application allows tenant contributions to an overall utility bill to be divided among the tenants. E-Allocation can allocate costs from pulse metering such as gas and water as well as electrical.

1.3 Ordering Information

Catalog Number	Description
PXMP-EPM	PXMP Meter Energy Portal Module
PXMP-EPM-M	PXMP Meter Energy Portal Module w/ Modem

1.4 Symbols

The following symbols are used in this PXMP Energy Portal User manual.

	Diode
	Fuse
	Protective Earth Ground
	Resistor
	Switch
	ELECTRICAL WARNING: Refers to instructions that, if not followed, can result in death or injury.
	WARNING: Refers to instructions that, if not followed, can result in death or injury.
	CAUTION: Refers to instructions that, if not followed, can result in equipment damage.

1 BACnet/IP support will be available through a firmware upgrade. Please contact Eaton Customer Success Team for instructions by emailing pqsupport@eaton.com or calling 800-809-2772 option 4 (US) or 414-449-7100 option 4 (outside US).

2 Power Xpert Multi-Point Energy Portal Module (PXMP-EPM) Hardware

The PXMP-EPM plugs into the slot 10 of the PXMP Meter Base (PXMP-MB). The EPModule comes standard with a front-facing Ethernet configuration port and a LAN/WAN Ethernet port on the bottom (see Figure 1). A product identification label is on the right side of all PXMP Energy Portal Modules. This information can be viewed through the PXMP-MB USB configuration port or the PXMP-EPM's front Ethernet configuration port.

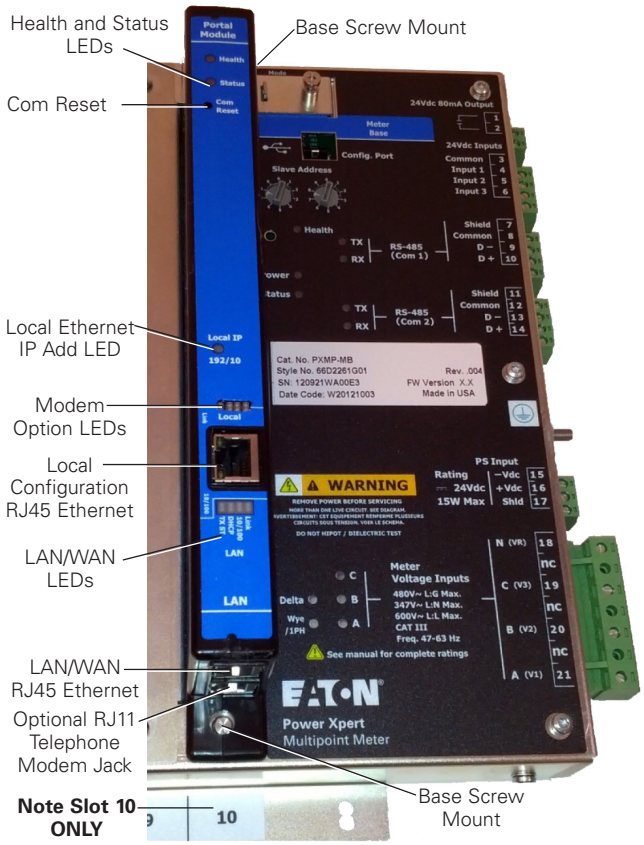


Figure 1. PXMP-EPM-M Mounted in the Right Side of PXMP-MB (Only Part of the PXMP-MB Is Shown).

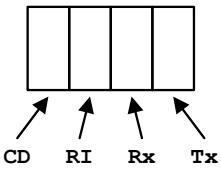
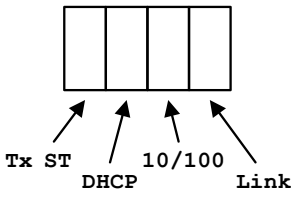
Key Features of PXMP-EPM(-M):

- Two 10/100 base-T Ethernet ports (RJ45 connectors), one for configuration and the second one for connecting to LAN/WAN.
- Equipped with 4 GB of non-volatile memory and capable of storing up to 10 years of load profile data at 15-minute interval.
- PXMP-EPM-M supports internal dial up telephone modem with RJ11 connection at the bottom of the module for interface with remote billing software in applications where network connections are not possible or practical.

2.1 Onboard LEDs

The PXMP-EPM(-M) has on-board LEDs to indicate operating status. Table 1 describes LED names and their functions.

Table 1. LED Names and Descriptions.

Name	Color	Description
Health	Green	The LED blinks once every 2 seconds when the PXMP-EPM(-M) operates normally. The LED blinks twice per second during power-up initialization if one of the following conditions happens • Internal fault • Invalid configuration • Communication fault • Self-test failure A reboot operation is required to clear the fault.
Status	Red	The LED blinks once every 2 seconds when unacknowledged event(s) are present during normal operation. Note: The LED blinks rapidly when the PXMP-EPM(-M) is initialized after power up. Once the PXMP-EPM(-M) completes initialization and begins normal operation, the LED stops the rapid blinking.
Local IP 192/10	Red	The LED is off when the local Ethernet port's IP address is 192.168.1.1. The LED is on when the local Ethernet port's IP address is 10.1.1.1.
Modem Option LEDs	Green	Only available on PXMP-EPM-M. The modem option LEDs indicate modem status, as shown below.  CD: The LED is on when carrier detector is successful. RI: The LED is on when ring indicator is active. Rx: The LED is on when the modem receives data. Tx: The LED is on when the modem transmits data.
LAN/ WAN LEDs	Green	The LAN LEDs indicate LAN status, as shown below.  Tx ST: The LED is flashing when there is activity on the link; otherwise, the LED is off. DHCP: The LED is on when the dynamic host configuration protocol (DHCP) is enabled; otherwise, the LED is off. 10/100: The LED is on when link speed is 100 Mbps; otherwise, the LED is off. Link: The LED is on and blinks when link connection is good and network traffic is normal. The LED is off when there is no link connection.

2.2 COM Reset Switch and Procedure to Reset Communications

The PXMP-EPM(-M) must be configured the first time before it is used. To do so, follow the steps below.

1. Install and secure the PXMP-EPM(-M) into slot 10 of the PXMP Meter Base (PXMP-MB).
2. On power up, press and hold the Com Reset Switch for more than 2 seconds.
3. Within 15 minutes, connect to the PXMP-EPM(-M) module through its local Ethernet port. Refer to Section 4.1 for connection instructions.
4. Login with the default Username and Password. Refer to Section 5.1 for login instructions. The default administrative Username is admin. The default administrative Password is admin.

Note: For security purposes, please change the administrative Password as soon as possible. In case the administrative Password is lost, the administrative Password can be restored to factory default by following the steps listed above.

3. PXMP-EPM(-M) Installation

⚠ WARNING

BE SURE THAT ALL SYSTEM POWER IS OFF WHEN ASSEMBLING A PXMP METER INCLUDING THE INSTALLATION OF THE PXMP-EPM AND ITS ASSOCIATED EXTERNAL COMM. CIRCUITS.

To install a PXMP-EPM(-M) into the PXMP-MB assembly, first remove the metal slot cover on the Meter Base, slot 10 only, using a compatible head screw driver for the screws at top/bottom. Remove the EPM from its packing and remove the black plastic retainers from the mounting screws. Align the EPM connectors and screw mounts with those of the Meter Base. Then push the Module into the Base and tighten the mounting screws until the module housing is tight against the Backplane. The module is secured with captive screws that, when tightened, ground the module to the Meter Base and to the earth ground stud.

Note: The PXMP-EPM(-M) will not ground to the PXMP-MB if the black plastic retainers are not removed from the mounting screws.

Note: The PXMP-EPM(-M) will not function properly in a slot other than slot 10.

4. PXMP-EPM(-M) Commissioning and Configuration

The PXMP-EPM(-M) may be configured either through the front-facing local Ethernet configuration port or through the LAN/WAN Ethernet port on the bottom (see Figure 1).

To set up of the LAN/WAN Ethernet port, User must first connect to the PXMP-EPM(-M) through the local Ethernet configuration port. After the LAN/WAN Ethernet port is configured, the PXMP-EPM(-M) can be accessed and configured remotely through the LAN/WAN connection.

4.1 Local Ethernet Port

To configure the PXMP-EPM(-M) module through the local Ethernet configuration port:

1. Connect one end of a standard Ethernet cable to the front facing Ethernet configuration port on the PXMP-EPM(-M), and the other end of the Ethernet cable to a computer.

Note: The PXMP-EPM(-M) local Ethernet configuration port has a permanent Internet Protocol (IP) address of 192.168.1.1.

2. If Java Runtime Environment (JRE) is not already on the computer, download and install the latest version of JRE from www.java.com.
3. Set the computer's IP address to 192.168.1.100 by completing the following
   a. Click Window's Start. Then click Settings > Control Panel (Windows 2000) or Control Panel (Windows XP/Vista/7).
   b. In Control Panel, click Network and right-click Local PC Area Connection. Select Properties from the shortcut menu.

      For Windows 7, in Control Panel, click Network and Internet > Network and Sharing Center > Change adapter settings. Double-click Local Area Connection. Click Properties button.

   c. In the Properties dialog, select Internet Protocol (TCP/IP) and click the Properties button.

      For Windows 7, in the Local Area Connection Properties dialog window, select Internet Protocol Version 4 (TCP/IPv4) and click the Properties button.

   d. In the Internet Protocol (TCP/IP) Properties window, select "Use the following IP address" and then enter the IP address of:

      192.168.1.100,

      with a Subnet Mask set to:

      255.255.255.0

      For Windows 7, in the Internet Protocol Version 4 (TCP/IP) Properties window, select "Use the following IP address" and then enter the IP address of:

      192.168.1.100,

      with a Subnet mask set to:

      255.255.255.0

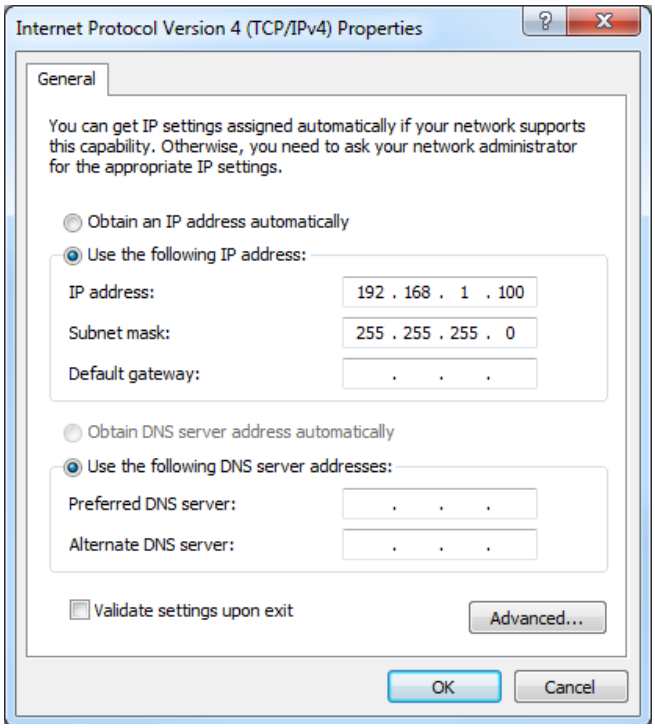


Figure 2. Internet Protocol Version 4 (TCP/IPv4) Properties Dialog Box.

   e. Click OK.
4. Launch Internet Explorer and then navigate to:

   http://192.168.1.1

Note:

- When connected to a computer, the Link LED will illuminate and, when communicating, the 10/100 LED will flicker.
- When the PXMP-EPM(-M) is connected to a router through its LAN/WAN Ethernet port, and the router has an IP address of:

  192.168.1.1,

  the PXMP-EPM(-M)'s local Ethernet port automatically switches to an alternative IP address of:

  10.1.1.1

  The 192/10 LED will illuminate. To reset the local Ethernet port's IP address back to 192.168.1.1, disconnect the Ethernet cable to the LAN/WAN Ethernet port, and the press and hold the Com Reset button for at least 3 seconds before releasing.

Once the commissioning is completed, and the connection through the local Ethernet port is no longer needed, disconnect the standard Ethernet cable from the front facing Ethernet configuration port, and change the Internet Protocol (TCP/IP) Properties in Figure 2 back to their original settings.

4.2 LAN/WAN Ethernet Port

To configure the PXMP-EPM(-M) through the LAN/WAN Ethernet port, connect one end of a standard Ethernet cable to the Ethernet port on the bottom of the PXMP-EPM(-M), and the other end of the Ethernet cable to a network.

The PXMP-EPM(-M) ships with Dynamic Host Configuration Protocol (DHCP) enabled. Connect the standard Ethernet cable from the LAN/WAN Ethernet port to a network. Because DHCP is enabled, the User must find the IP address via the local Ethernet port. See Section 5.1 and 5.2 in this manual on how to obtain LAN/WAN Ethernet port's IP address.

4.3 Configure PXMP Through PXMP-EPM(-M) Using Configuration Software

To support commissioning and configuring the PXMP-MB, Eaton provides a separate PXMP Configuration Software. The software is a Java-based application and is included on a CD provided with each PXMP-MB. The software can also be downloaded from the Eaton Power Xpert Multi-Point Meter Web site at www.eaton.com/meters.

For detailed instructions on configuring PXMP-MB through PXMP-EPM(-M) using the configuration software, please refer to the Power Xpert Multi-Point Meter Configuration Software User Manual (MN150002EN).

5. PXMP-EPM(-M) Embedded Web Server Interface

PXMP-EPM(-M) Embedded Web Server makes data in a PXMP Meter available to Users. Users can access the Web Server from web browsers and connect to the PXMP-EPM(-M) web interfaces over secure network communications.

When users connect to the PXMP-EPM(-M) Embedded Web Server using hypertext transfer protocol (HTTP), the communication proxy automatically redirects the request to an HTTP secure (HTTPS) connection. The HTTPS connection provides bidirectional encryption of communications between the web server and the User. The web server encrypts the session with a digital certificate for authentication.

To install a Root CA Certificate on a client machine, navigate to the ca.html file within the Energy Portal:

https://<PXMP-EPM IP Addr>/ca.html

Click on Root CA Certificate then Open the file and follow the series of screens to install the file.

Store the file within "Trusted Root Certification Authorities" to access the Energy Portal without warning messages.

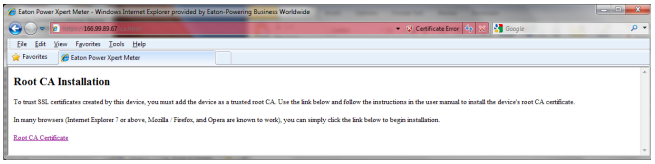


Figure 3. Root CA Installation Screen.

5.1 Login Into PXMP-EPM(-M) Web Server

Once users connect to the PXMP-EPM(-M) Embedded Web Server, either through Local Ethernet Configuration Port or LAN, a Power Xpert Multi Point Meter Welcome screen is displayed (see Figure 4).

Figure 4. Power Xpert Multi-Point Meter Welcome Screen.

The PXMP-EPM(-M) web server supports individual Usernames and Passwords to ensure that User access is limited to authorized information only. A User signs into the web server by providing Username and corresponding Password. To do so, click "Sign In" link on the upper-left side of the Welcome screen.

The Energy Portal Login screen (see Figure 5) appears if the User has not previously signed in. The User provides login credentials by entering appropriate Username and Password. The login credentials are then validated by the web server after the User clicks the "Login" button.

Note: The default administrative Username is admin. The default administrative Password is admin. For security purposes, please change the Password as soon as possible after login.

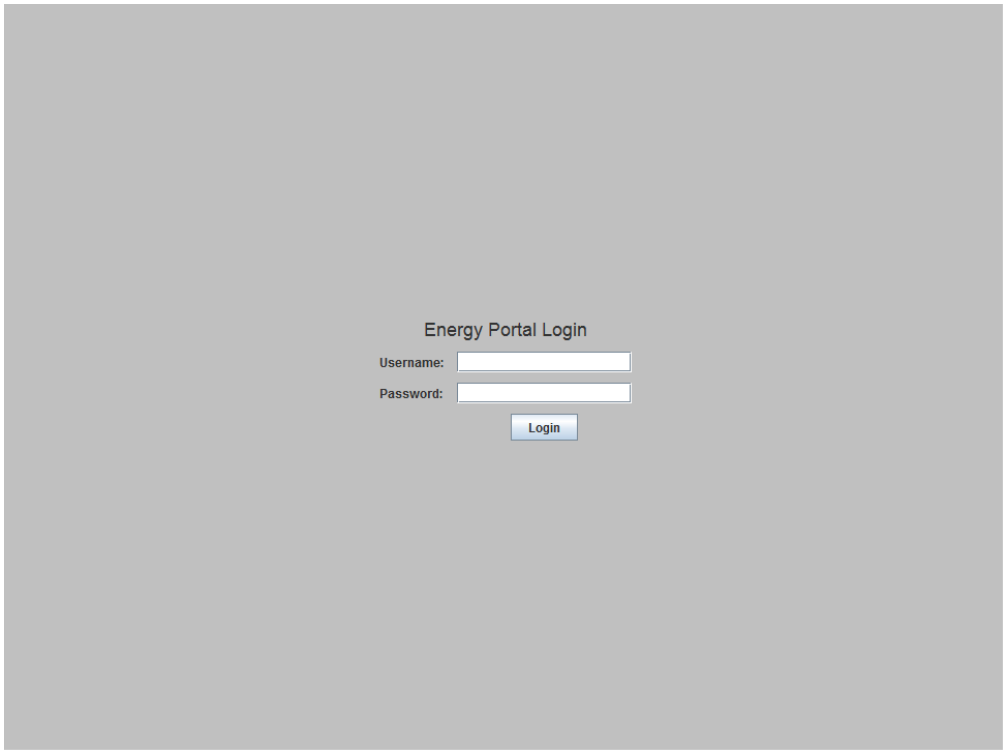


Figure 5. Energy Portal Web Interface Login Screen.

5.2 User Access Levels

The web server offers 2 levels of User access:

- Facility Manager and
- Tenant(s).

The Facility Manager has administrative rights, and can add, modify, or remove Tenant accounts, as well as change account Passwords. The Tenant(s) can customize dash boards, view their own load profiles, and print results.

Depending on the User-supplied login credentials, the web server provides separate web interfaces after successful logins for Facility Manager and Tenant(s). The web interfaces are designed to help the Facility Manager and Tenant(s) complete energy-monitoring-related tasks. Table 2 lists tasks the Facility Manager and Tenant(s) can perform via menu options in web interfaces.

Table 2. Menu Options for the Facility Manager and Tenant(s).

Menu Options	Facility Manager	Tenant(s)
Dashboard	✓	✓
Meter	✓	
Power	✓	
Load Profile	✓	✓
Channel Data	✓	
Events	✓	
Setup	✓	
Print	✓	✓

5.2.1 Login as Facility Manager

For the Facility Manager, a typical web interface screen is similar to the one shown in Figure 6. The "Logout" link on the top of the screen allows the Facility Manager to sign off the web server.

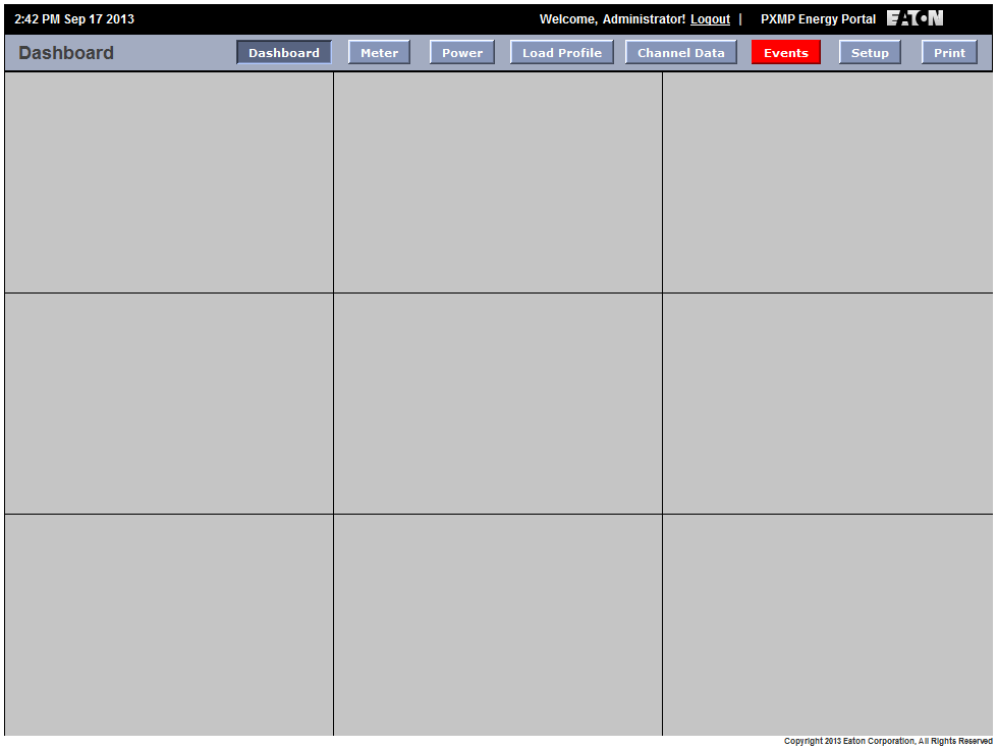


Figure 6. Dashboard Screen for the Facility Manager.

5.2.1.1 Ethernet/LAN IP Address

The PXMP-EPM(-M) is set by default to obtain IP address automatically when an Ethernet cable connects its LAN/WAN Ethernet port to a network. To obtain the Ethernet/LAN IP Address, first follow the steps listed in Section 4.1 to establish a connection to the PXMP-EPM(-M) via the local Ethernet port, and then follow the steps listed in Section 5.1 to login into the PXMP-EPM(-M) Web Server as a Facility Manager. Use the default administrative Username and Password if the PXMP-EPM(-M) has not been previously configured.

Once logged in, click the "Setup" button on the top of the screen to show the Setup screen. In the tree view on the left side of the Setup screen, click the "+" symbol to the left of "Communications" to expand all communications-related settings. Click the "Ethernet Status" to show the PXMP-EPM(-M)'s IP address on the right (see Figure 7). Figure 7 shows an example of the Ethernet/LAN IP address. In the example shown, the automatically obtained IP address is 10.130.14.202. Use the address listed on this line when accessing PXMP-EPM(-M) web server through the LAN/WAN Ethernet port.

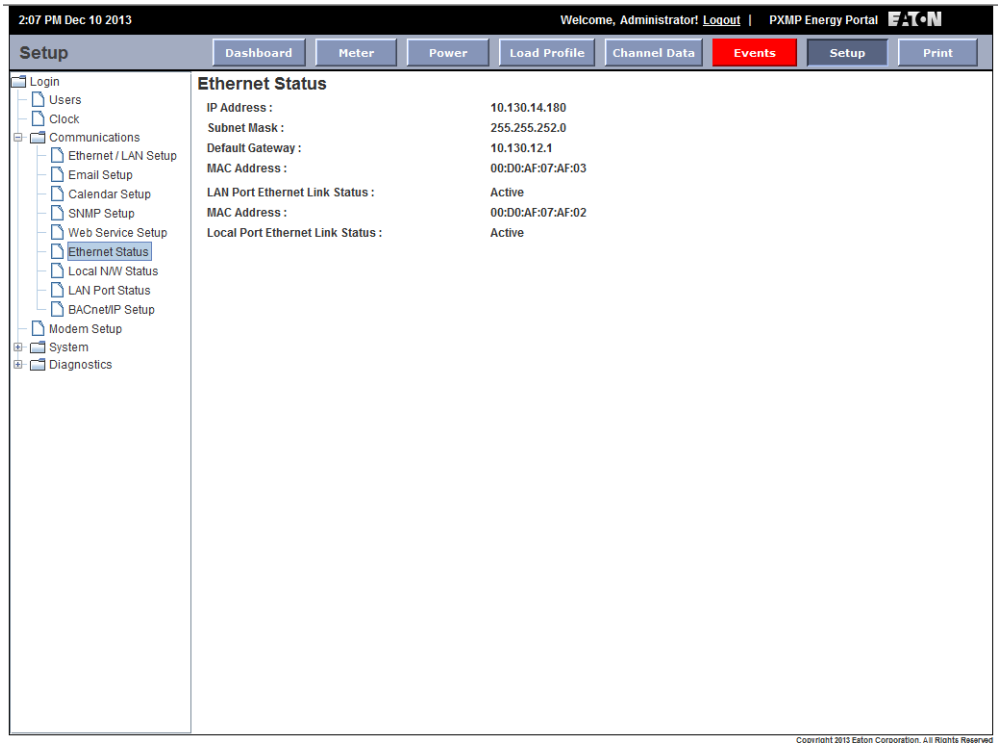


Figure 7. Ethernet Status Showing Ethernet/LAN IP Address.

5.2.1.2 Users Setup

The Facility Manager is responsible for managing Tenants' login credentials, including adding, modifying, or removing Tenant accounts, as well as changing account Passwords through the web interface. To do so, first click "Setup" button on the web interface.

A Current Login Info screen appears (see Figure 8). The screen displays a summary of the current login information. The PXMP-EPM(-M) web server supports up to five Users to logon to the server simultaneously. For example, Figure 8 shows that both the Facility Manager (admin) and a Tenant (tenant 3) are currently logged on.

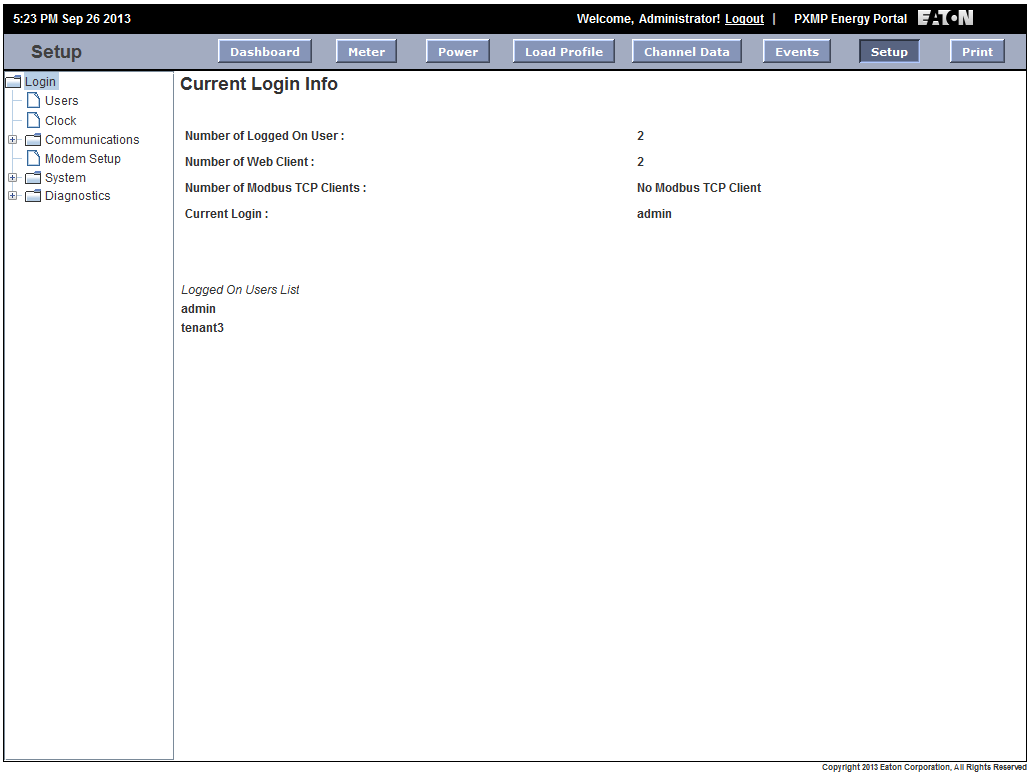


Figure 8. Current Login Info Screen for Facility Manager.

5.2.1.2.1 Add New Tenant Account

To set up Users, click "Users" icon on the left in Figure 8, a Users Setup screen appears (see Figure 9). The screen displays a list of existing Users. The Facility Manager can manage Tenants' login credentials by adding new Tenant accounts, editing or removing existing Tenant accounts, as well as changing account Passwords.

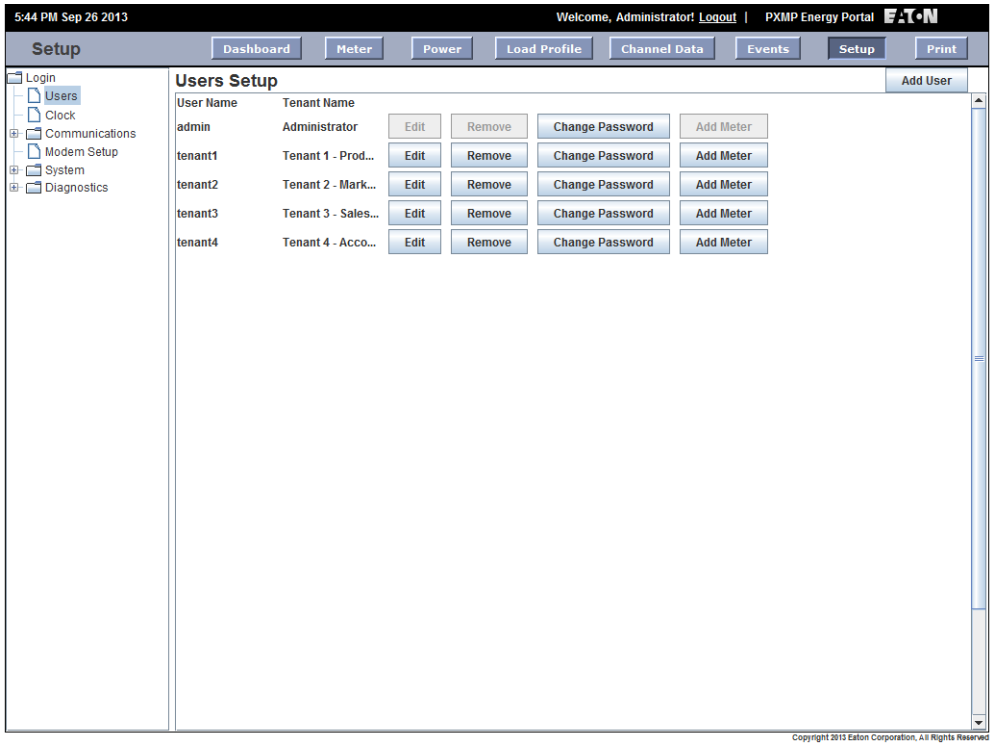


Figure 9. Users Setup Screen for Facility Manager.

To add a new Tenant account, click the "Add User" button on the screen's top-right corner. Enter the appropriate User Name, Tenant Name, and Password in the provided text boxes (see Figure 10). The User Name and Password are used by the Tenant to login to the Energy Portal Login screen (see Figure 5). The Tenant Name is used as an identification tag.

Note: A secure password with a minimum of 8 and maximum of 32 characters is recommended. A secure password contains at least:

- One digit from 0-9;
- One lowercase character;
- One uppercase character; and
- One special symbol, such as @, #, $, %, _.

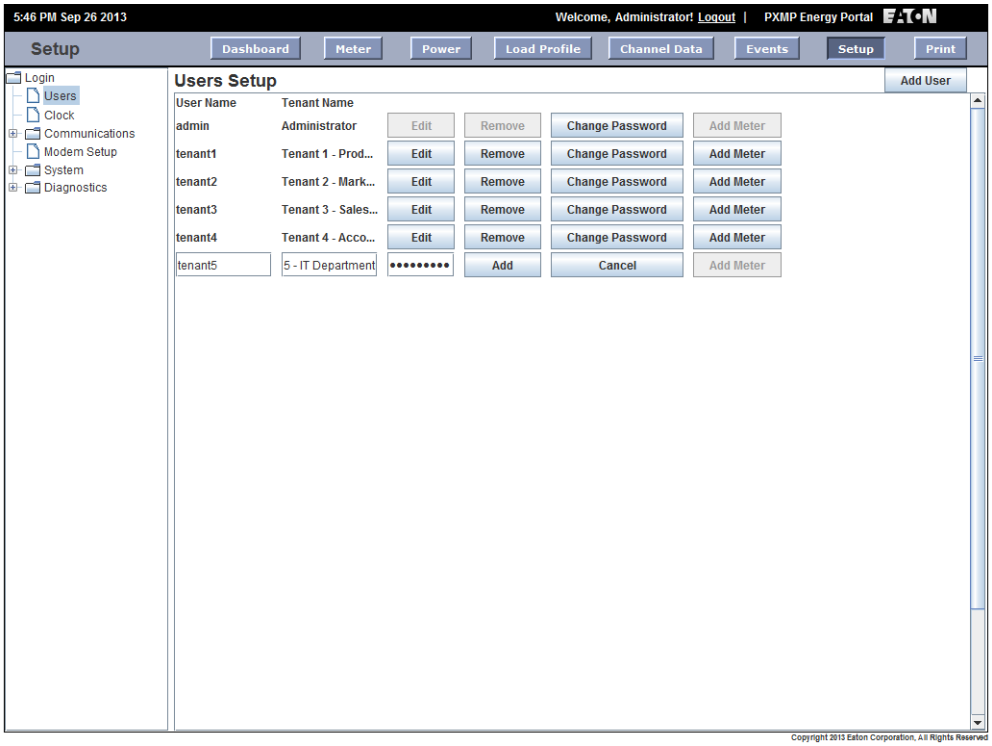


Figure 10. Add New Tenant Account.

Click "Add" button to complete adding the new Tenant account. The Users Setup screen is then updated with the newly added Tenant account (see Figure 11).

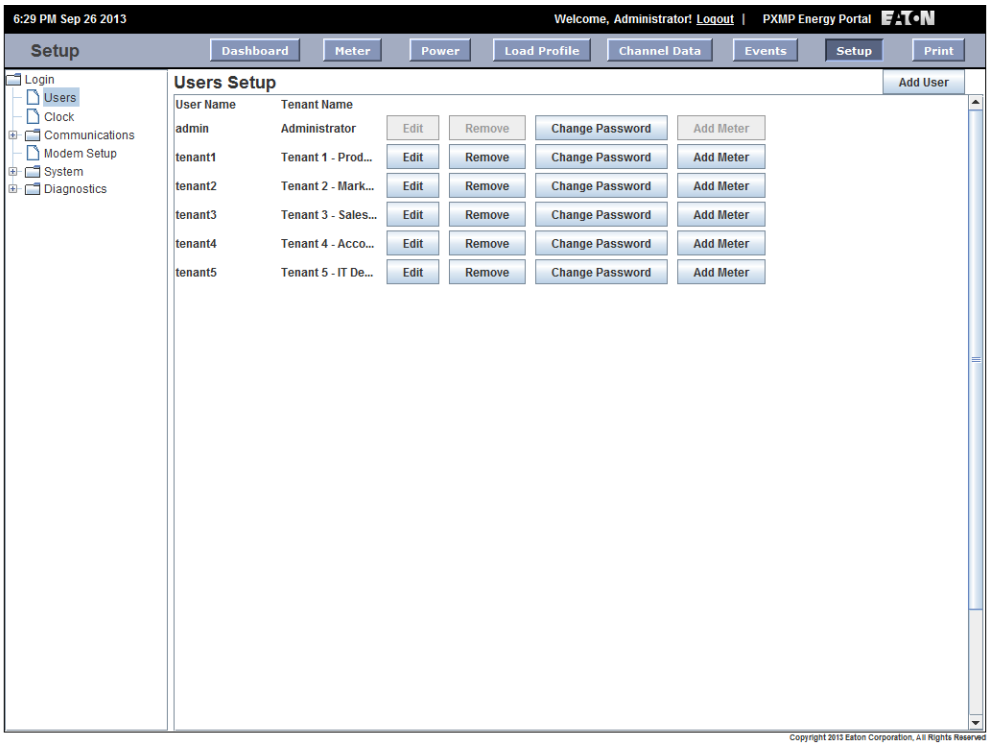


Figure 11. New Tenant Account Added.

5.2.1.2.2 Associate Meters with Tenant Accounts

Each Tenant is allowed to have one or more meters associated with the Tenant account. Once a meter is assigned to a Tenant, it is no longer available to other Tenants. To add or modify associated meters for each account, click the "Add Meter" button on the corresponding account. An "Add Meter for Tenant" dialog box appears (see Figure 12).

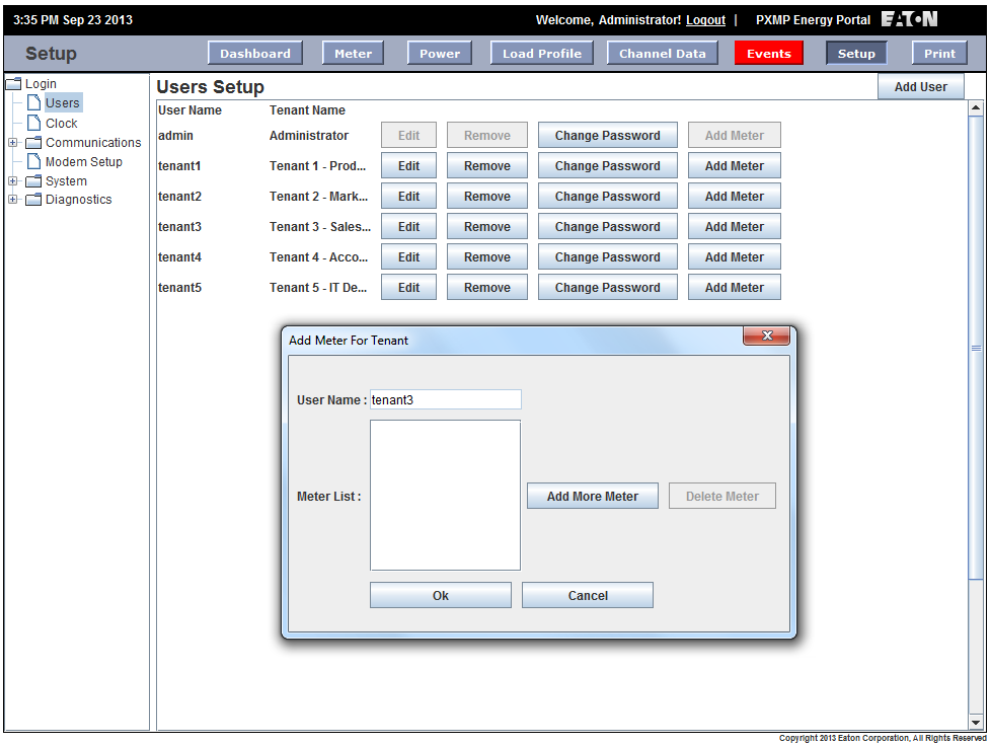


Figure 12. Add Meter for Tenant.

Click the "Add More Meter" button in the dialog box, a new dialog box with a list of energy or pulse meters appears (see Figure 13).

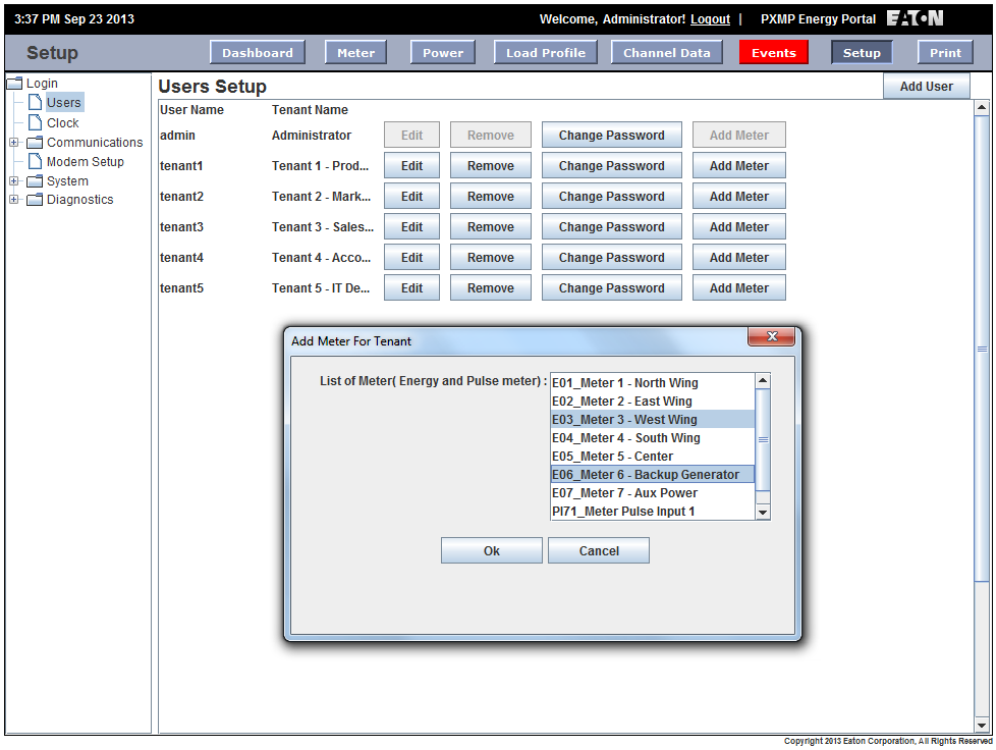


Figure 13. List of Available Energy or Pulse Meters.

The Facility Manager can select multiple meters by pressing and holding down the CTRL key on the keyboard while clicking desired meters from the list. In the example shown in Figure 13, two meters have been selected. Click the "Ok" button to add selected meters to the Tenant account.

When the Facility Manager is done with adding meters to the Tenant account, click the "Ok" button, shown in Figure 14, to complete the task. Otherwise, click the "Add More Meter" button or "Delete Meter" button to modify the added meter list.

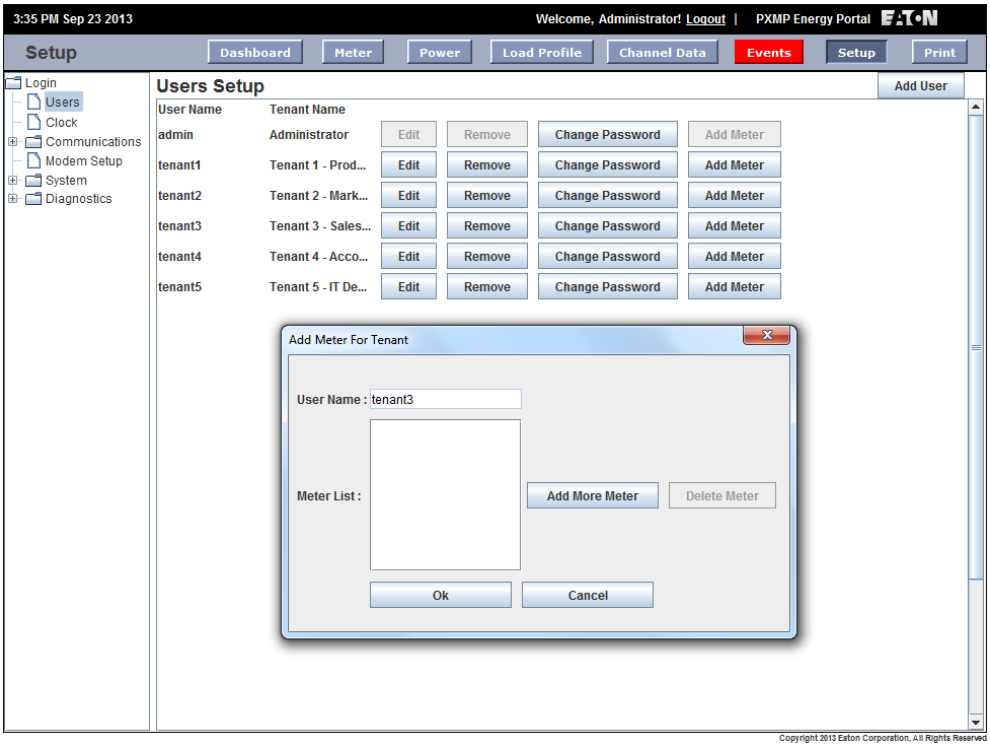


Figure 14. Meters Added to Tenant Account.

5.2.1.2.3 Remove Tenant Account

To remove a Tenant account, the account must be first dissociated with any meters. To do so, click the "Add Meter" button for the corresponding Tenant account and, in the "Add Meter for Tenant" dialog box, select all meters from the Meter List and click the "Delete Meter" button (see Figure 14).

Once all associated meters have been removed from current Tenant account, click the "Ok" button to return to the User Setup screen (see Figure 11). In the User Setup screen, click the "Remove" button to delete current Tenant account.

Note: The "Delete Meter" button dissociates selected meters from the current Tenant account. It does not disable or remove meters physically from the PXMP meter installation. If needed, the Facility Manager can always associate those deleted meters back to the same Tenant or to another Tenant account by clicking the "Add More Meter" button for appropriate Tenant account shown in Figure 14

5.2.2 Login as Tenant(s)

When a User enters the appropriate Username and Password provided by the Facility Manager (see Figure 5), and logs in as a Tenant, the following menu options are available:

- Dashboard;
- Load Profile; and
- Print.

For example, in Figure 11 the Facility Manager has set up login credentials for five different tenants. When tenant 3 logs into the PXMP-EPM(-M) web server, the web interface appears as shown in Figure 15.

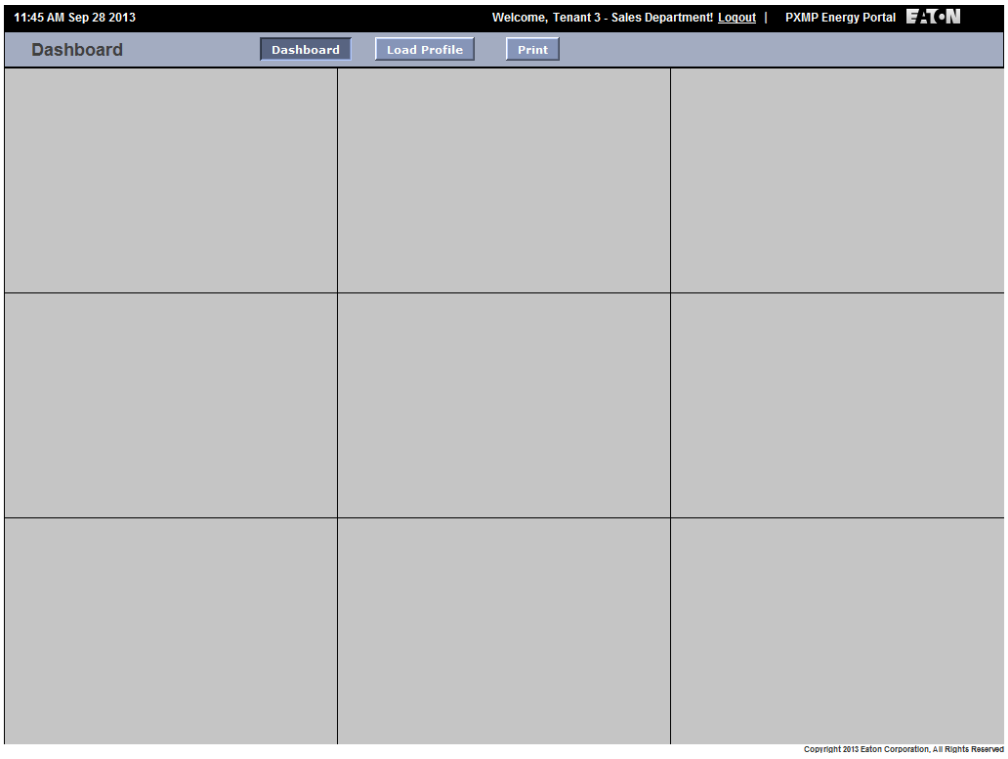


Figure 15. Dashboard Screen for Tenant(s).

5.3 Dashboard

The Dashboard is a highly configurable view. Once set, the configuration is saved on the server side allowing the User to view the customized screen anytime and anywhere. The dashboard is divided into a total of nine grids. A module can be placed in one or more grids (see Figure 16). The Facility Manager and Tenant(s) have access to a variety of modules. Table 3 lists available modules for Facility Manager and Tenant(s).

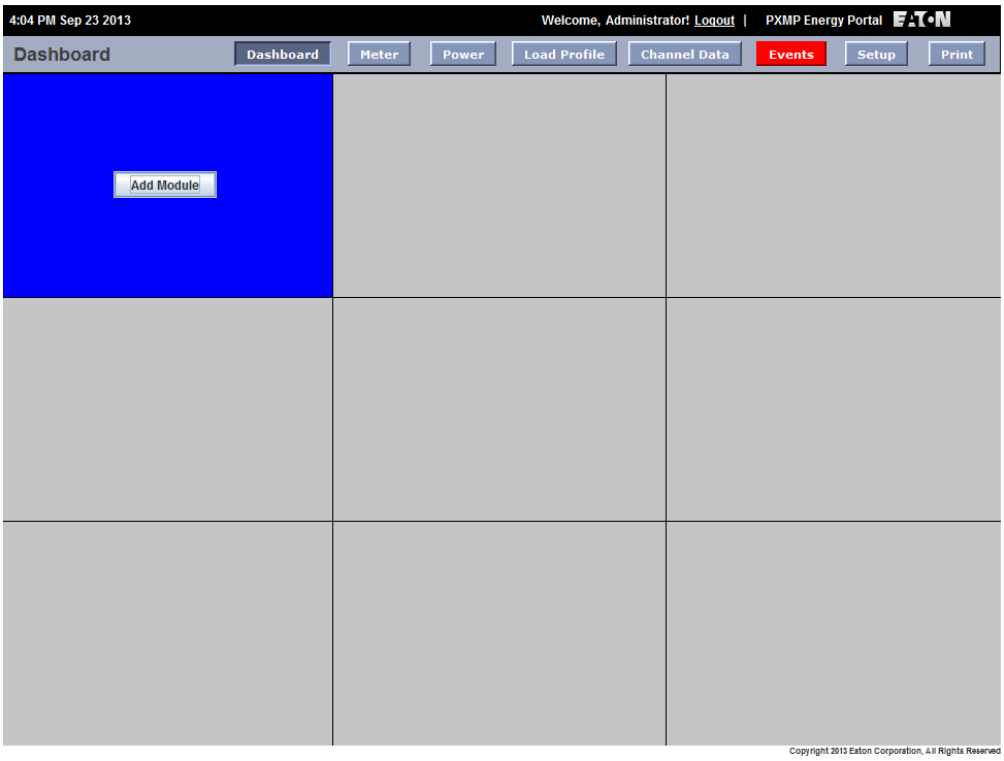


Figure 16. Dashboard Screen – Add Modules.

Table 3. Modules for Facility Manager and Tenant(s).

Dashboard Modules	Facility Manager	Tenant(s)
1x1 Module	Events Map Image	
1x2 Module	Real Time Values Map Image	Real Time Values
2x1 Module	Summary View Map Image	Summary View
2x2 Module	Load Profile Map Image	Load Profile

5.3.1 Dashboard for Facility Manager

An example is shown in Figure 17 to add a 1x1 map module to the dashboard in a Facility Manager's dashboard. Other modules can be added in a similar fashion.

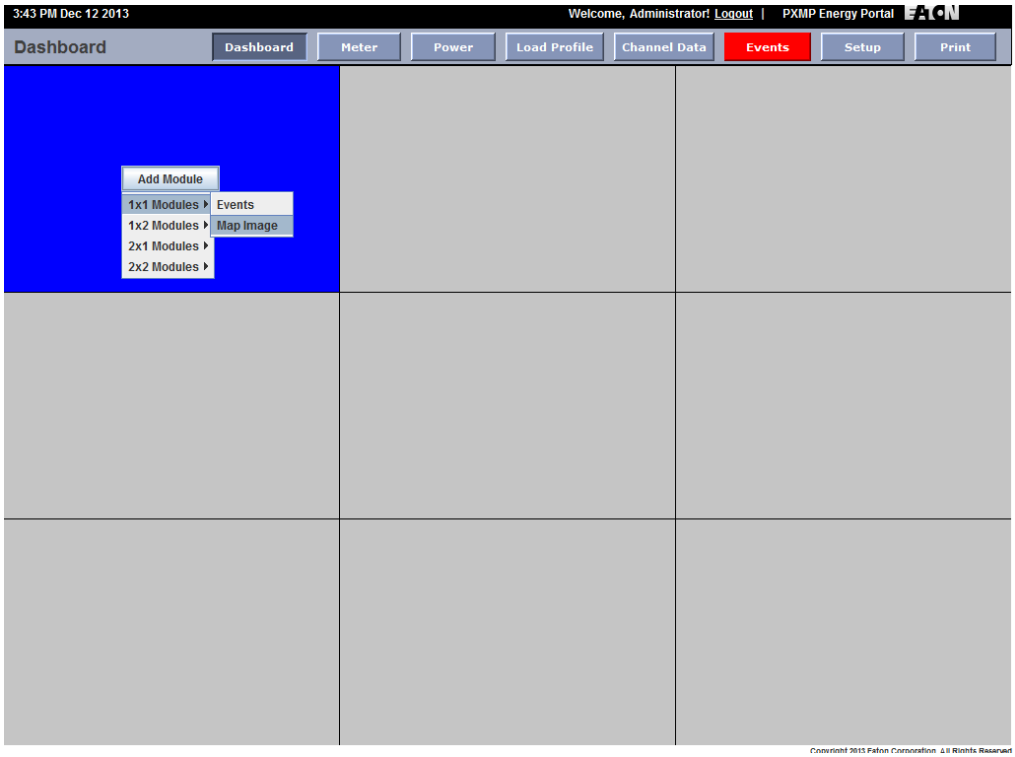


Figure 17. Dashboard Screen – Add 1x1 Modules.

To start with, move the mouse cursor to an area within the desired grid, an "Add Module" button will appear. Click on the "Add Module" button. In the drop-down list, select "1x1 Modules". Select "Map Image" to add a 1x1 map image module to the dashboard.

The map feature provides the Facility Manager with a great view of the facility and the quick summary of the energy consumption in different parts of the facility. To upload a new map, right-click inside the map module, and select "Upload Map Image," and a security warning dialog box appears (see Figure 18).

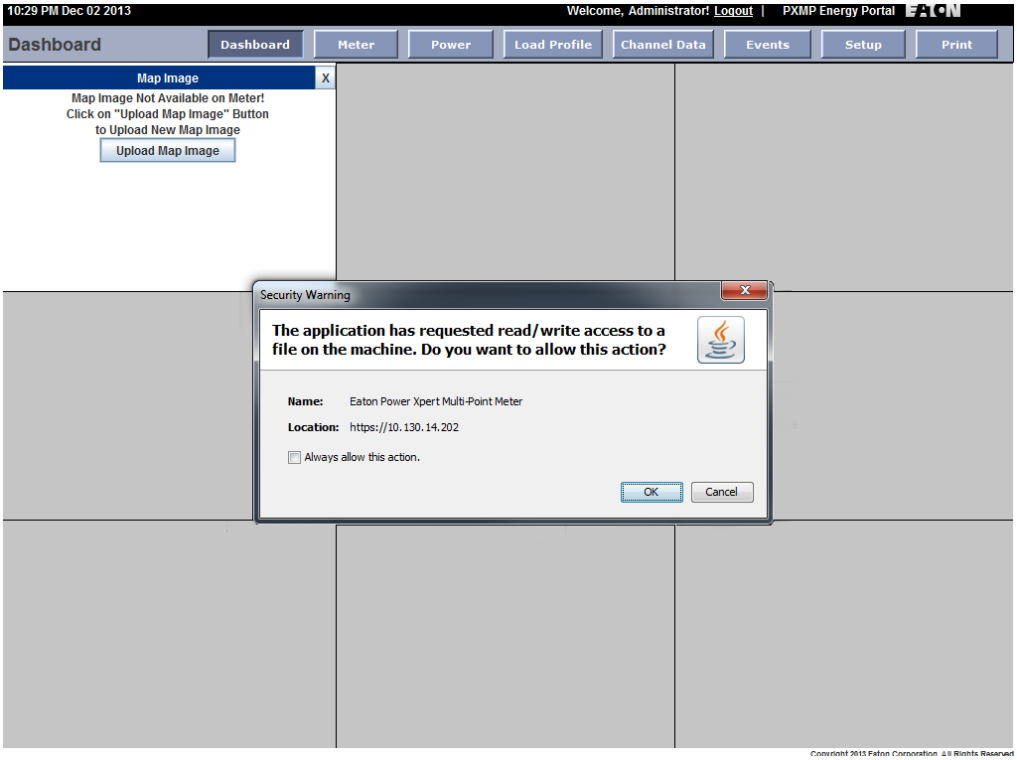


Figure 18. Dashboard Screen – Upload New Map.

To upload a map image to the 1x1 module, the energy portal web interface needs to access files on the computer. Click "Ok" button in the security warning dialog box will grant file access to energy portal web interface. An "Open" dialog box will appear (see Figure 19). A portable network graphics (PNG) file can be selected as the background in the map module.

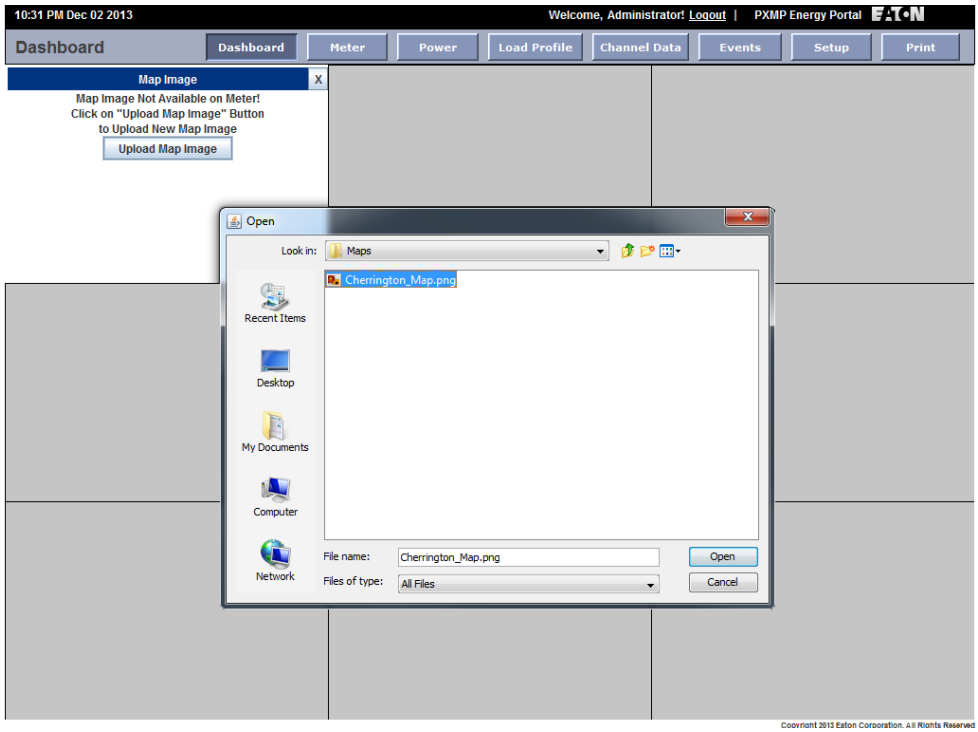


Figure 19. Dashboard Screen – Open a PNG File as Map Module Background.

Once a PNG file is selected and uploaded to the map module as its background, the Facility Manager can then mark the energy or pulse meters' locations on the map module's background. To do so, right-click on the desired spot inside the map module, select "Add" (see Figure 20). An "Add New Meter Details" dialog box will appear (see Figure 21).

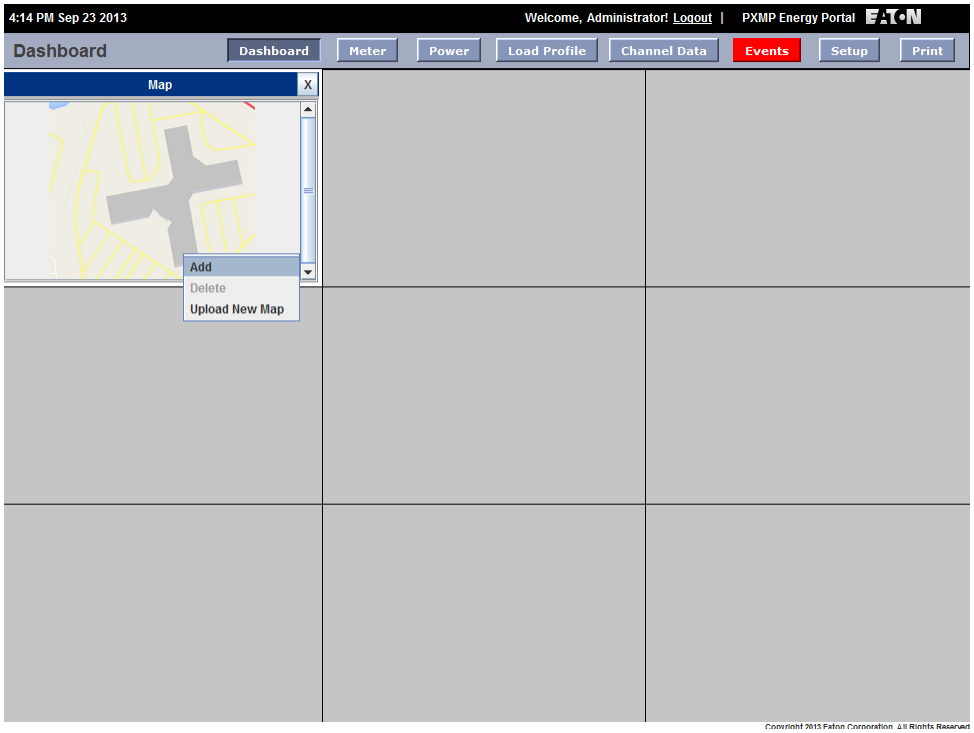


Figure 20. Dashboard Screen – Add Meters to the Map Module.

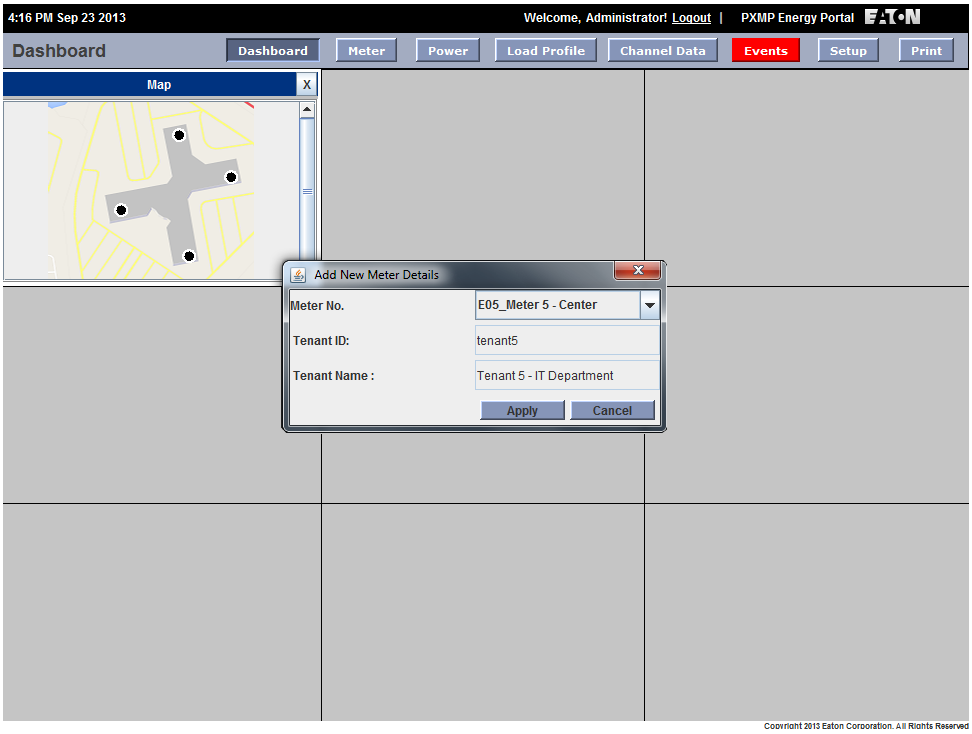


Figure 21. Dashboard Screen – Add New Meter Details.

The Facility Manager can select desired meters by clicking on the "Meter No." dropdown list. The meter's associated Tenant ID and name are also displayed in the "Add New Meter Details" dialog box. Click the "Apply" button to add the selected meter to the map module. The meter's location is marked by the • symbol on the map (see Figure 21).

Facility manager can view meter information associated with a location by clicking appropriate • symbols on the map (see Figure 22). The following information is displayed for an energy meter:

- Meter Name;
- Tenant Name;
- Total kWh (Forward);
- Peak W (Forward); and
- Peak W Today (Forward).

If the meter is a pulse meter, then the following information is displayed:

- Meter Name;
- Tenant Name;
- Pulse Count;
- Scaled Value; and
- Unit.

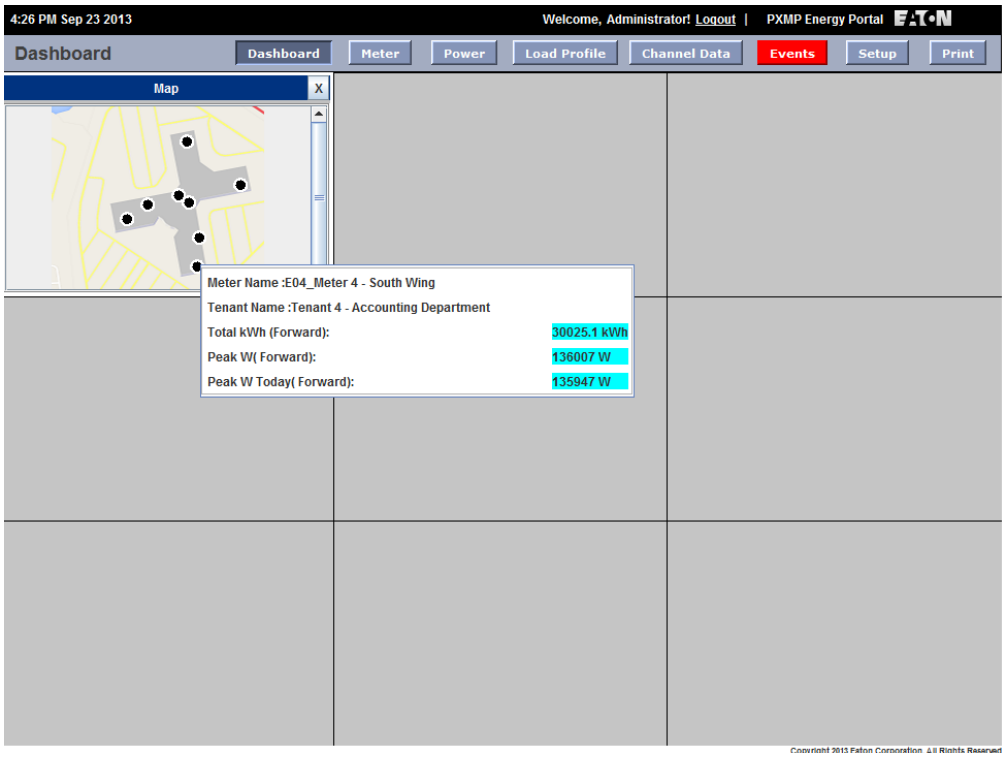


Figure 22. Dashboard Screen – Display Meter Information.

To delete a location from the map, right-click on the location symbol •, then select "Delete" from the pop-up menu to remove the location from the map (see Figure 23) . To change a meter's location on the map, first delete the location from the map, then right-click on the map to add the meter to the desired spot.

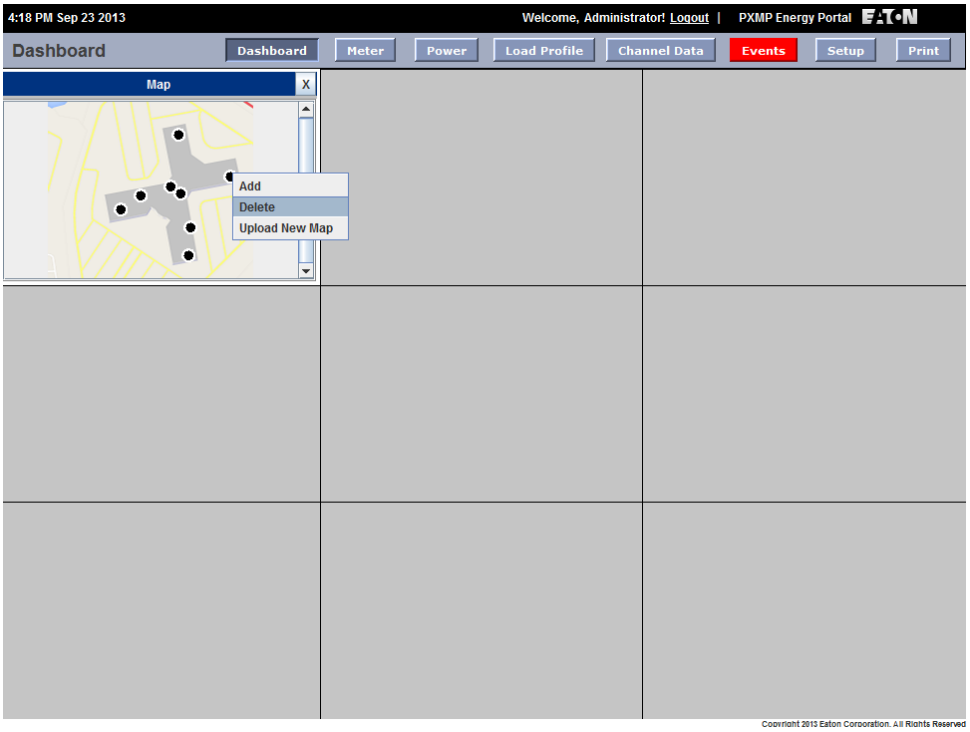


Figure 23. Dashboard Screen – Delete a Meter Location.

Figure 24 shows an example dashboard screen with four different modules for the Facility Manager. Note that the Facility Manager can select different parameters to display on the dashboard screen. Depending on the selected parameters, information is retrieved from the PXMP-EPM(-M) web server and displayed in real time. In the example shown in Figure 24, a "Please Wait …" sign appears when load profile information is being retrieved from the web server.

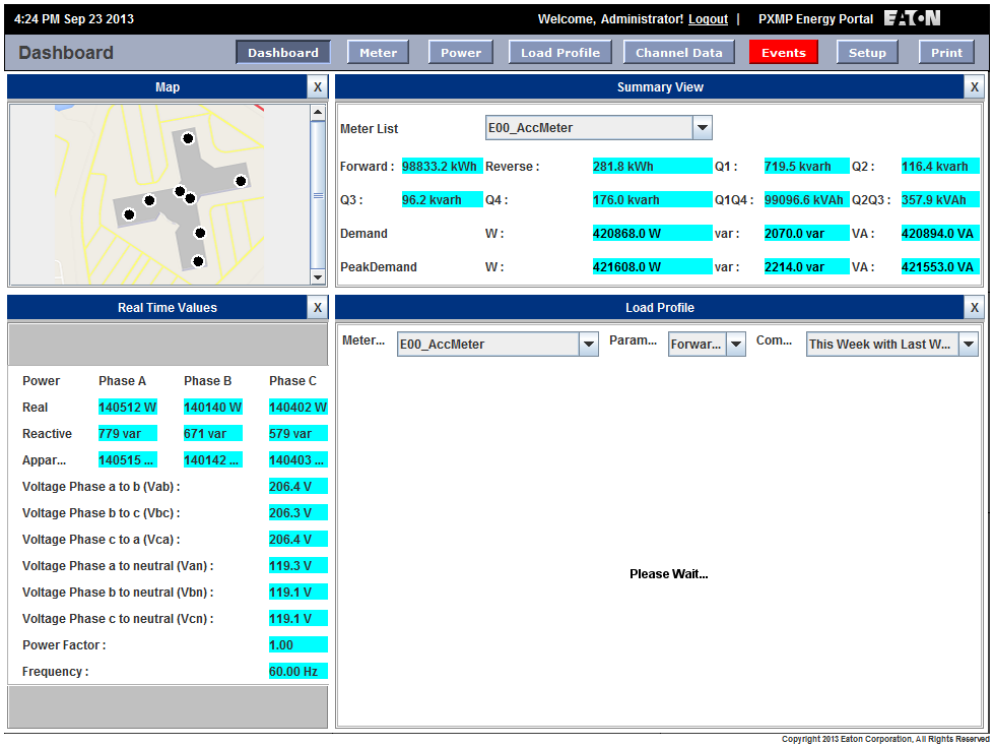


Figure 24. Dashboard Screen with Four Modules Displayed.

5.3.2 Dashboard for Tenant

When logged in as a Tenant, the User is allowed to choose from the following modules to display on the dashboard:

- Summary View;
- Load Profile; and
- Real Time Values.

Figure 25 shows the summary view and load profile modules for tenant 3. Note that the Tenant can select any meter associated with the Tenant's account from the Meter List for display.

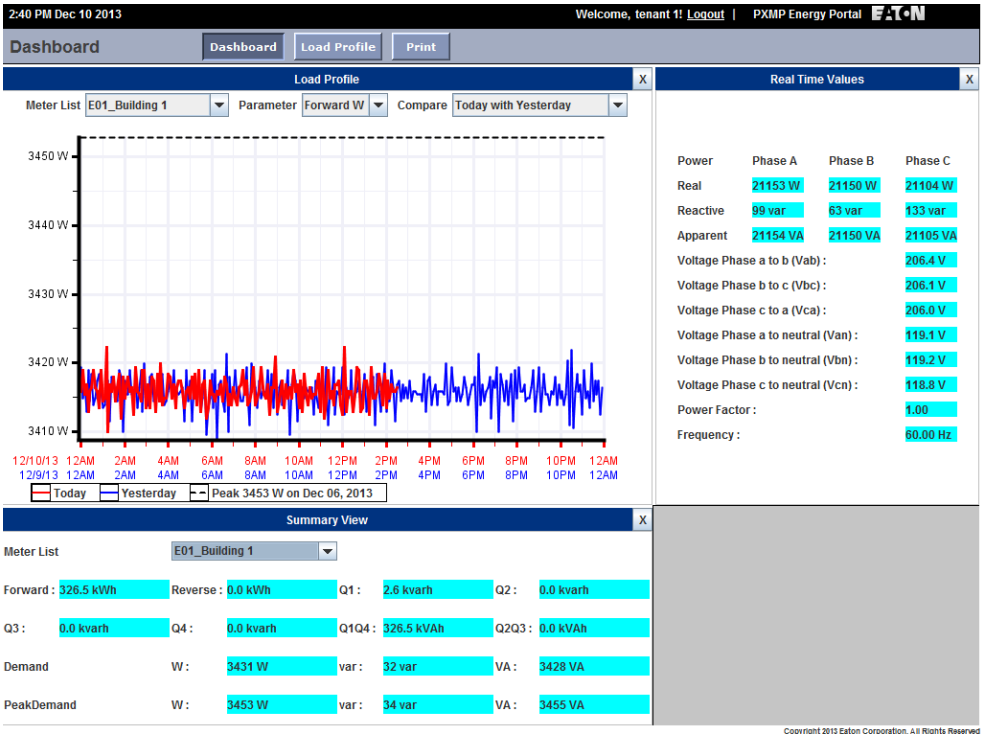


Figure 25. Dashboard Screen with Summary View and Load Profile for Tenant(s).

In the load profile module, the Tenant can also select to display a real, reactive, or apparent power quantity, such as Forward W, Q2 Var, or Q1Q4 VA, by choosing appropriate item from the Parameter drop-down list. In addition, the load profile module also allows the Tenant to make the following comparisons:

- Today with Yesterday;
- This Week with Last Week; and
- This Month with Last Month.

The default value for comparison is "This Week with Last Week."

5.4 Meter Screen

The Meter screen is visible to Facility Manager only. The Facility Manager can select from either line-neutral or line-line voltages, currents, or temperature data for display. The PXMP-EPM(-M) calculates and stores those trend data every five minutes, and displays relevant trend data in the Meter screen as well as in the Power screen (see Section 5.5).

In the Meter screen (see Figure 26), based on the User's selection in the left side, the corresponding interval average and min/max values are displayed in graphical formats on the right side. The Facility Manager can also use the horizontal scroll bar below the graph to examine data trends over time. The bottom of the display shows the tabular view of the interval data. Data can be copied by selecting the grid to be copied and then selecting the copy form the right click menu.

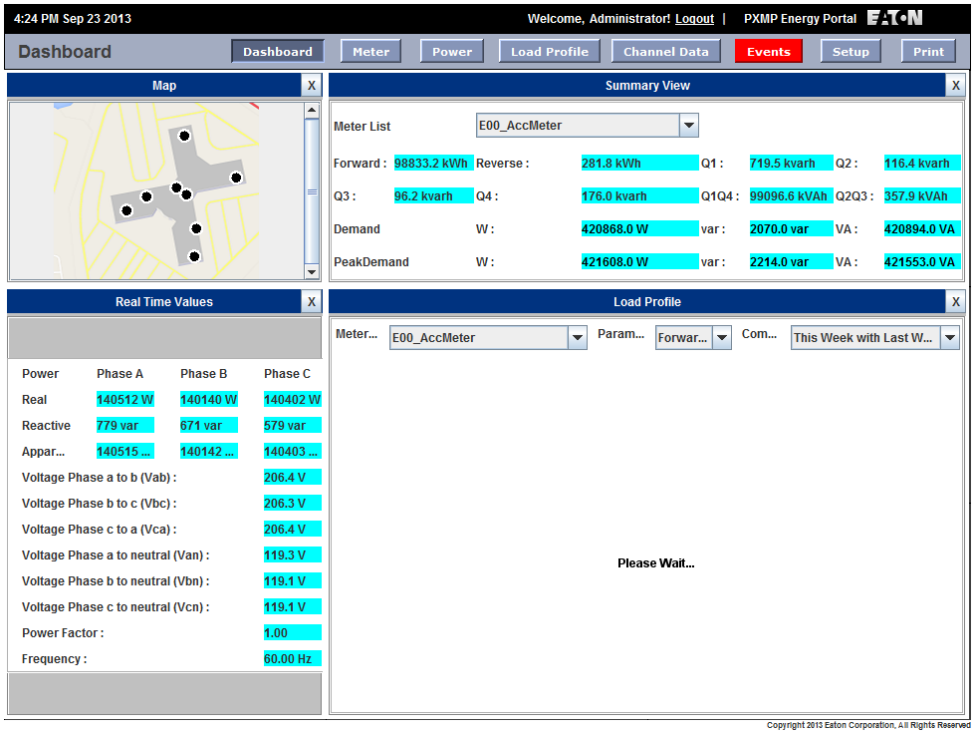


Figure 26. Dashboard Screen with Four Modules Displayed.

To zoom in or out in the graph, use the "+" or "–" buttons. The drop-down list between the "+" or "–" buttons also allows the Facility Manager to perform zoom operations. To print the displayed graph data, click the "Print" button below the graph.

The PXMP-EPM(-M) keeps a record of the measured absolute minimum and maximum voltages and the corresponding time. Such information is displayed above the table for monitoring purposes.

The Facility Manager can reset min/max values, trend data, and profile data through the Energy Portal web interface. In Figure 26, when the Facility Manager right-clicks the mouse at an empty spot, a mouse right-click menu appears. The Facility Manager can then select from the mouse right-click menu appropriate entry to reset metered data in the PXMP-EPM(-M).

Note: Reset operations only clear displayed data. They do not clear or change any archived FTP data.

5.4.1 Reset All Min/Max

In the Meter screen, selecting "Reset All Min/Max" will clear all min/max values, as well as the associated time stamps stored in the PXMP-EPM(-M). The "Reset All Min/Max" will at the same time clear min/max values and the associated time stamps in the Power screen (see Section 5.5, Figure 27).

5.4.2 Reset Trend Data

In the Meter screen, selecting "Reset Trend Data" will clear the graph and the table in Figure 26. The "Reset All Min/Max" will, at the same time, clear the graph and the table in the Power screen (Section 5.5, Figure 27).

5.4.3 Reset Profile Data

In the Load Profile screen (see Section 5.6), selecting "Reset Profile Data" will clear profile data shown in the graph and the table shown in Figure 29. The "Reset Profile Data" will at the same time clear the graph in the load profile module in the Facility Manager's dashboard (see Section 5.3.1).

5.5 Power Screen

The Power screen is visible to Facility Manager only. By selecting a meter from the Meter drop-down list on the left side of the screen, the Facility Manager can obtain corresponding average and min/max values of power and frequency data.

The power and frequency data are displayed in both graphical and tabular formats on the right side of the Power screen. Table 4 gives available power and frequency data that can be displayed.

Table 4. Available Power and Frequency Data.

Meter	• Main Meter[1]
	• All Tenant Meter(s)
Power	• System Power[1, 2]
	• Real Power (Watts)
	• Reactive Power (var)
	• Apparent Power (VA)
	• Power Factor
Frequency	• Frequency (Hz)

[1] Default display
[2] Only available when the main meter is selected.

Figure 27 shows an example of the Power screen. Similar to the Meter screen, the Facility Manager can use the horizontal scroll bar to examine data trends over time, use the "+" or "–" buttons or the drop-down list between the "+" or "–" buttons to zoom in or out in the graph, and the "Print" button to print the displayed graph data. Clicking the "Save" button will save the all the data from the trend graph display to a file in comma-separated values (CSV) format. Clicking "Save Table" will save the data from the table to a file in CSV format.

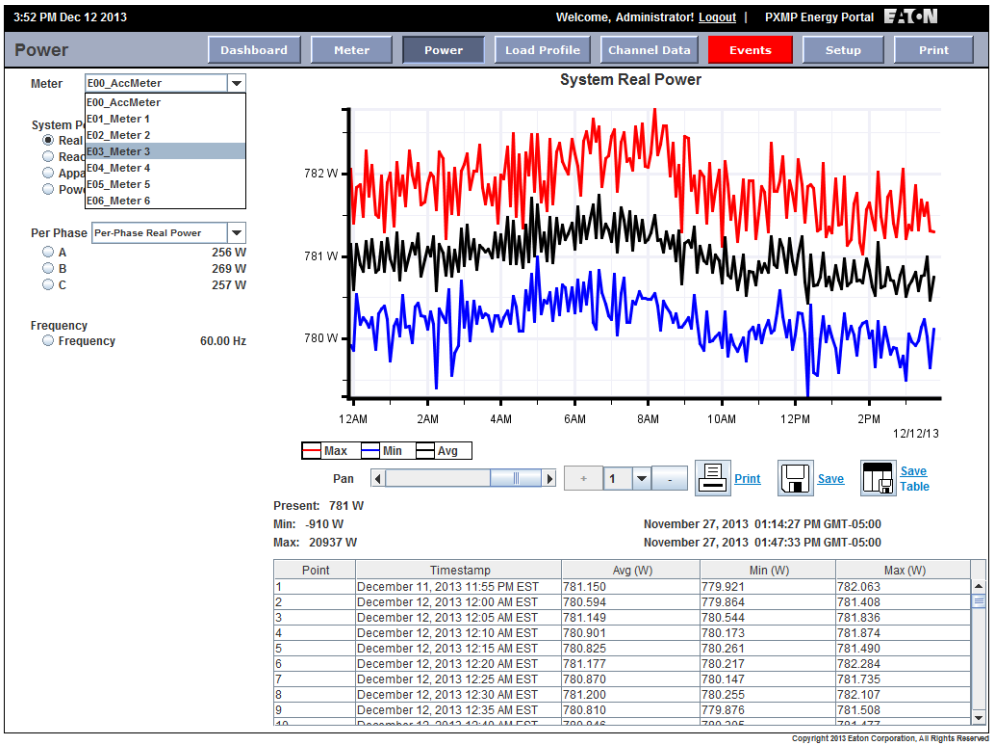


Figure 27. Power Screen for Facility Manager.

In the example shown in Figure 27, E00_AccMeter is a system meter. If the system meter is selected, then in addition to the System Power option, the data contained in Table 5 may also be selected and displayed from the Power drop-down list.

Table 5. Available System Meter Power Data.

Real Power (Watts)	Per-Phase Real Power • A (Watts) • B (Watts) • C (Watts)
Reactive Power (var)	Per-Phase Reactive Power • A (vars) • B (vars) • C (vars)
Apparent Power (VA)	Per-Phase Apparent Power • A (VA) • B (VA) • C (VA)
Power Factor	Per-Phase Power Factor • A • B • C

Note: The "System Power" option in the "Power" drop-down list is only available for the main meter. It is not available when a meter other than the system meter is selected.

Note: The prefix "Exx" is added to the meter names to indicate the energy meters.

5.6 Load Profile Screen

The load profile screen is visible to both the Facility Manager and Tenant(s). The Facility Manager has access to all meters, and can reset individual meter's energy or demand data. The Tenant(s) have access only to the meters associated with the Tenant's account, and cannot reset energy or demand data.

5.6.1 Load Profile for Facility Manager

Figure 28 shows an example of a Load Profile screen for Facility Manager. Based on the selected parameter list, Tenant ID and meter list on the left, corresponding data are displayed on the right side of the Load Profile screen. In the example shown in Figure 28 the main meter E00_AccMeter's energy and demand information are displayed.

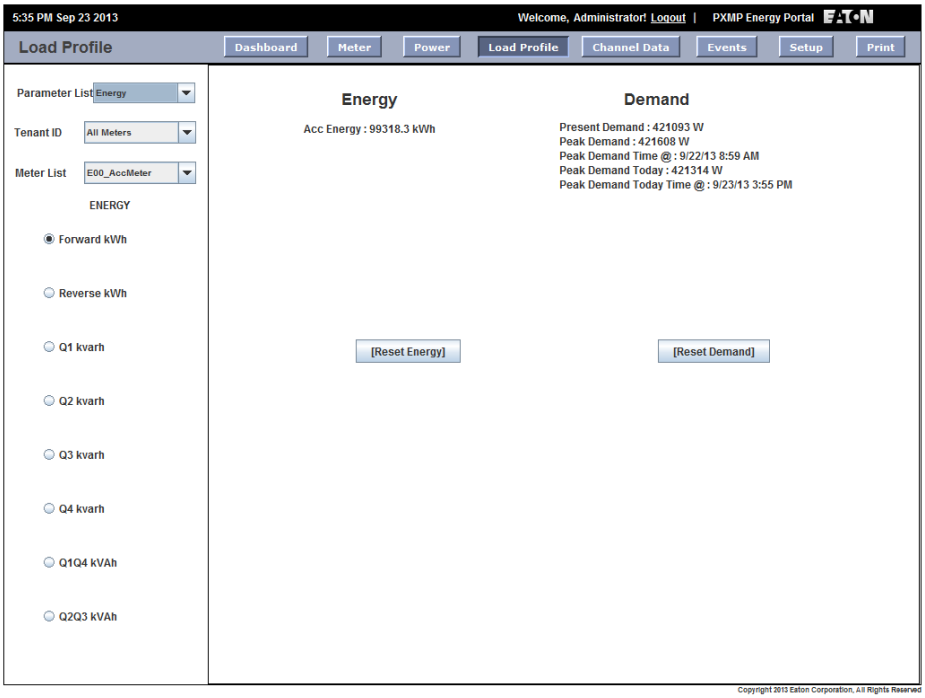


Figure 28. Load Profile Screen for Facility Manager.

In addition to energy, the "Parameter List" on the left side the load profile screen has the following options:

- Pulse Meter;
- Load Profile; and
- Load Comparison.

Figure 29 shows an example when the "Load Profile" option is selected from the "Parameter List" to display data from the main meter. The load profile data are stored in the PXMP Meter Base. The PXMP-EPM(-M) retrieves the load profile data from the Meter Base in the background, and stores them in the PXMP-EPM(-M)'s non-volatile memory.

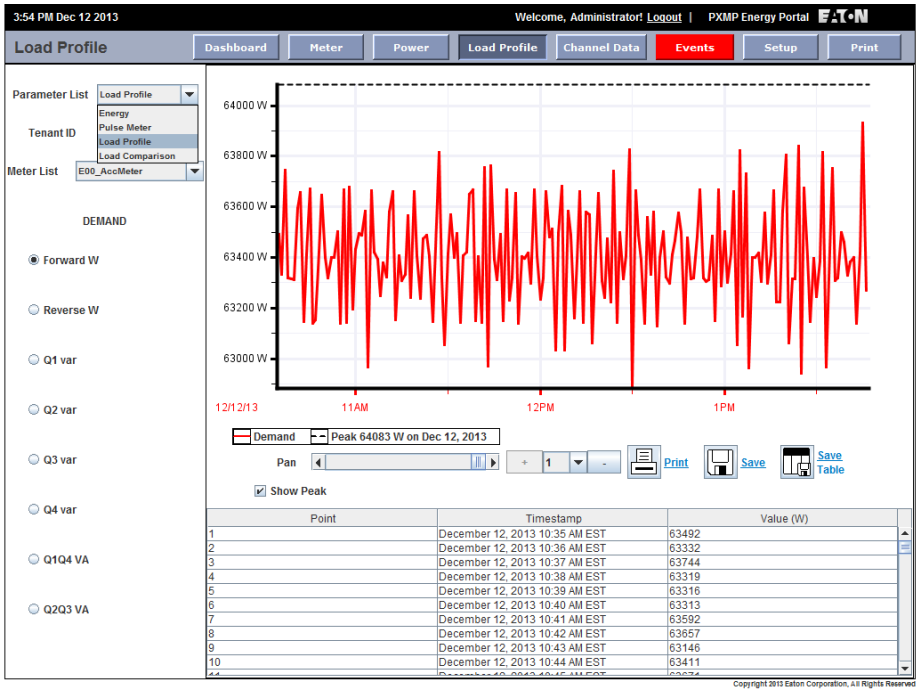


Figure 29. Load Profile and Other Options for the Facility Manager.

In Figure 29, when the "Show Peak" check box is selected, peak values will be displayed on the load profile graph on the right side of the screen.

To compare the load profile data from different time periods, select "Load Comparison" from the "Parameter List." The graph and tables are automatically updated on selection of the following different comparison options:

- Today with Yesterday;
- This Week with Last Week; and
- This Month with Last Month.

Figure 30 shows an example of load comparison for E00_AccMeter. The comparison is made on Q1 var data between today and yesterday.

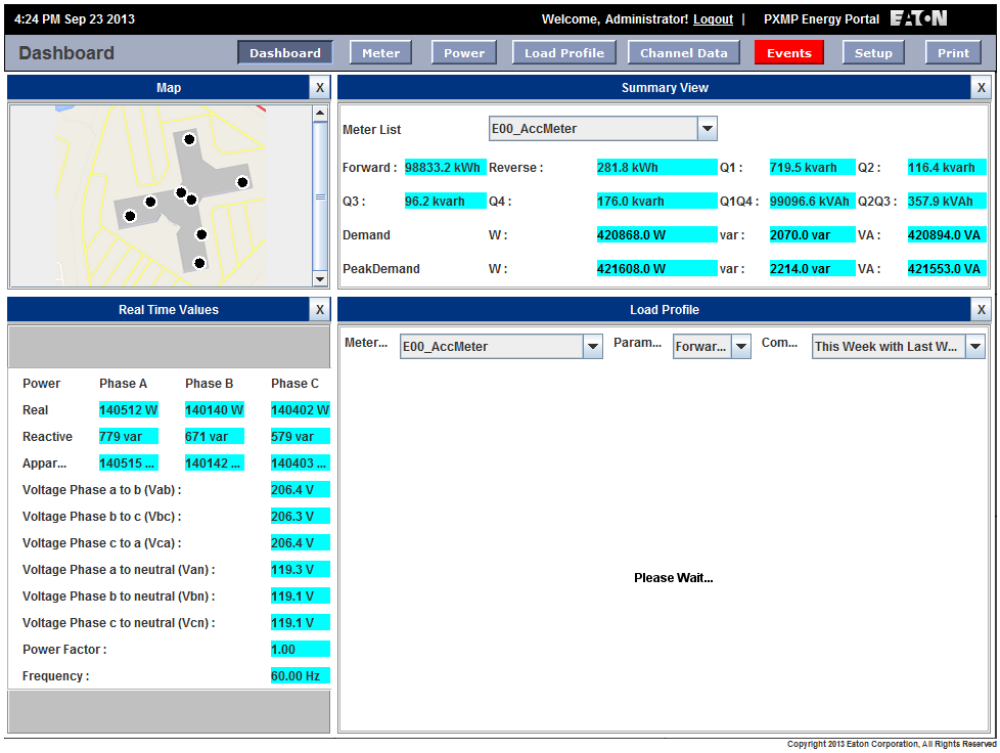


Figure 30. Dashboard Screen with Four Modules Displayed.

The "Tenant ID" drop-down list on the left side of the load profile screen allows the Facility Manger to select meters associated with a specific Tenant (see Figure 31).

Figure 31. Select Tenant in Load Profile Screen for Facility Manager.

For example, in Figure 31, the Tenant with an ID of tenant 1 is selected. The "Meter List" is then automatically updated to include only meters associated with this specific tenant (see Figure 32).

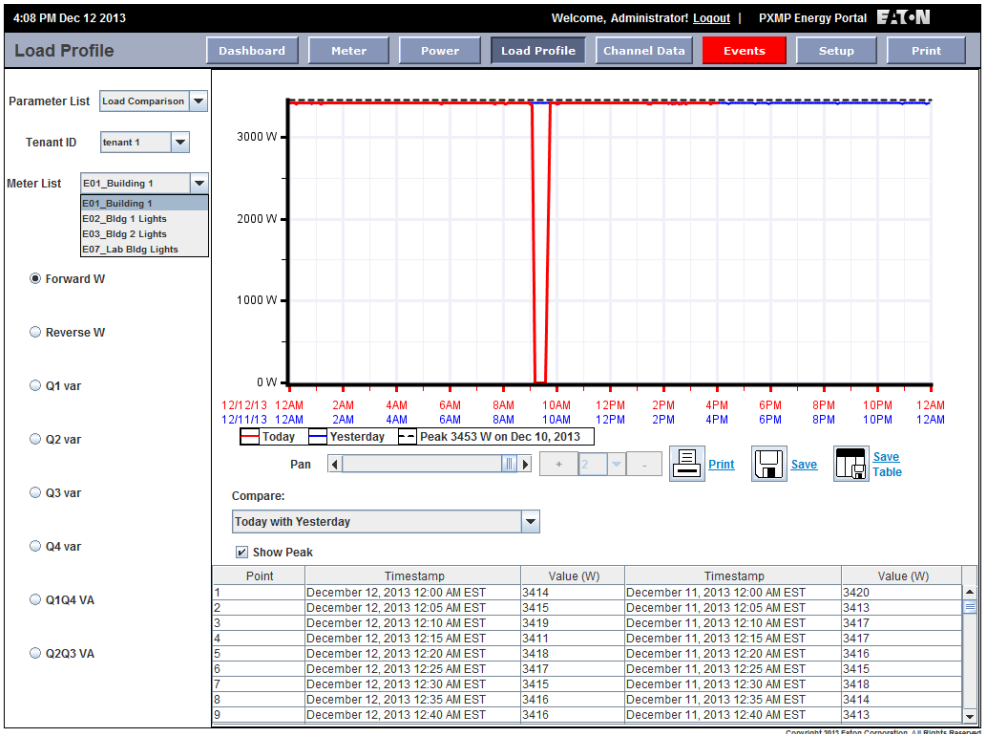


Figure 32. Select Tenant in Load Profile Screen for Facility Manager.

5.6.2 Load Profile for Tenant

The load profile screen for Tenant(s) (see Figure 33) is similar to the load profile screen for the Facility Manager. However, the tenant does not have the following features:

- Selection of a Tenant from the "Tenant ID" drop-down list;
- Access to the main meter and other Tenants' meters; and
- "Reset Energy" and "Reset Demand" buttons.

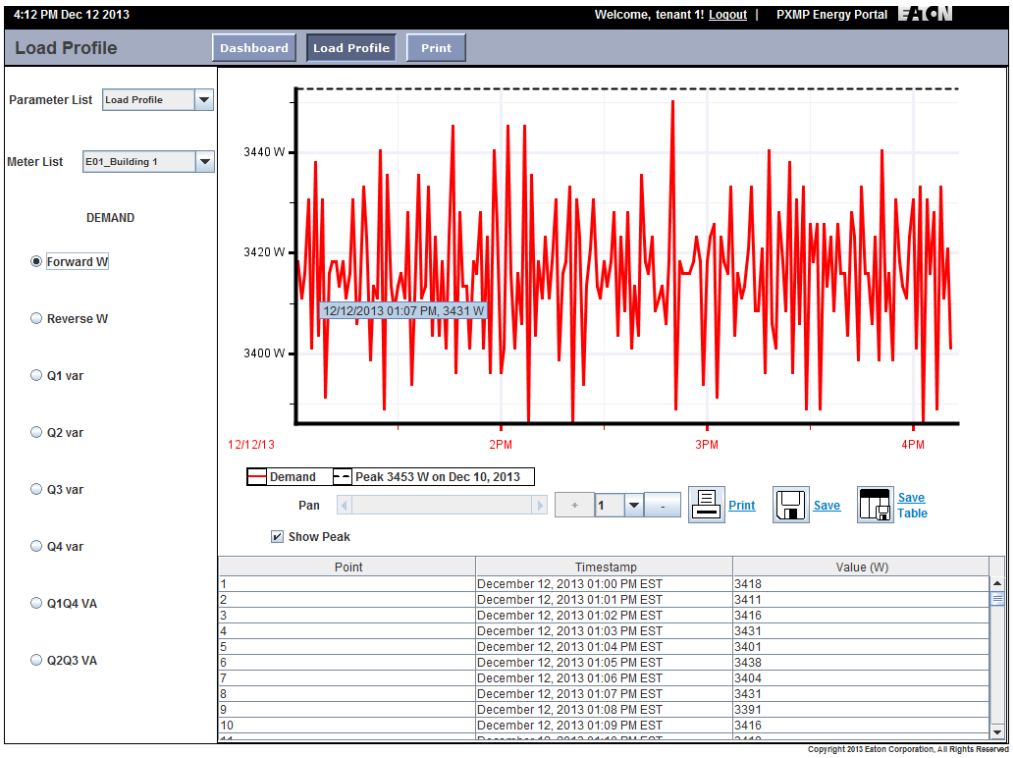
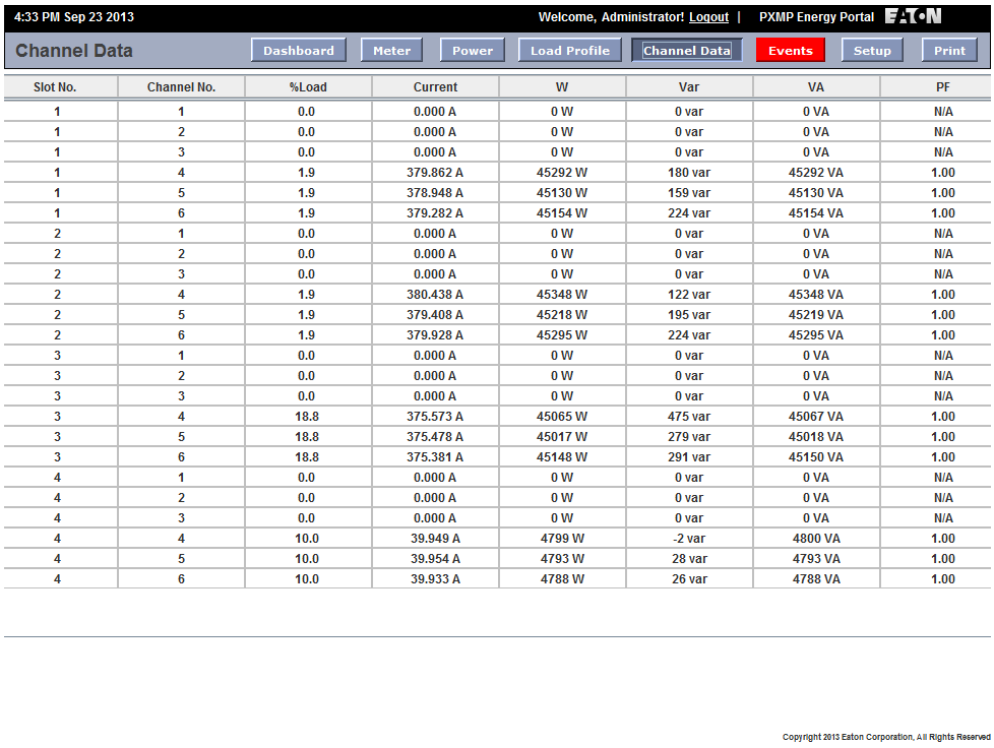


Figure 33. Load Profile Screen for Tenant(s)

5.7 Channel Screen

The Channel screen is visible to the Facility Manager only. It displays data in a tabular format from all meter modules (excluding pulse input and digital output modules) installed on the PXMP-MB Meter Base. Figure 34 shows the channel screen of a PXMP-EPM(-M).

The information shown in Figure 34 provides a snapshot of all meter modules. For example, it shows that a total of four cards have been installed in slots 1 through 4 on the PXMP-MB Meter Base. Each card has six channels. Only channels four through six on each card have non-zero currents measured.



Slot No.	Channel No.	%Load	Current	W	Var	VA	PF
1	1	0.0	0.000 A	0 W	0 var	0 VA	N/A
1	2	0.0	0.000 A	0 W	0 var	0 VA	N/A
1	3	0.0	0.000 A	0 W	0 var	0 VA	N/A
1	4	1.9	379.862 A	45292 W	180 var	45292 VA	1.00
1	5	1.9	378.948 A	45130 W	159 var	45130 VA	1.00
1	6	1.9	379.282 A	45154 W	224 var	45154 VA	1.00
2	1	0.0	0.000 A	0 W	0 var	0 VA	N/A
2	2	0.0	0.000 A	0 W	0 var	0 VA	N/A
2	3	0.0	0.000 A	0 W	0 var	0 VA	N/A
2	4	1.9	380.438 A	45348 W	122 var	45348 VA	1.00
2	5	1.9	379.408 A	45218 W	195 var	45219 VA	1.00
2	6	1.9	379.928 A	45295 W	224 var	45295 VA	1.00
3	1	0.0	0.000 A	0 W	0 var	0 VA	N/A
3	2	0.0	0.000 A	0 W	0 var	0 VA	N/A
3	3	0.0	0.000 A	0 W	0 var	0 VA	N/A
3	4	18.8	375.573 A	45065 W	475 var	45067 VA	1.00
3	5	18.8	375.478 A	45017 W	279 var	45018 VA	1.00
3	6	18.8	375.381 A	45148 W	291 var	45150 VA	1.00
4	1	0.0	0.000 A	0 W	0 var	0 VA	N/A
4	2	0.0	0.000 A	0 W	0 var	0 VA	N/A
4	3	0.0	0.000 A	0 W	0 var	0 VA	N/A
4	4	10.0	39.949 A	4799 W	-2 var	4800 VA	1.00
4	5	10.0	39.954 A	4793 W	28 var	4793 VA	1.00
4	6	10.0	39.933 A	4788 W	26 var	4788 VA	1.00

Figure 34. Channel Screen for Facility Manager.

5.8 Events Screen

The Events screen is visible to Facility Manager only. The Event screen displays events associated with the PXMP Meter. An event log stores event information in the PXMP Meter Base. The PXMP-EPM(-M) retrieves event information from the Meter Base, and stores it in the PXMP-EPM(-M)'s non-volatile memory. A maximum of 20 events are stored and displayed on the left side of the Events screen (see Figure 35).

Once an event on the left side of the events screen is selected, the corresponding event details are displayed on the right side of the events screen with the following:

- Event ID;
- Event Details;
- Start Time;
- Clear Time;
- Cause; and
- Value.

If there is an alarm associated with the selected event, then alarm details are also displayed along with the event details. Alarm details consist of the following:

- Alarm ID;
- Alarm Type;
- Alarm Limit;
- Alarm Reset; and
- Duration.

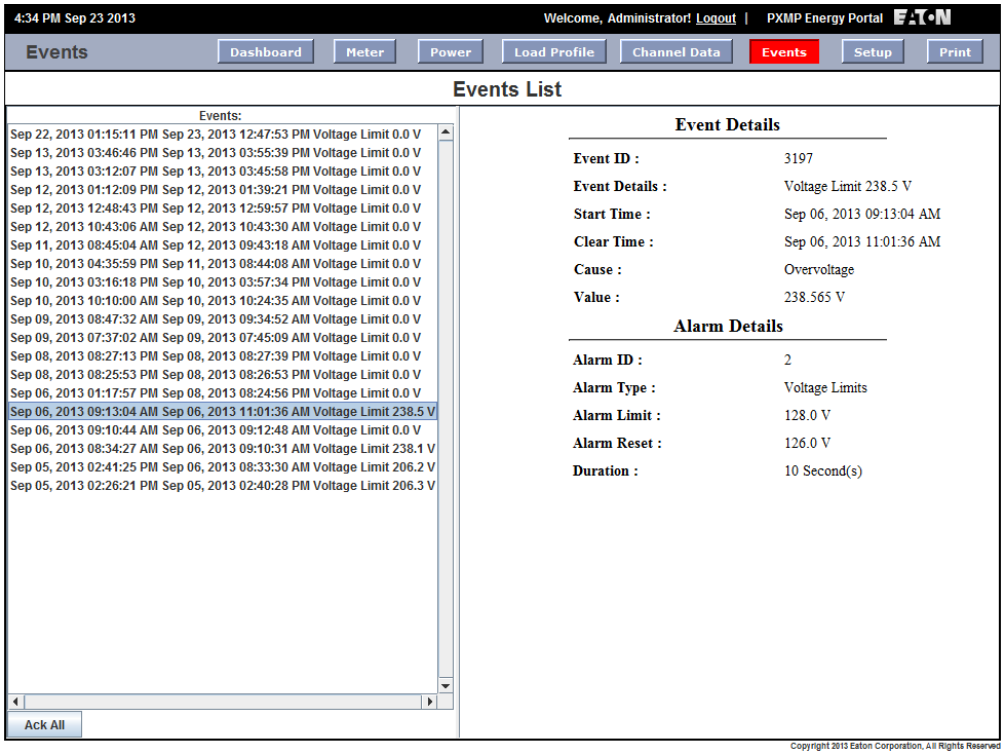


Figure 35. Events Screen for Facility Manager.

After new event(s) are captured, the Facility Manager can acknowledge the event(s). If the event(s) have not been acknowledged, then the "Events" menu button is displayed with a red background (see Figure 35). To acknowledge all unacknowledged event(s), click the "Ack All" button on the lower left side of the events screen. A dialog box appears to confirm this operation with the Facility Manager (see Figure 36).

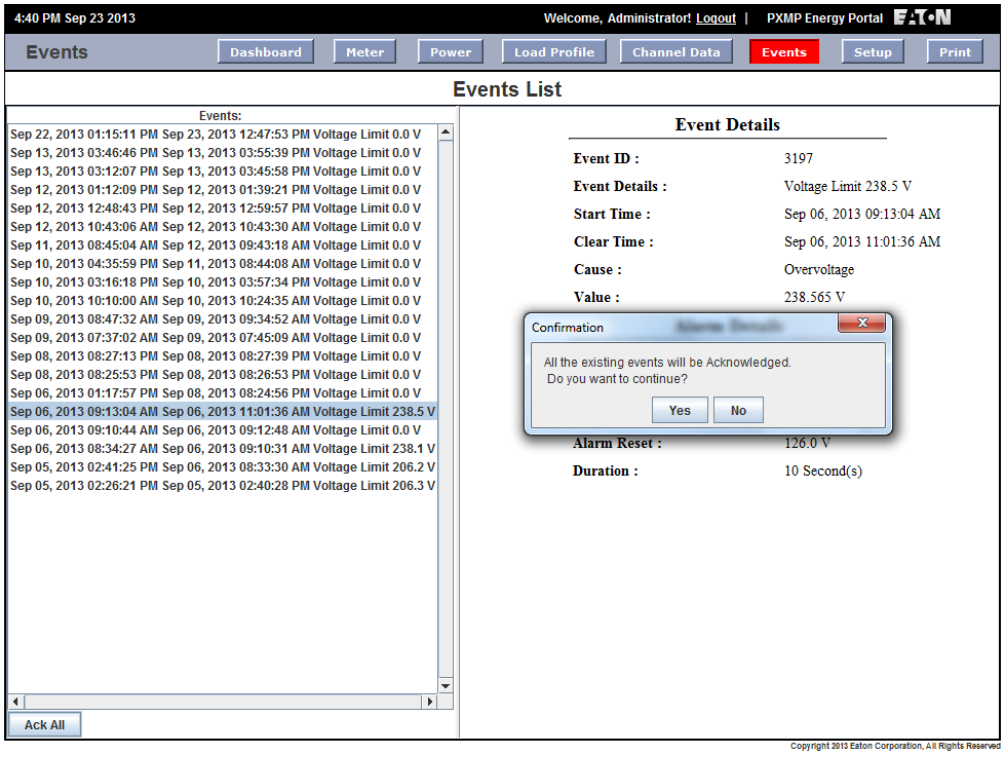


Figure 36. Confirmation to Acknowledge Events for Facility Manager.

Once existing events have been acknowledged, the "Events" menu button is no longer displayed with a red background (see Figure 37). The button will display a red background again when any new unacknowledged event(s) is captured.

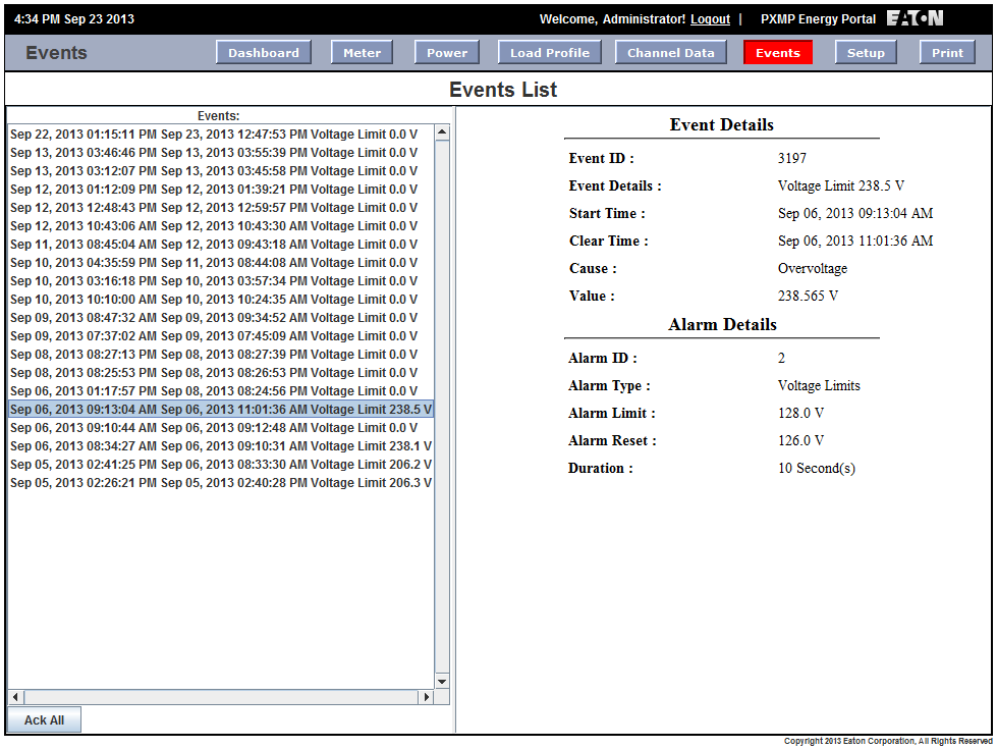


Figure 37. All Events Have Been Acknowledged By Facility Manager.

5.9 Setup Screen

The Setup screen and all its settings are visible to the Facility Manager only. It allows the Facility Manager to perform following tasks:

- Users Setup;
- Clock Setup;
- Communications Setup;
- Modem Setup;
- System Information; and/or
- Diagnostics Information.

For Users Setup, please refer to Section 5.2.1.2 of this manual. Follow the steps in that section to complete other tasks in the above list.

5.9.1 Clock (NTP)

Click the "Clock" node from the panel on the left side of the Setup screen to display the current system time, time zone, and time sync source(s) if available (see Figure 38). To update the current system time, such as the year and date, time zone, and time synchronization servers that support network time protocol (NTP), click the "Edit" button on the top right of Clock Information screen.

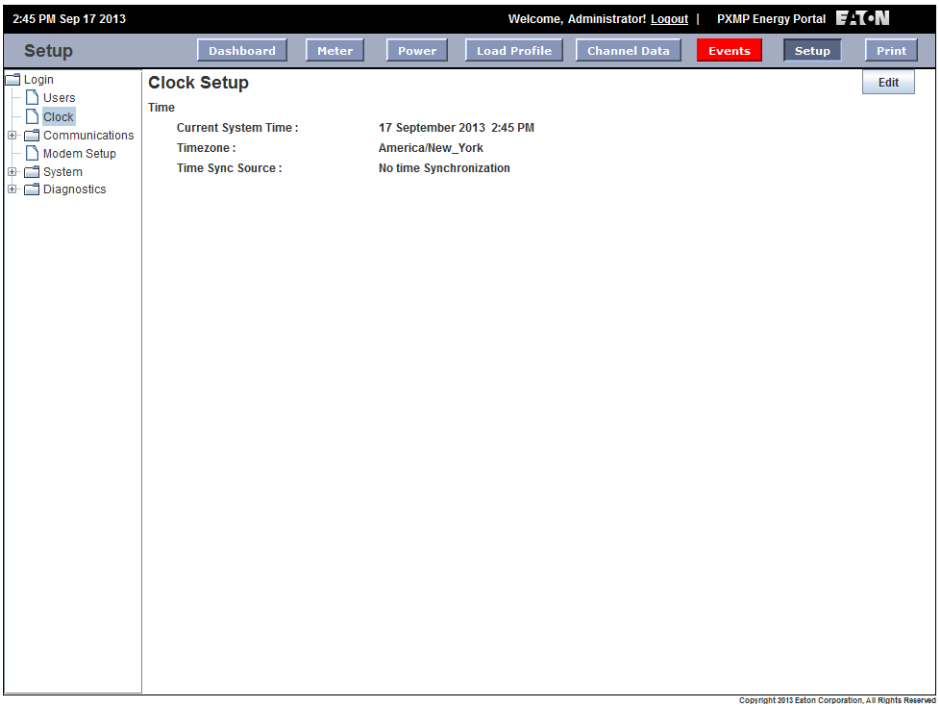


Figure 38. Clock Information Screen.

An example of the Clock Setup Edit screen is shown in Figure 39. The Facility Manager can set up appropriate time and time zone by using the drop-down listed provided. To setup NTP time synchronization server(s), first select the "Synchronize with NTP server(s)" option, and then enter NTP Server IP address(es) or hostname(s). Select "No time Synchronization" option if the PXMP-EPM(-M) time does not need to be synchronized with NTP servers. When done, click the "OK" button on the top right of the screen to return to the Clock Information screen.

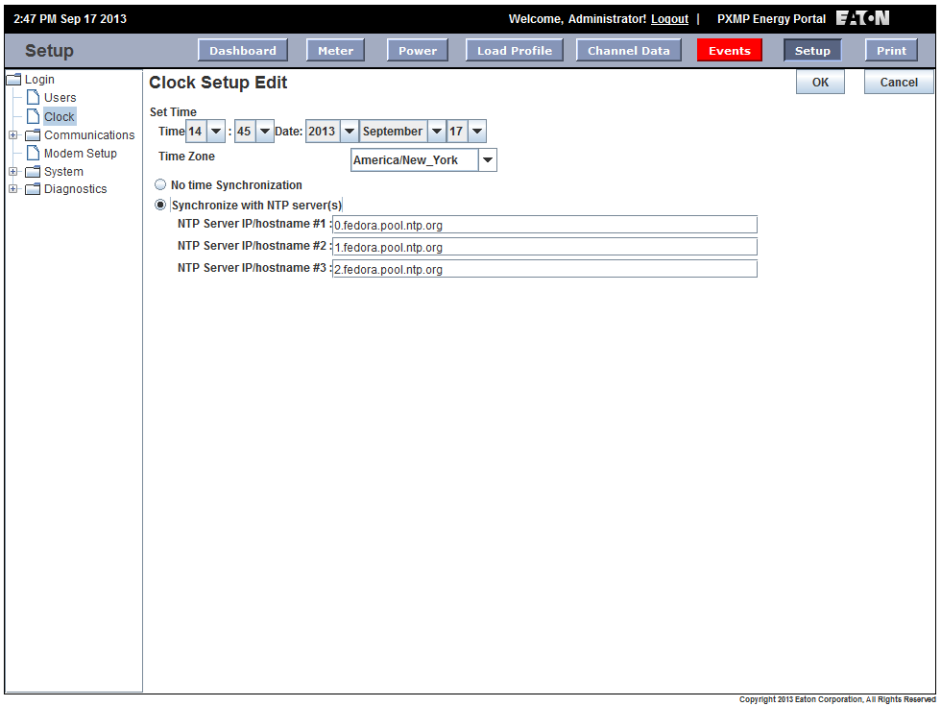


Figure 39. Clock Setup Screen.

5.9.2 Communications

A Facility Manager can perform communications-related tasks by clicking the "+" symbol next to the "Communications" node on the left side of the screen to expand it. The communications settings include the following nine groups:

- Ethernet/ LAN Setup;
- Email Setup;
- Calendar Setup;
- SNMP Setup;
- Web service Setup;
- Ethernet Status;
- Local N/W Status;
- LAN Port Status; and
- BACnet/IP Setup[1].

5.9.2.1 Ethernet/LAN Setup

The Ethernet/LAN Setup screen displays configuration details for the LAN/WAN Ethernet port to the Facility Manager (see Figure 40). To update the Ethernet/LAN settings, click the "Edit" button on the top left of the Ethernet / LAN Setup screen.

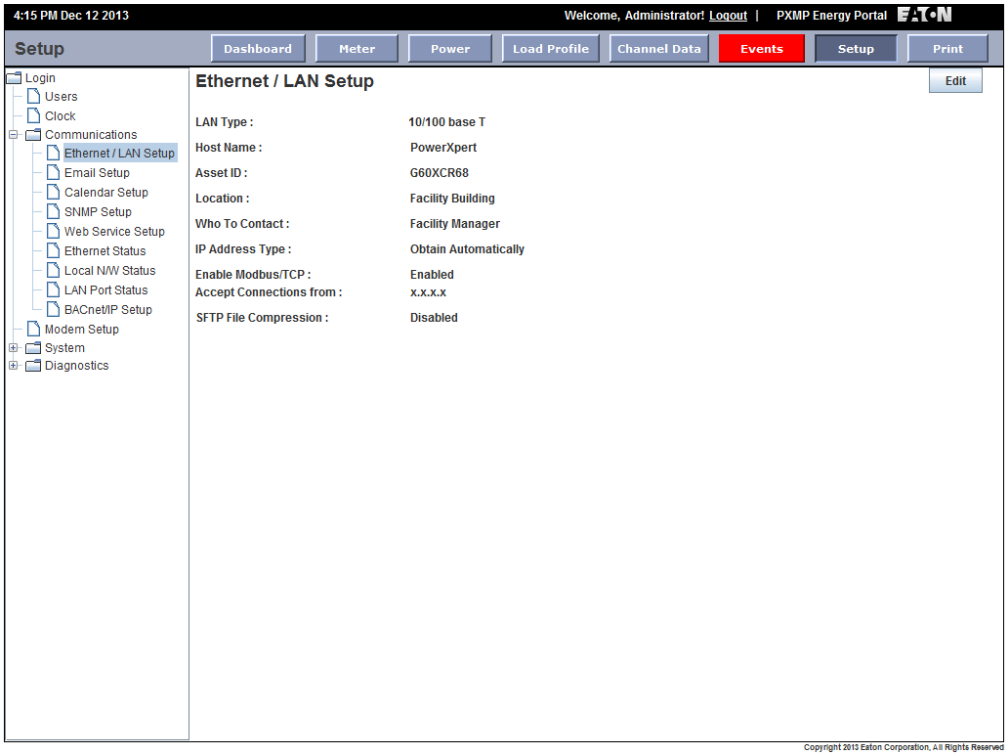


Figure 40. Ethernet/LAN Setup Page.

An example of the Ethernet/LAN Setup Edit page is shown in Figure 41. The Facility Manager can fill in appropriate information for host name, asset ID, location, and who to contact.

The PXMP-EPM(-M) offers three different ways to configure IP address when it is connected to a network through the LAN/WAN Ethernet port. The IP address may be obtained automatically by selecting the "Obtain Automatically" option. Conversely, depending on the communications protocol used, the Facility Manager may manually setup the IP address by selecting either "IPv4 IP Address" or "IPv6 IP Address," and entering appropriate information for IP address, subnet mask/prefix length, default gateway, preferred DNS server, alternate DNS server, and domain name.

To enable access to PXMP-EPM(-M) via the secure file transfer protocol (SFTP), enter the appropriate Password in the "SFTP Password" box. The Facility Manager can further enable Modbus/TCP or SFTP file compression features by checking appropriate checkbox next to the "Enable Modbus/TCP" or "SFTP File Compression" option. Uncheck the checkbox to disable the feature. When done, click the "OK" button on the top right of the page to return to the Ethernet/LAN Setup screen.

Note: The default SFTP Password is "ftp" (without quotation marks) if the SFTP Password field in Figure 41 is left blank. See Section 6.1 for details on how to access to PXMP-EPM(-M) SFTP service.

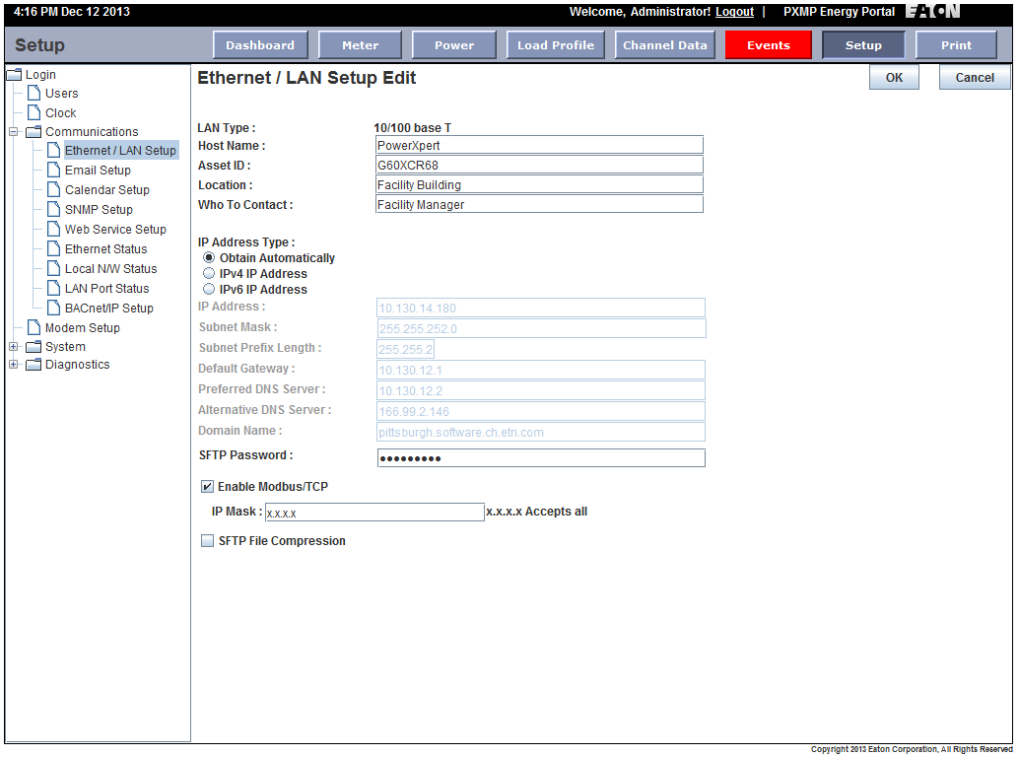


Figure 41. Ethernet/LAN Setup Edit Page.

5.9.2.2 Email Setup

The Email Setup screen displays email configuration details to a Facility Manager (see Figure 42). To update the email settings, click the "Edit" button on the top right of the Email Setup screen.

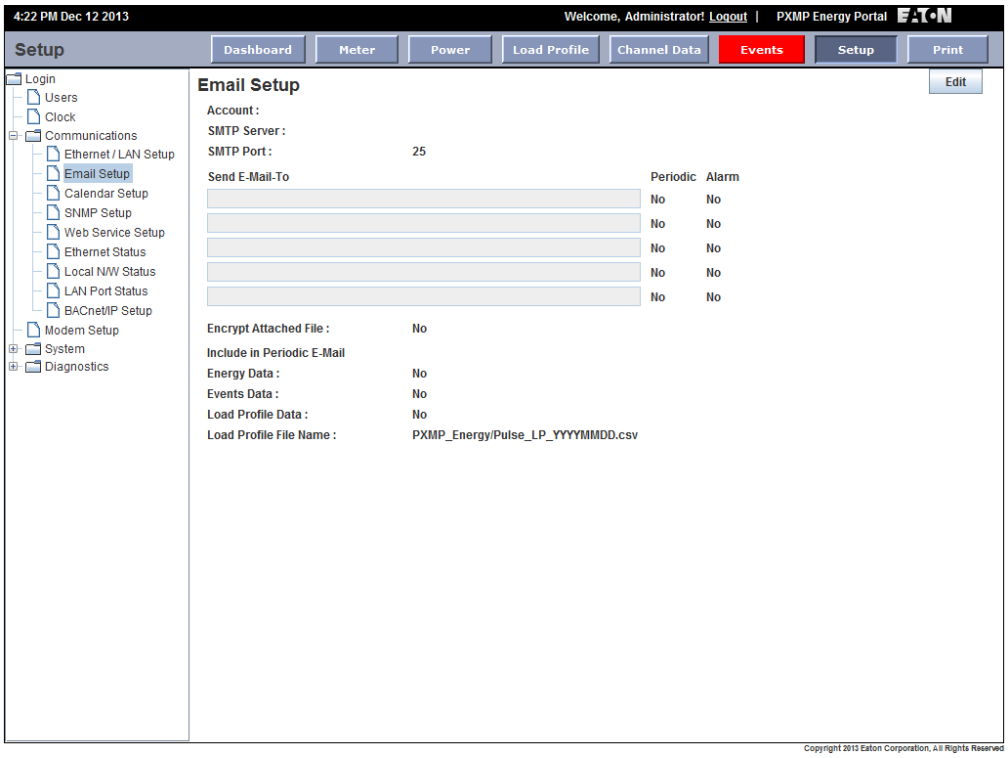


Figure 42. Email Setup Screen.

Figure 43 shows an example of the Email Setup Edit page. The Email Setup Edit page is divided into three sections. In the first section, the Facility Manager provides information to set up an account to send emails. This includes account, Password, simple mail transfer protocol (SMTP) server, and SMTP port. The SMTP port is selected from a list of available choices, including ports 25, 465, and 587. Note that the information shown in Figure 43 is for illustration purpose only.

In the second section, the Facility Manager can designate up to five email addresses. Depending on the Facility Manager's selections, the PXMP-EPM(-M) web server sends email updates to the designated email addresses either periodically, when an alarm occurs, or when either criteria is met.

The PXMP-EPM(-M) web server can be set up to send alarm emails or periodic emails to designated email addresses. Alarm emails are generated and sent as soon as alarms are triggered. Figure 44 shows a sample alarm email. Periodic emails are generated and sent according to the schedule set in the Calendar (Section 5.9.2.3). Figure 45 shows a sample periodic email.

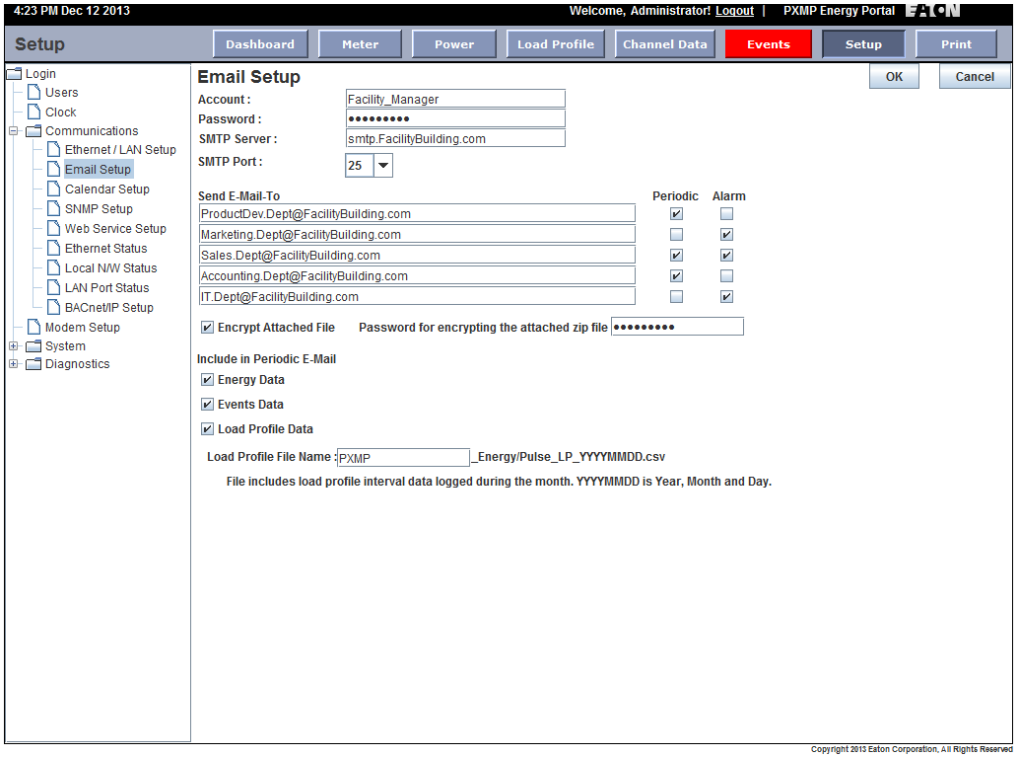


Figure 43. Email Setup Edit Page.

In the third section, the Facility Manager may decide which of the following items are included in the periodic email:

- Energy Data;
- Events Data; and/or
- Load Profile Data.

A zip file may be attached in the email sent by the Facility Manager. The zip file includes load profile data logged during the month. The Facility Manager may choose an appropriate file name for the zip file, and encrypts the attached zip file by specifying a Password.

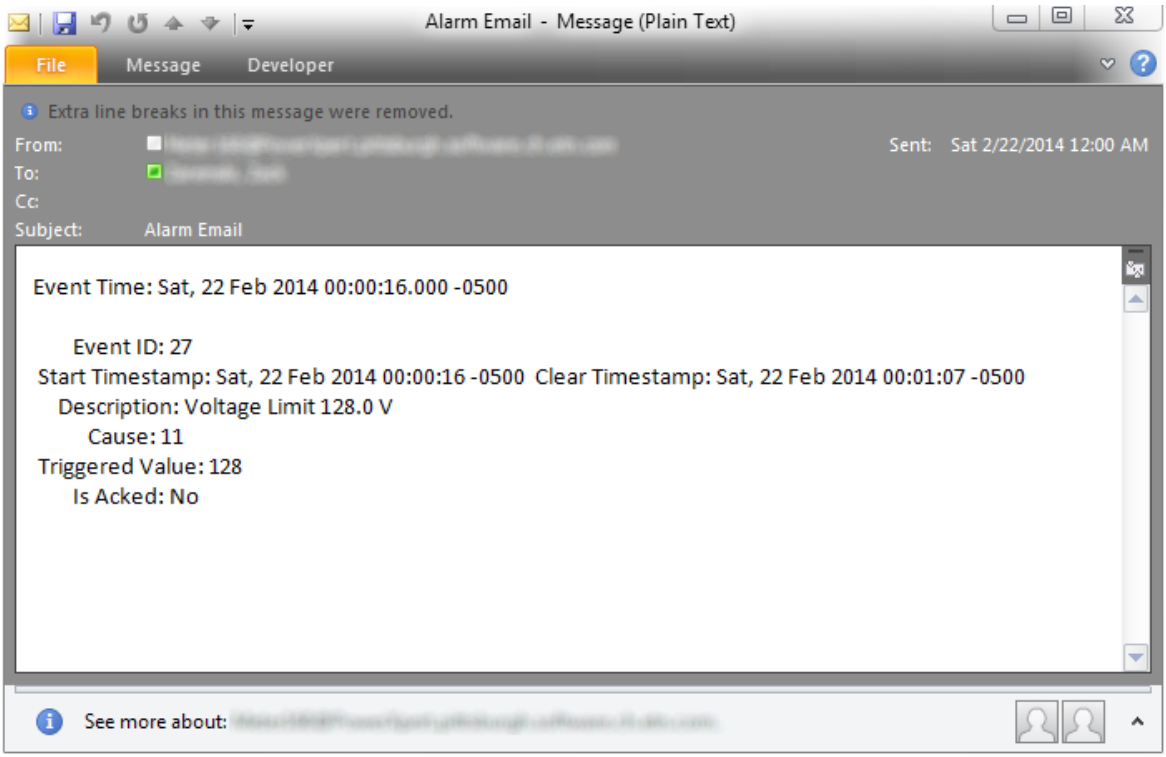


Figure 44. Alarm E-Mail.

The alarm e-mail contains Event ID, Event Start and Clear Timestamps, Description, Cause, and other alarm-related information. For example, in Figure 44, an overvoltage event is shown in the sample alarm email. The overvoltage event started on Saturday, February 22, 2014 at 00:00:16, and cleared at 00:01:07 on the same day.

In Figure 44, the Description field shows the voltage limit associated with the event. The Cause field displays a numerical value to indicate the actual cause of the alarm. The value 11 represents an overvoltage event. A complete list of numerical values and corresponding causes is given in Table B.5.

If the event has not been acknowledged by the Facility Manager, then the "Is Acked" field displays "No." Please refer to Section 5.8 of this manual for instructions on how to acknowledge an event.

For periodic e-mails, the message body and attachment provide energy, events, and load profile data. In Figure 45, the e-mail message body is divided into the following two sections

- Event Time
- Event Details

The Event Time lists the time when the periodic e-mail is generated. The Event Details lists energy and demand data under the "Aggregate Meter" and "Virtual Meters" sections.

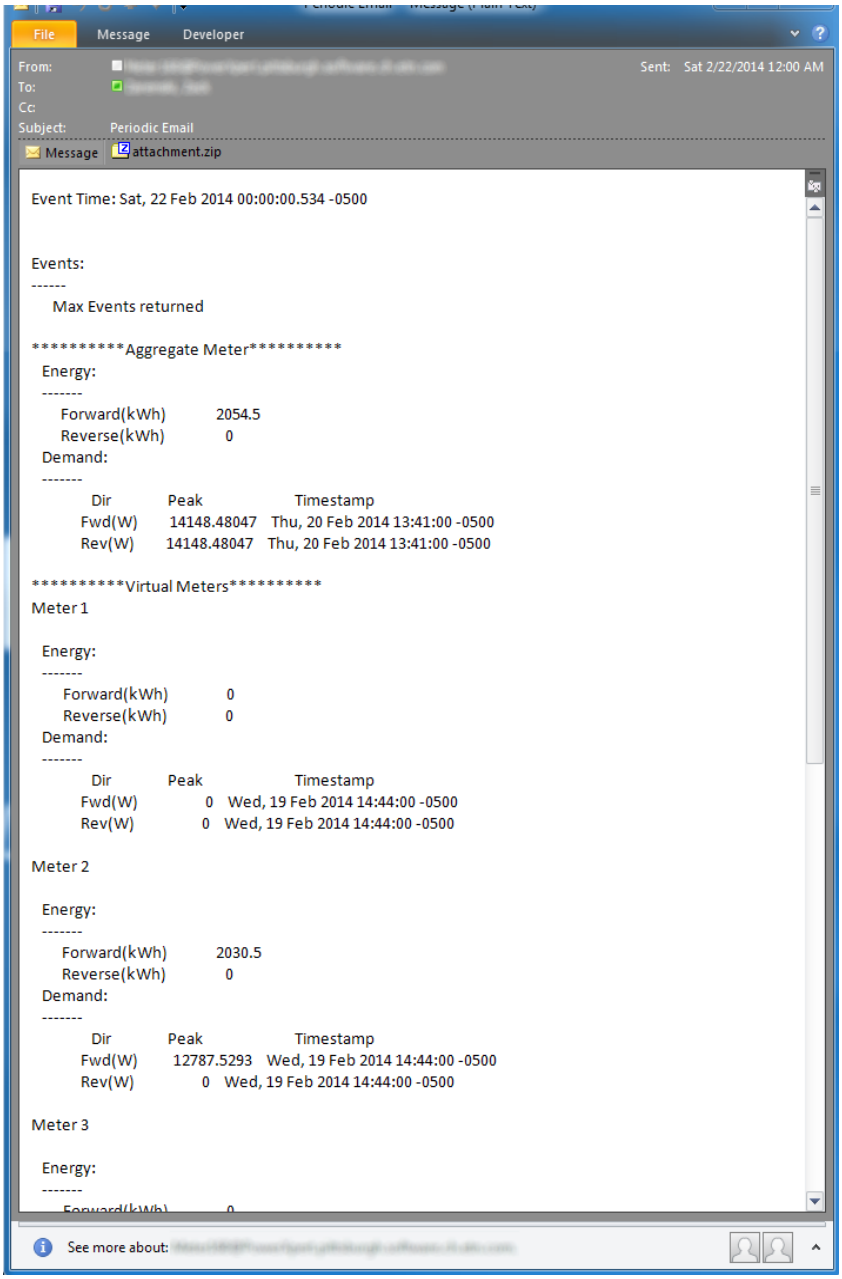


Figure 45. Periodic E-Mail.

In Figure 45, the PXMP-EPM(-M)'s total forward and reverse energy is listed under the "Aggregate Meter" section. The peak forward (Fwd) and reverse (Rev) demands and their corresponding time are listed in the same section.

For individual meters, their energy data is listed under the "Virtual Meters" section. For example, in Figure 45, Meter 2 has a forward energy of 2030.5 kWh, and a peak forward demand of 12787.5293 W. The peak demand occurred on Wednesday, Feb. 19, 2014 at 14:44 local time. The data also indicates that Meter 2 is set up to operate in UTC-05:00 Time Zone, i.e., U.S. Eastern Time Zone.

The attached zip file contains load profile data logged during the current calendar month. Figure 46 shows contents of a sample e-mail attachment. The zip file also contains load profile data logged during the previous calendar month. Please refer to Section 6.2.1 for detailed explanations of contents and formats of the load profile data files.

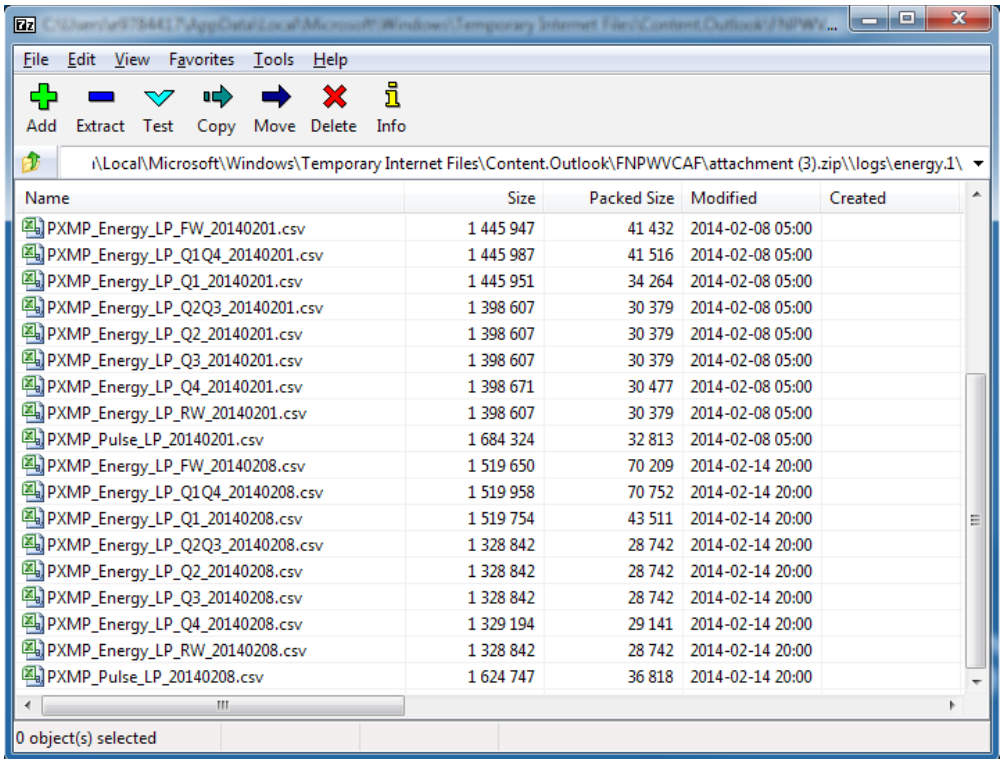


Figure 46. Load Profile Data Files in E-Mail Attachment.

5.9.2.3 Calendar

The Calendar Screen displays calendar event dates on which email notifications are to be sent. To add, change, or modify a calendar event, click the "Edit" button on the top right of the calendar page. A Calendar Edit page, similar to the one shown in Figure 47, appears.

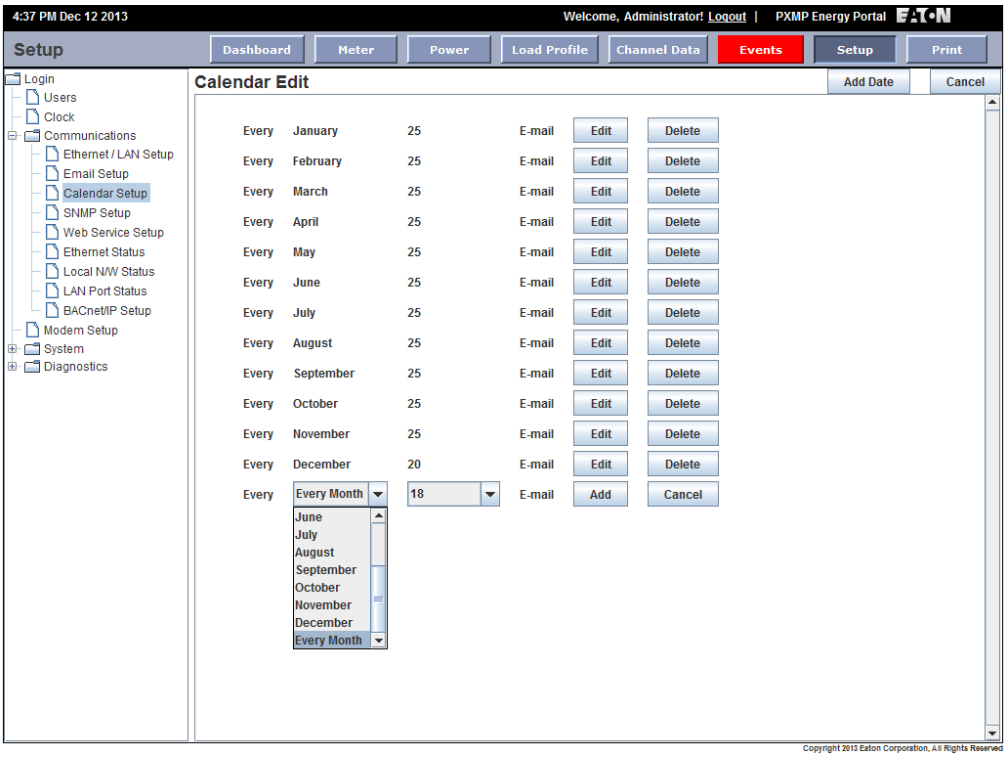


Figure 47. Calendar Edit Page.

To add new events to the calendar, click the "Add Data" button on the top right of the screen, and then select the month and date for the desired calendar event. The PXMP-EPM(-M) web server allows the Facility Manager to choose a specific date for the desired calendar event. The Facility Manager may also choose to specify an event that repeats every month. In the example shown in Figure 47, an event is being specified to repeat every month on the 18th. Click the "Add" button to add the specified event to the calendar.

To modify an existing calendar event, click the "Edit" button associated with the event. Clicking on the "Delete" button will delete an existing event from the calendar.

5.9.2.4 SNMP Setup

The simple network management protocol (SNMP) is a protocol for managing devices on an IP network. Events (traps) are sent to designated SNMP manager devices. To configure SNMP settings, click the "Edit" button on the top right of the SNMP Setup screen. The web server displays a page similar to the one shown in Figure 48. In the SNMP Setup Edit page, the Facility Manager can enable/disable SNMP services, and configure the SNMP setting by filling in appropriate fields. Table 6 shows the fields that can be designated when setting up the SNMP functionality.

Table 6. SNMP Functions and Descriptions.

Name	Description
Read-only User Community String	This is the meter Password required to read information from the meter. With this community string, the meter will respond to an SNMP GET REQUEST by sending the requested information via an SNMP GET RESPONSE. By SNMP convention, this string defaults to public.
Read/Write User Community String	This is the meter. Password required to change meter settings. With this community string, the meter will change the specified setting to the specified value when it receives an SNMP SET REQUEST.
Trap Recipient Community String	This string identifies the meter to the SNMP manager receiving the trap.
SNMP Trap Agent	This is the IP address of the SNMP manager that should receive the traps. Up to six IP addresses can be specified.

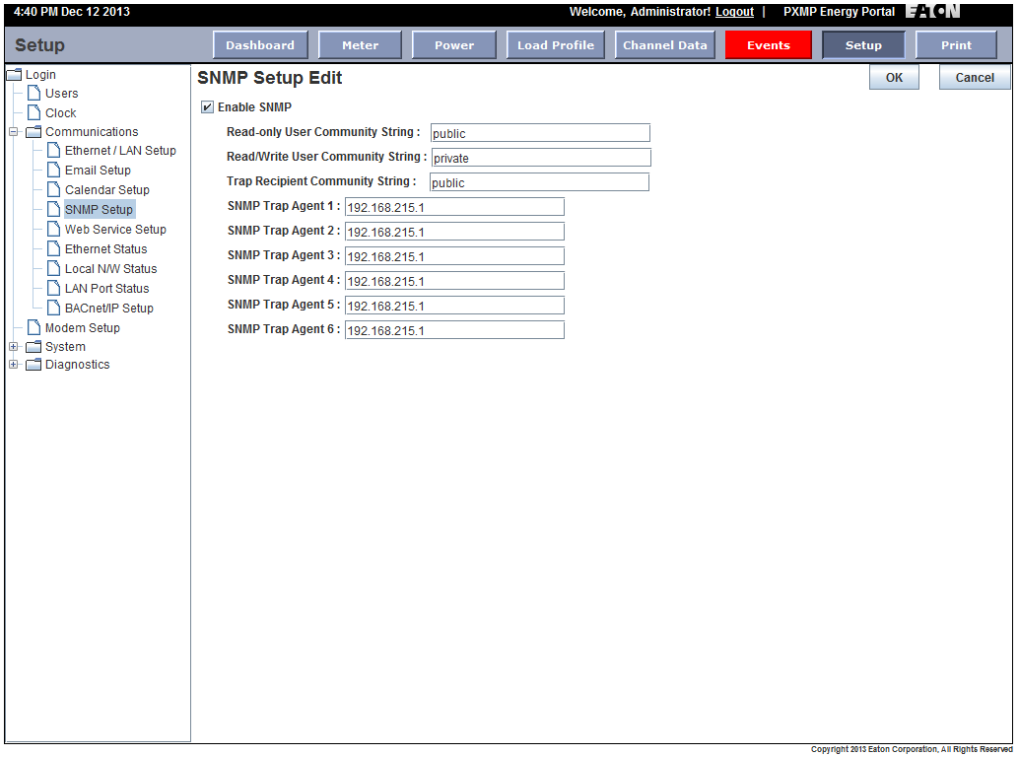


Figure 48. SNMP Setup Edit Page.

5.9.2.5 Web Service Setup for Power Xpert Insight (PXI) Software

The Web Service Setup screen (Figure 49) allows the Facility Manager to enable/disable and specify web services trend update interval, to enable/disable web services alarm notification.

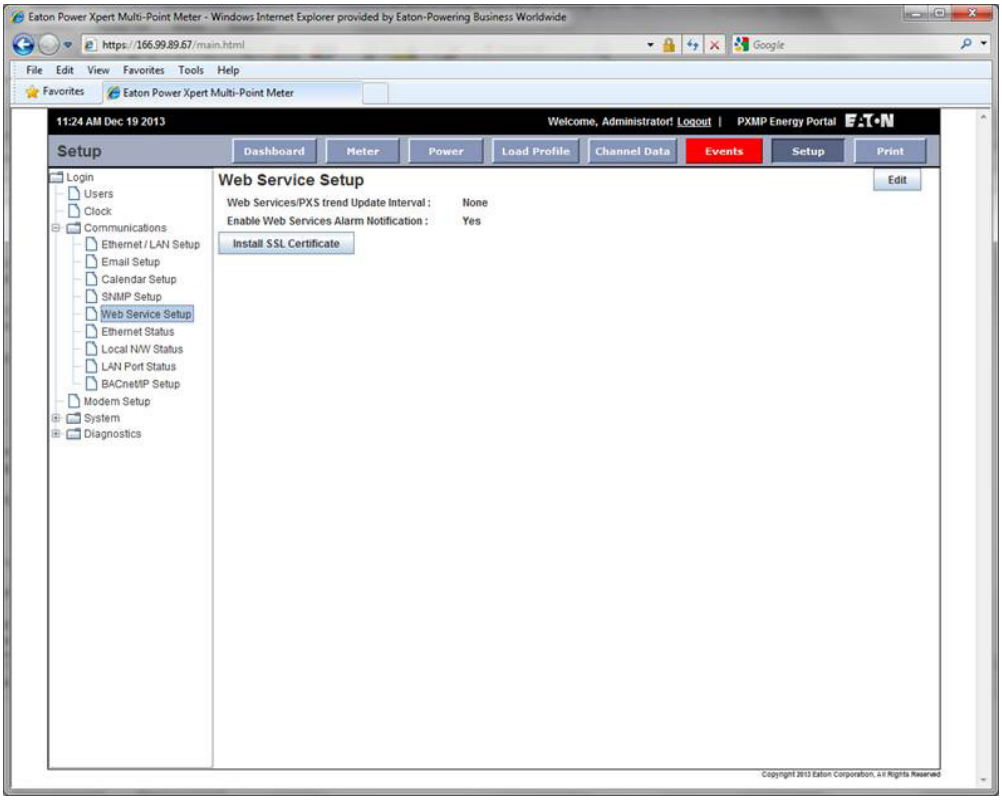


Figure 49. Web Service Setup Screen.

From the Root CA Installation screen, click on the "Root CA Certificate" link. The File Download – Security Warning screen will appear.

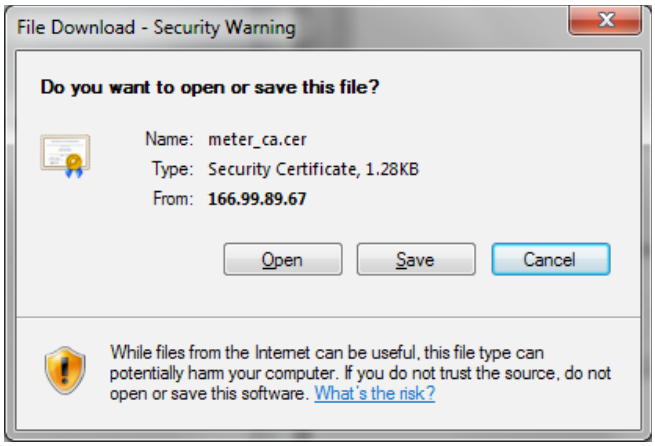


Figure 50. File Download – Security Warning Screen.

From the File Download – Security Warning screen, click on "Open" and the Certificate Information screen will appear.

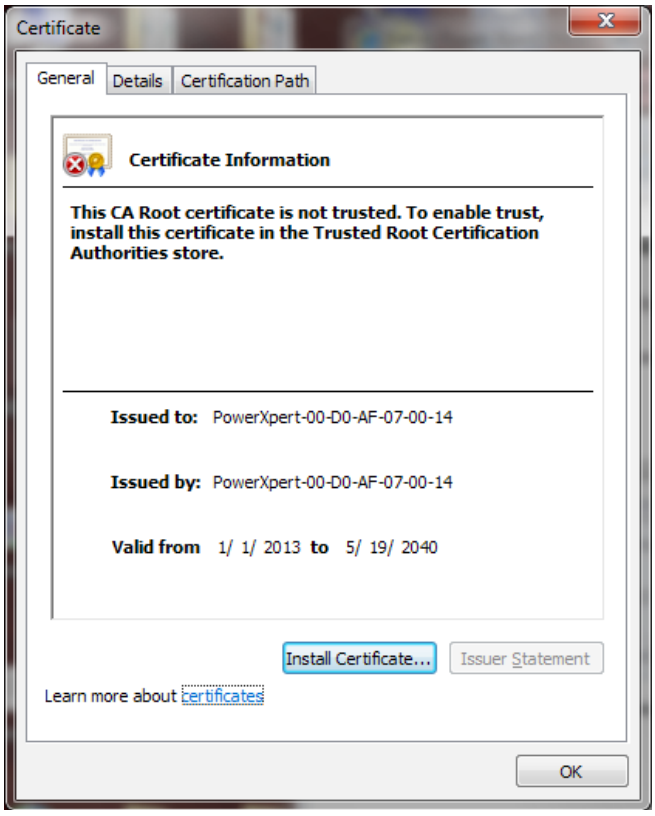


Figure 51. Certificate Information Screen.

From the Certificate Information screen, click on "Install Certificate …" and the Certificate Import Wizard screen will appear.

Figure 52. Certificate Import Wizard Screen.

From the Certificate Import Wizard screen, click on "Next" and the Certificate Import Wizard – Certificate Store screen will appear.

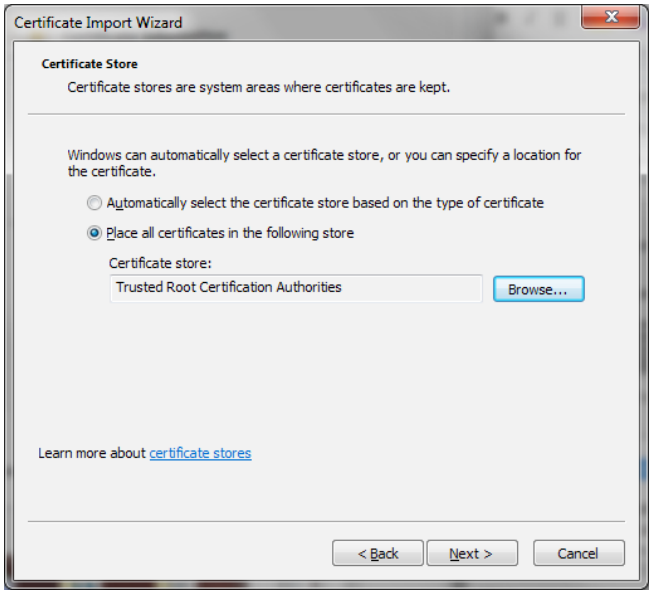


Figure 53. Certificate Import Wizard – Certificate Store Screen.

Select "Place all certificates in the following store" option then, if necessary, browse to select the "Trusted Root Certification Authorities" location. Once the selection has been made, click on "Next" and the Certificate Import Wizard – Completing the Certificate Import Wizard screen will appear.

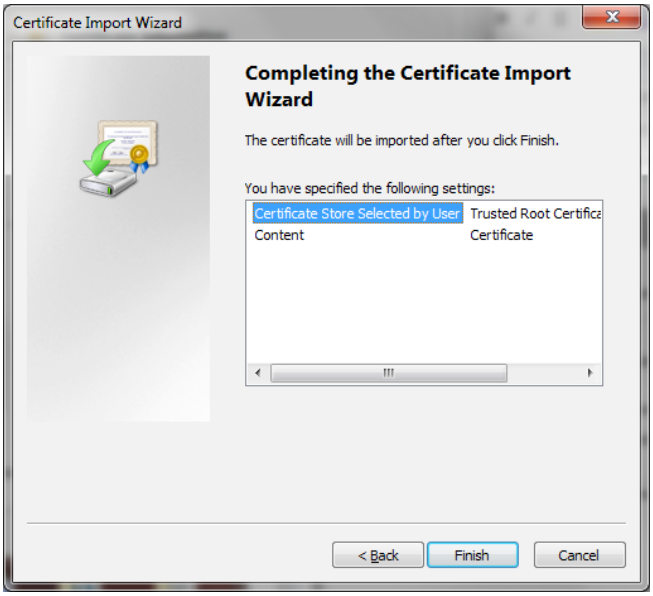


Figure 54. Certificate Import Wizard – Completing the Certificate Import Wizard Screen.

From the Certificate Import Wizard – Completing the Certificate Import Wizard screen, click on "Finish". The Certificate Wizard will complete the Root CA Certificate installation. When complete, the "The Import was successful" message will appear. The installation is now complete.

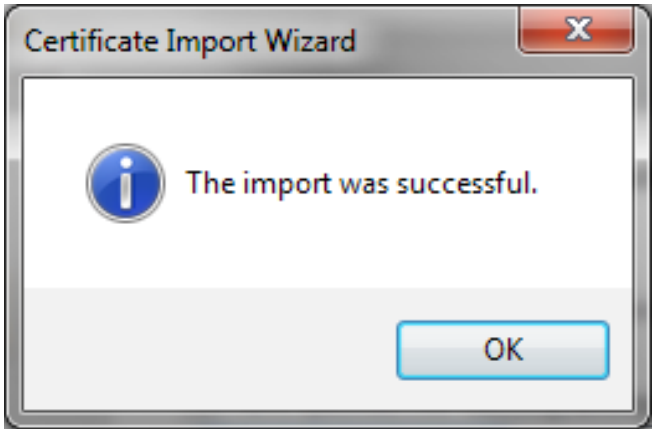


Figure 55. Certificate Import Wizard – The Import Was Successful Screen.

In the Web Service Setup Edit page (see Figure 56), the Facility Manager may enable web services trend update by selecting an update interval from the following three choices:

- 5 Minutes;
- 15 Minutes; or
- 60 Minutes.

Selecting the "None" option on the Web Service Setup page will disable web services trend update.

The web services alarm notification can be turned on or off by checking or unchecking the box next to the "Enable Web Services Alarm Notification."

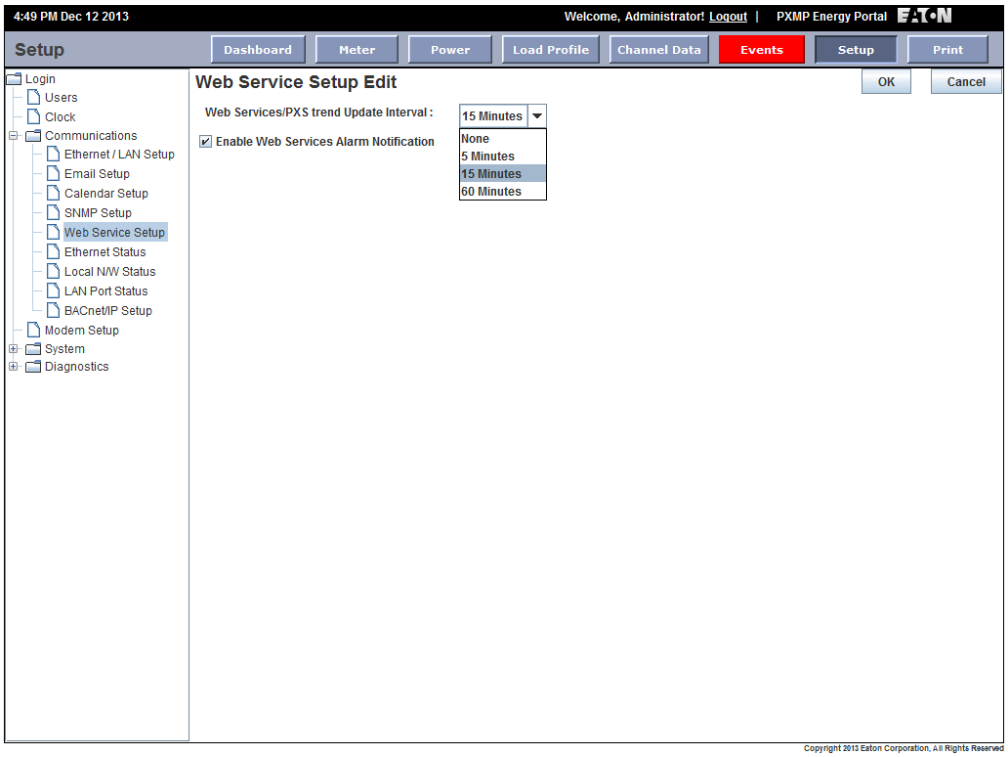


Figure 56. Web Service Setup Edit Page.

5.9.2.6 Ethernet Status

The Ethernet Status screen (also see Section 5.2.2.1 - Figure 7) shows Ethernet-related status information. The screen is divided into two sections. The IP address, subnet mask, and default gateway are shown in the first section. Such information may be used by the Facility Manager and Tenant(s) to remotely login into the PXMP-EPM(-M) web server.

The media access control (MAC) addresses and link status are given in the second section. Both the MAC address of the LAN/WAN Ethernet port and the MAC address of the local Ethernet port are listed along with their link status. For example, as shown in Figure 7, the LAN/WAN Ethernet port has a MAC address of 00:D0:AF:07:AF:05, and the local Ethernet port has a MAC address of 00:D0:AF:07:AF:04. Both ports' Ethernet links are active.

5.9.2.7 Local N/W Status

The Local Network (N/W) Status screen (see Figure 57) shows detailed information about the local Ethernet port. The screen is for display information only, and cannot be edited.

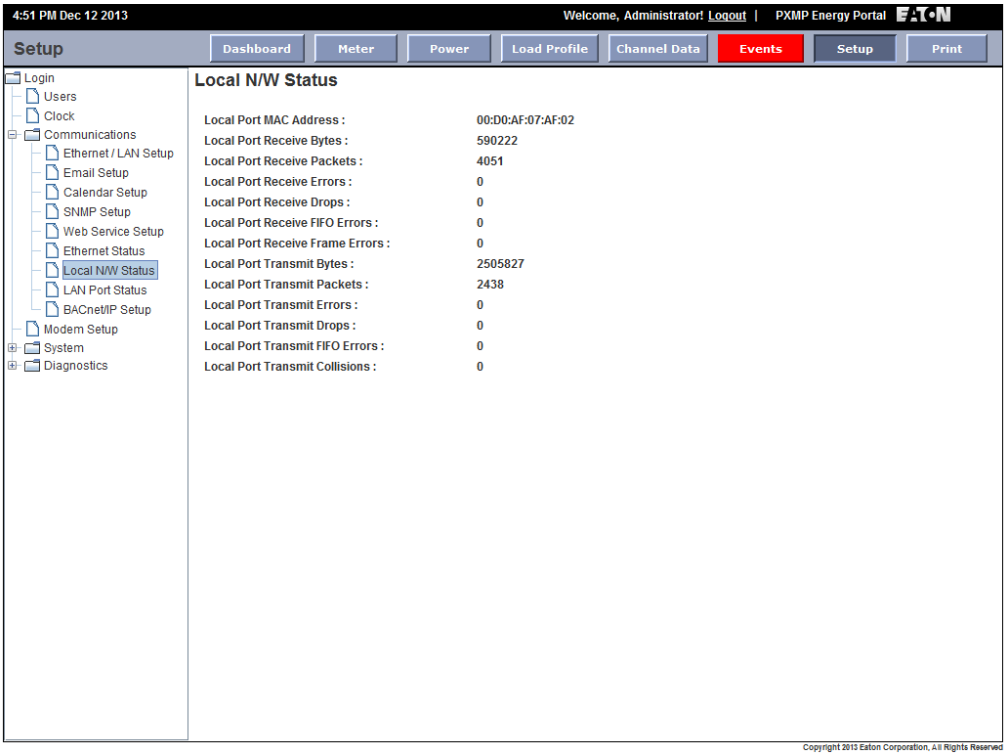


Figure 57. Local N/W Status Screen.

5.9.2.8 LAN Port Status

The LAN Port Status screen (see Figure 58) shows detailed information about the LAN/WAN Ethernet port. The screen is for display information only, and cannot be edited.

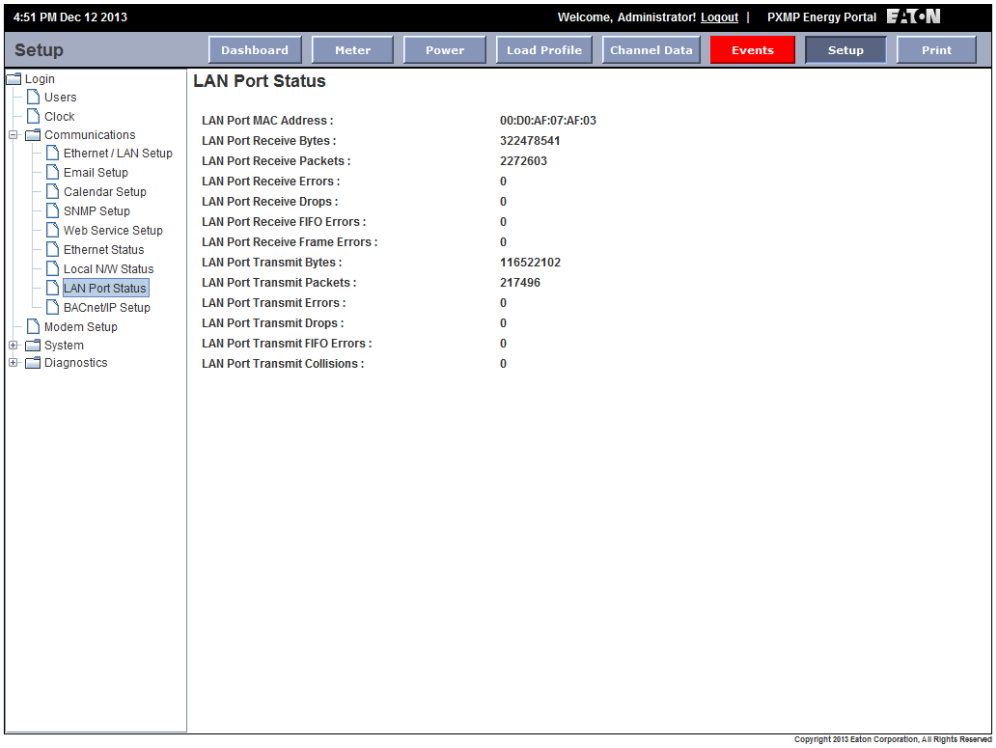


Figure 58. LAN Port Status Screen.

5.9.2.9 BACnet/IP Setup

BACnet/IP support will be available through an upgrade. Please contact Eaton Customer Success Team for instructions by emailing pqsupport@eaton.com or calling 800-809-2772 option 4 (US) or 414-449-7100 option 4 (outside US).

5.10 Modem Setup

Modem connection uses the standard Point to Point Protocol (PPP) for communication. After the connection is established, a web browser or SFTP client can be used to view the simple web page and download the Trend and Load Profile log files.

Standard AT commands are used to setup the modem, initiate the call, or receive the call. Enter the specific command in the text boxes provided. These setting override the default modem settings. For example, number of rings to pick-up is set to 1 as default but by changing the "Answer Call" string to "AT S0=4" sets up the modem to pick up the call after four (4) rings.

In applications where network connections are not possible or practical, the Facility Manager can choose to access a PXMP-EPM-M module through dial up telephone modem.

To do so, the PXMP-EPM-M must be connected to the telephone network via the RJ11 connection that is located at the bottom of the module. The Windows PC also needs to be connected to the telephone network before completing the following steps.

1. Click Window 7's Start. Then click Control Panel.
2. In Control Panel, click Network and Internet > Network and Sharing Center > Set up a new connection or network (see Figure 59).
3. A window similar to the one shown in Figure 60 appears. Choose "Set up a dial-up connection" option, and click "Next" button.

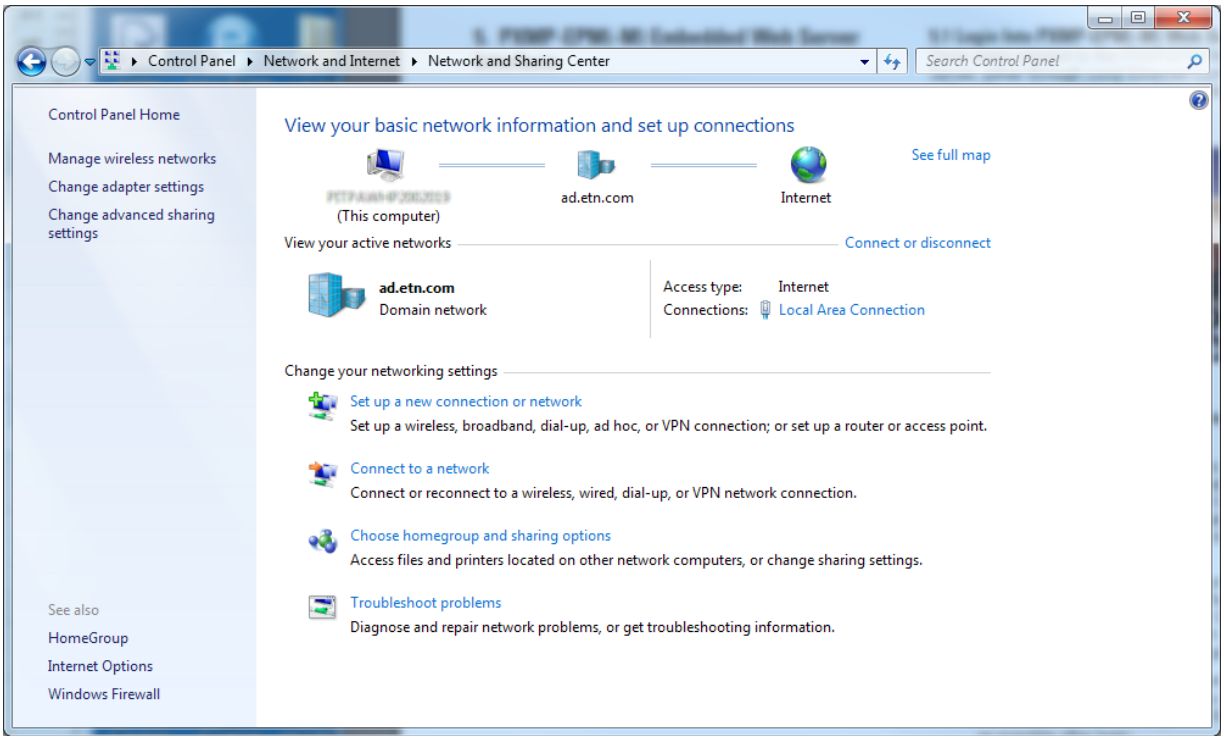


Figure 59. Network and Sharing Center.

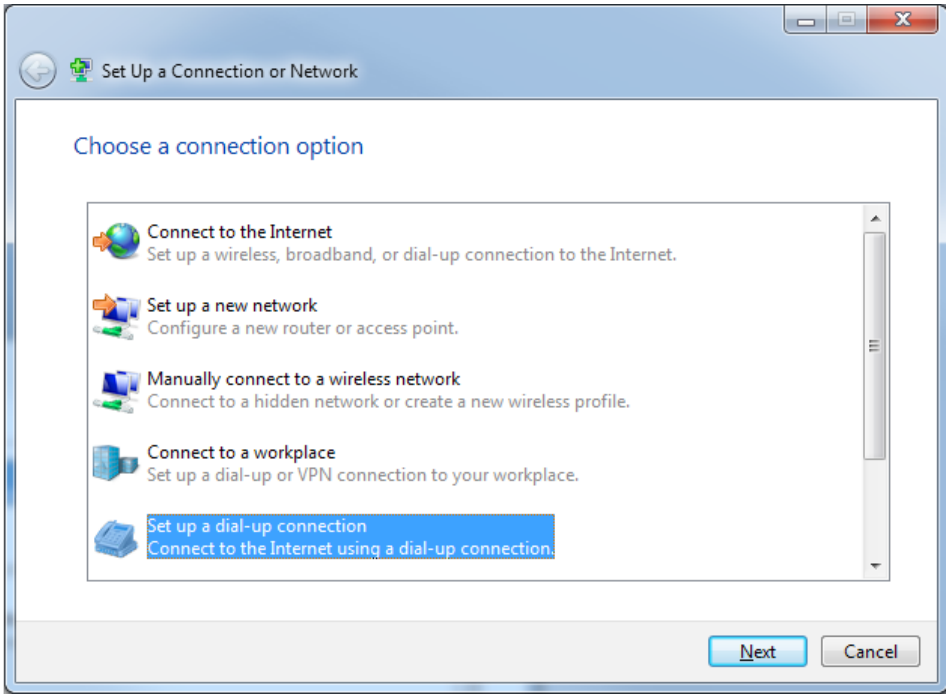


Figure 60. Set Up a Connection or Network.

4. A "Create a Dial-up Connection" window appears (Figure 61). The "Dial-up phone number" needs to be filled in with the phone number that is assigned to the PXMP-EPM-M module. The "User name" and "Password" are defined by the Facility Manager in the Modem Setup section (see Figure 68). A "Connection name" may be optionally assigned to the current dial-up connection.

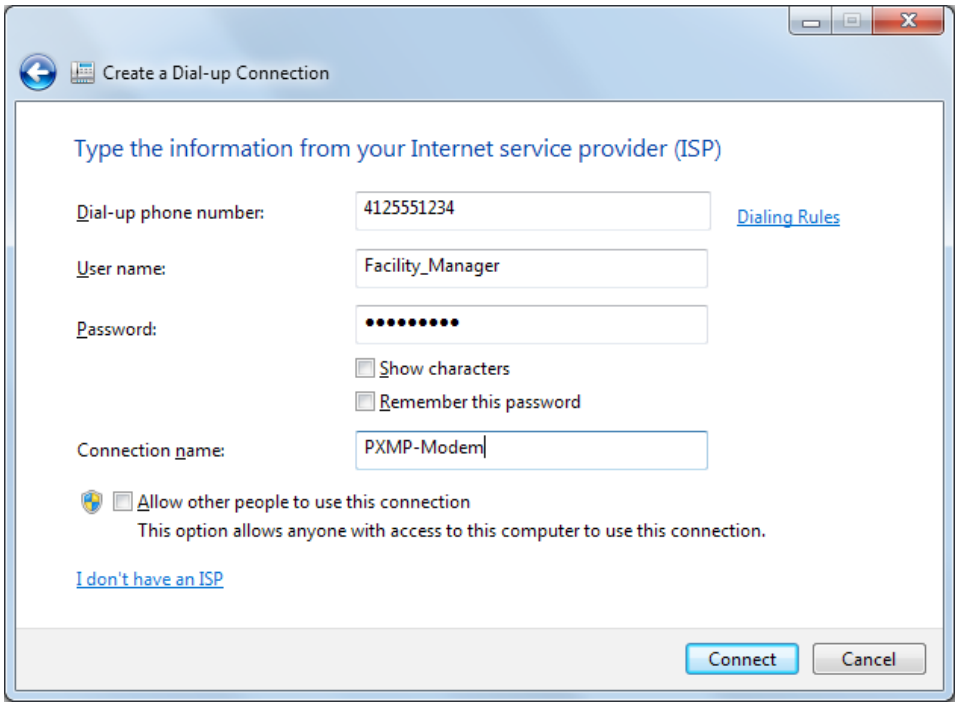


Figure 61. Create a Dial-up Connection.

5. Click the "Connect" button in (see Figure 61) to proceed with the dial-up connection. Upon a successful connection, the Facility Manager can access the PXMP-EPM-M at a fixed IP address of 192.168.2.1, as shown in Figure 62.

6. The connection speed of a dial-up connection is much slower than an Ethernet connection. It is recommended to view the PXMP-EPM-M's meter data using HTML only page. Click "HTML Only Page" link in Figure 62, a web page similar the default page shown in Figure 63 appears.

Note: Due to the limited connection speed, only basic information is shown in the default HTML only page.

Figure 62. Dial-up Connection Welcome Screen.

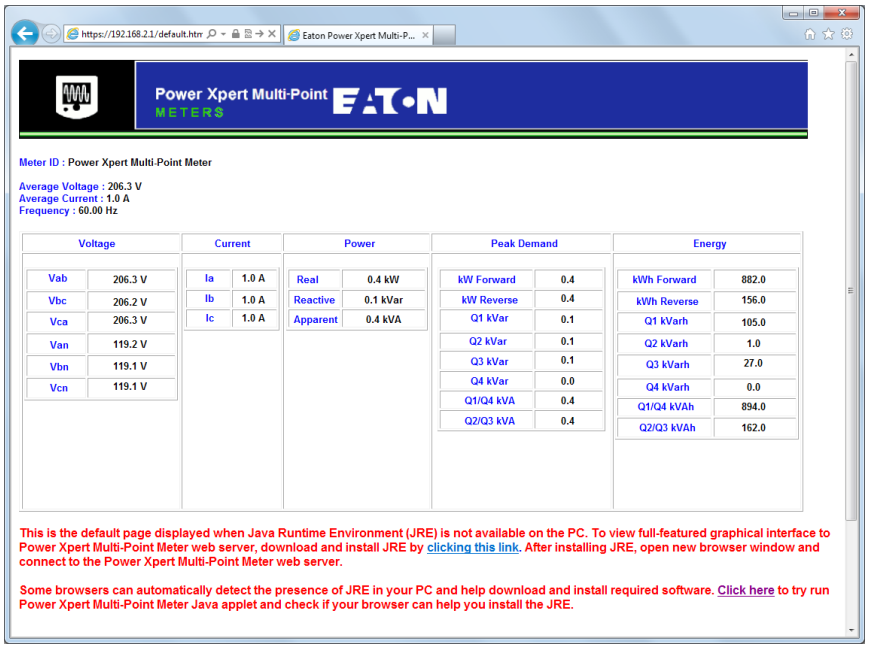


Figure 63. HTML Only Page.

7. To disconnect from the PXMP-EPM-M module's modem, in Network and Sharing Center (Figure 59), click the Change adapter settings on the left. A Network Connections window, similar to the one shown in Figure 64, appears. In the example shown in Figure 64, "PXMP-Modem" is a currently active modem connection. Right-click the active modem connection and select Disconnect from the context menu. Once the PC is disconnected from the PXMP-EPM-M module's modem, the modem connection status become Disconnected, as shown in Figure 65.

8. To reconnect to the same PXMP-EPM-M module, select the previously established connection in Control Panel > Network and Internet > Network Connections. In the example shown in Figure 65, the "PXMP-Modem" connection is selected.

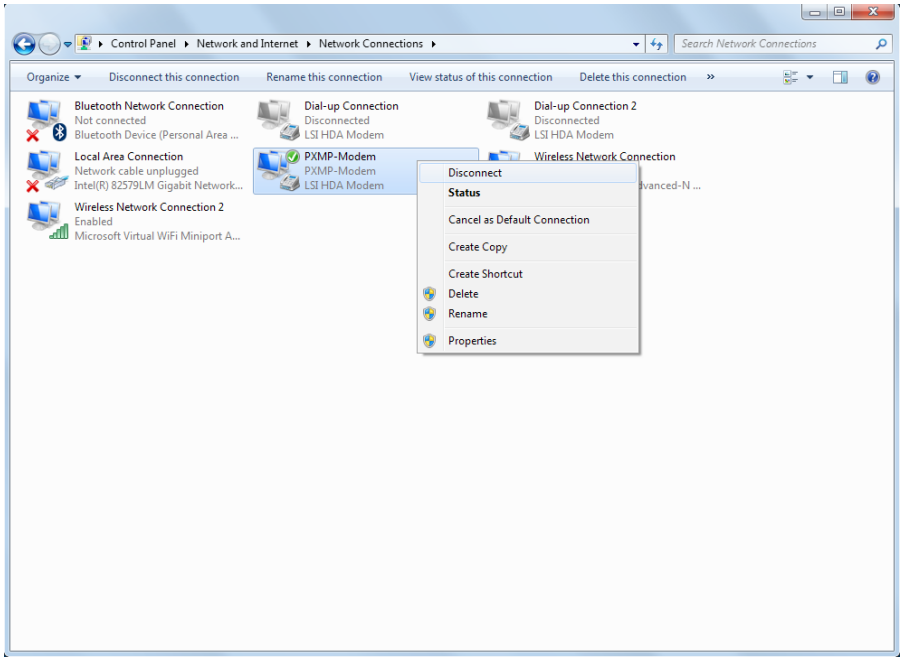


Figure 64. Disconnect Modem Connection.

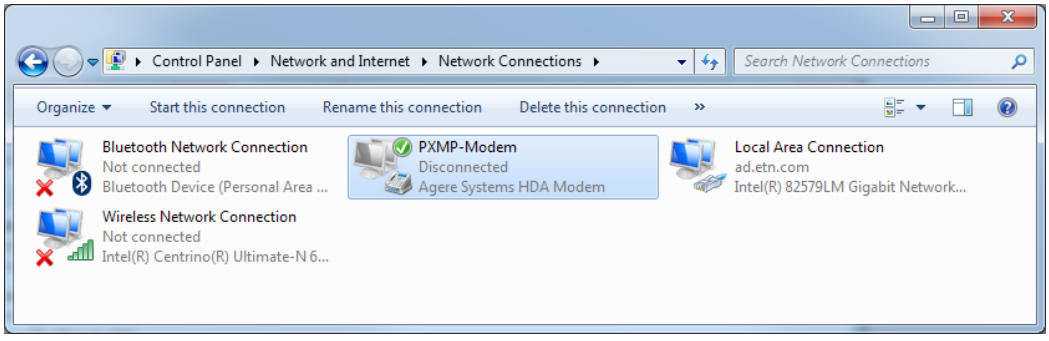


Figure 65. Modem Connection.

9. Double-click the selected modem connection in Figure 65, a window similar to the one shown in Figure 66 appears. The Facility Manager needs to confirm that the information in User name, Password and Dial is correct. Click the "Dial" button to proceed and reconnect to the PXMP-EPM-M module's modem.

To set up or modify communication settings for the RJ11 telephone modem jack located at the bottom of the PXMP-EPM(-M), click the "Edit" button on the Modem Setup screen (see Figure 67). A screen similar to the one shown in Figure 68 appears.

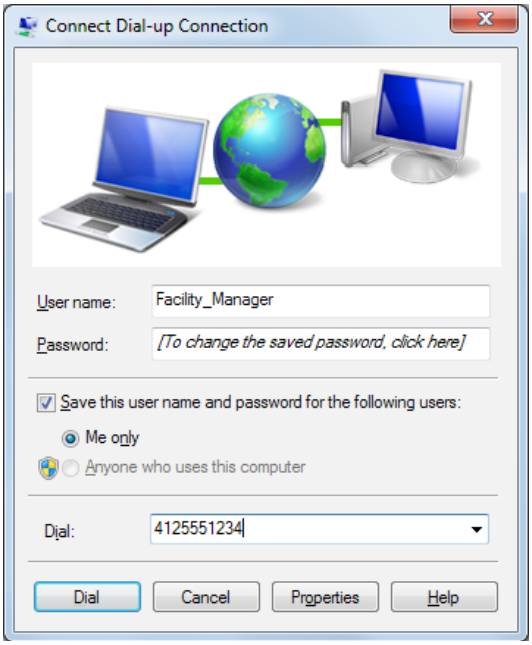


Figure 66. Connect Dial-up Connection.

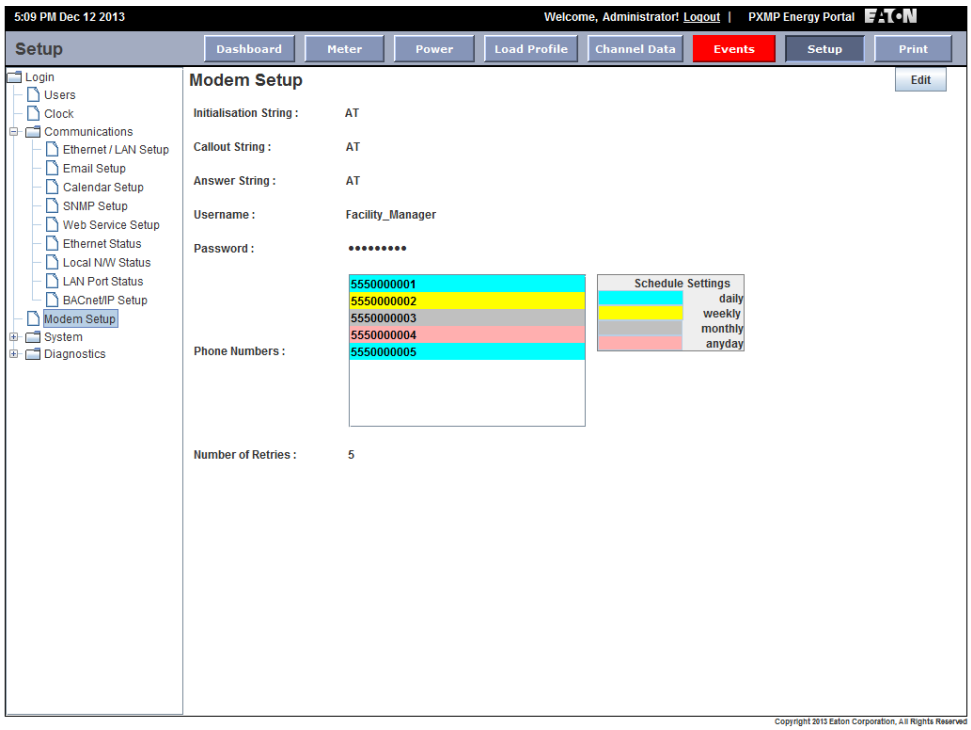


Figure 67. Modem Setup Screen.

To set up the modem dialing, the Facility Manager enters the initialization string, call out string, answer string, and Username in the respective fields on the Modem Setup Edit page (see Figure 68). The "Password" and "Confirm Password" fields have to match each other.

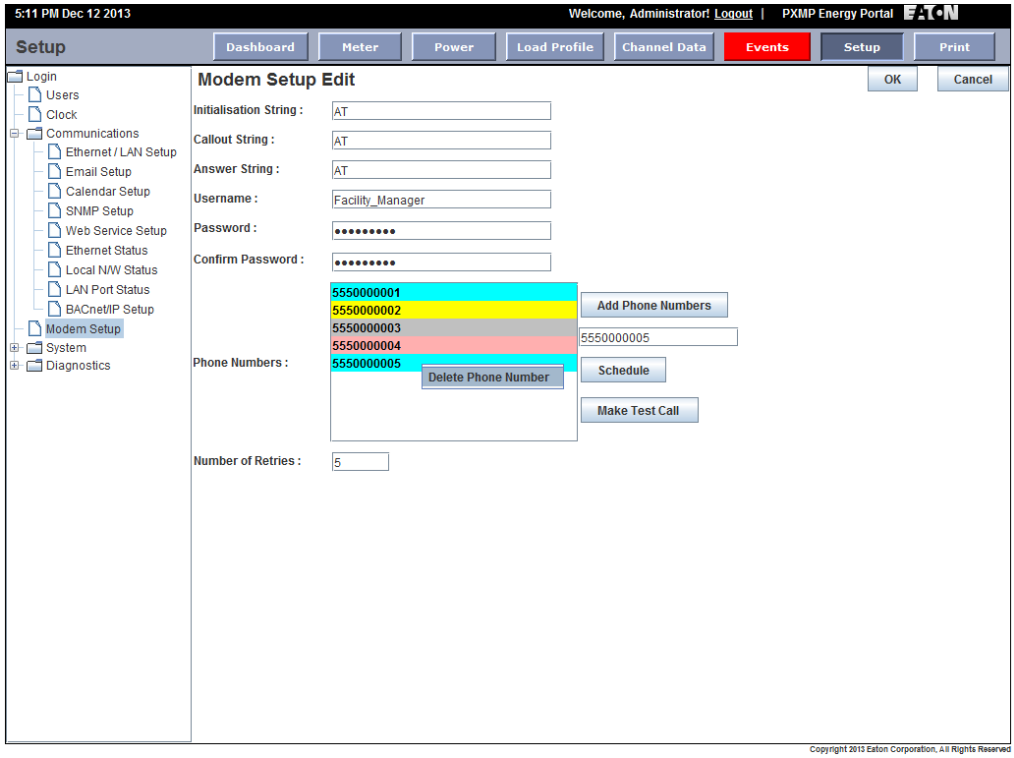


Figure 68. Modem Setup Edit Page.

To enable the modem to dial to other phone(s), enter the phone numbers, one at a time, in the box provided below the "Add Phone Numbers" button, and then click the "Add Phone Numbers" button to add to the "Phone Numbers" list on the left.

The PXMP-EPM(-M) supports the following modem calling schedule:

- Call every day at certain time;
- Call once a week at certain;
- Call any month at certain date and time; and
- Call any day.

To configure a modem calling schedule, click the "Schedule" button in the Modem Setup Edit page, a "Modem Configuration – Schedule" dialog box appears (see Figure 69).

In the Modem Configuration – Schedule box, first click a phone number and then select the desired calling schedule, and enter the time of calling using the drop-down lists at the bottom of the dialog box. Each calling schedule is marked with a unique color in the web interface. Click the "Ok" button to close the dialog box and return to the Modem Setup Edit page.

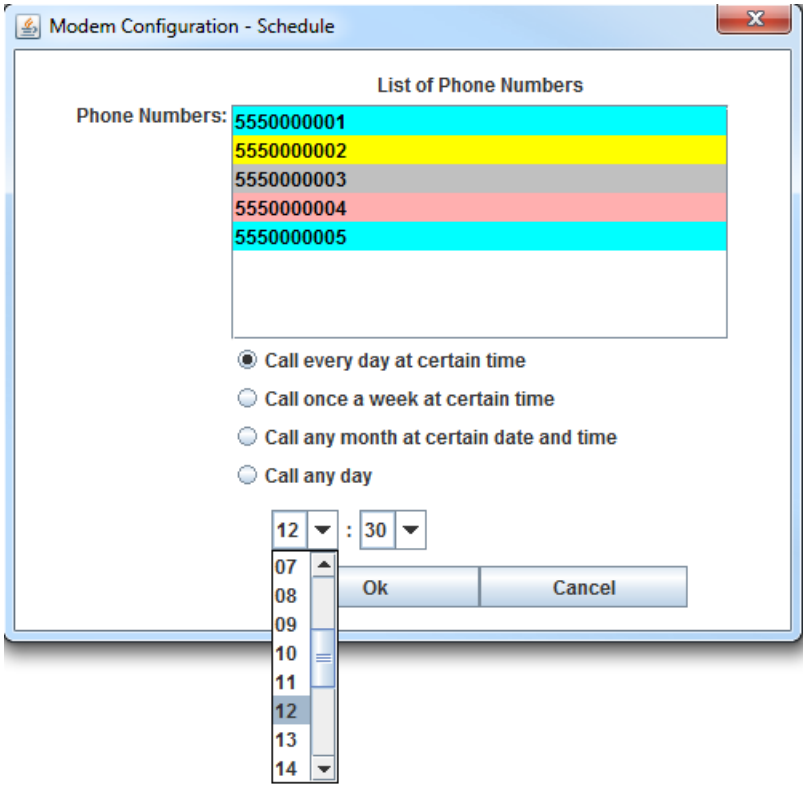


Figure 69. Modem Configuration – Schedule Call Every Day.

To remove a phone number, right click the phone number in the "Phone Numbers" list (shown in Figure 69), and select the "Delete Phone Number" option.

Click the "Make Test Call" button to test the modem setup. The PXMP-EPM(-M) allows the Facility Manager to set a number for modem retries when dialing. To set this retry number, enter appropriate information in the "Number of Retries" box. The default value is five.

5.10.1 System Information

A Facility Manager can view system information, including the hardware and firmware information of the PXMP meter base and modules by clicking the "+" symbol next to the "System Information" node on the left side of the screen to expand it.

5.10.1.1 System Hardware

Click the System Hardware screen node from the panel on the left side of the Setup screen to display the current system hardware information (see Figure 70). The system hardware page provides information for:

- Energy Portal;
- Meter Base; and
- Module in Each Slot.

The system hardware information may be used for trouble-shooting purpose. To print a copy of the system hardware information, click the "Print" icon at the top of the system hardware page.

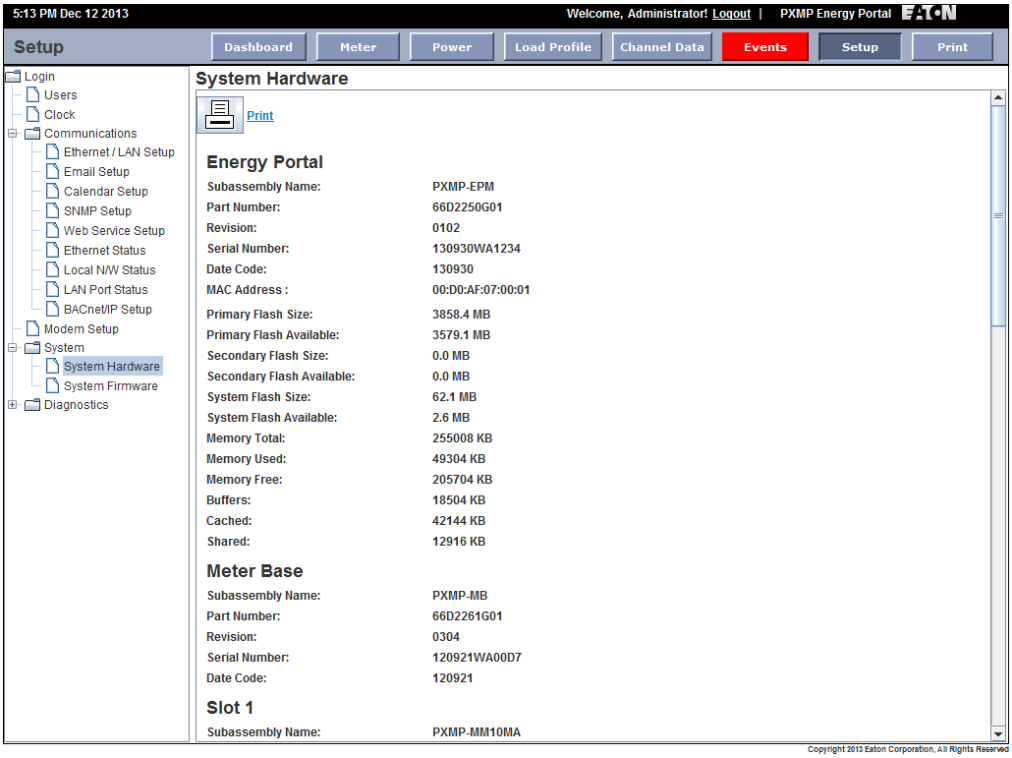


Figure 70. System Hardware Screen.

5.10.1.2 System Firmware

The System Firmware screen displays component names, assembly names, part numbers, and their respective versions for the PXMP-MB and modules in slots 1-10 (see Figure 71). Note that the assembly name is also the PXMP component's catalog number.

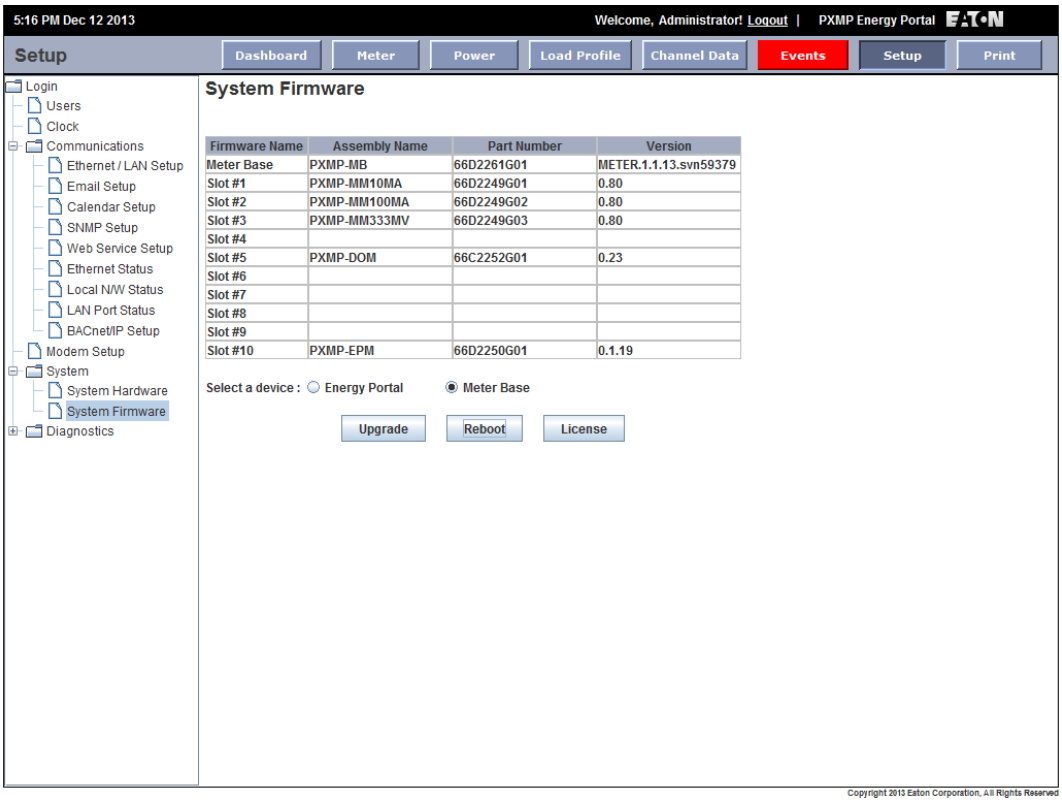


Figure 71. System Firmware Screen.

To upgrade firmware for the PXMP-EPM(-M) module or PXMP meter base, selecting an option in the "Select a device" (see Figure 71). The "Energy Portal" option refers to the firmware upgrade for the PXMP-EPM(-M) module, while the "Meter Base" option refers to the firmware upgrade for the PXMP meter base.

Once a device is selected, click the "Upgrade" button. The web server prompts with a screen similar to that shown in Figure 72. Click the "Choose Upgrade File" button and select the zip archive that contains the desired firmware upgrade. Click the "Start Upgrade" button in the Upgrade Firmware page to initiate firmware upgrade.

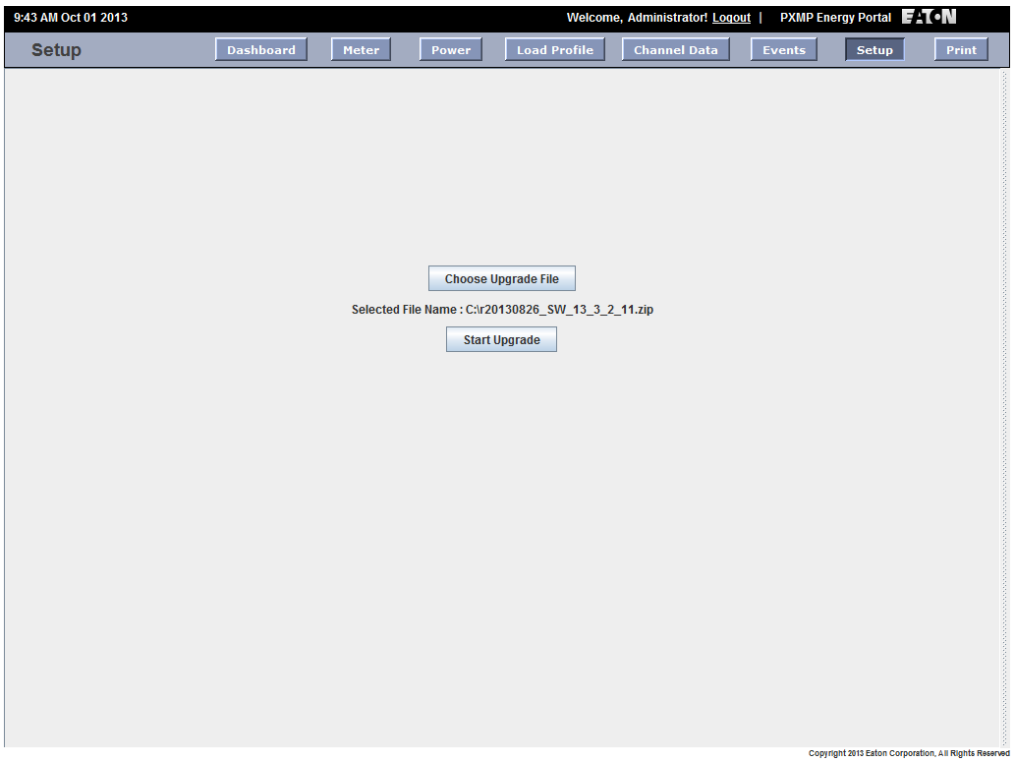


Figure 72. Upgrade Firmware Page.

To reboot the PXMP-EPM(-M) module or the PXMP meter base, select desired device in "Select a device" in Figure 73. Select the "Energy Portal" option to reboot the PXMP-EPM(-M) module, and select the "Meter Base" option to reboot PXMP meter base. Click the "Reboot" button to execute a reboot.

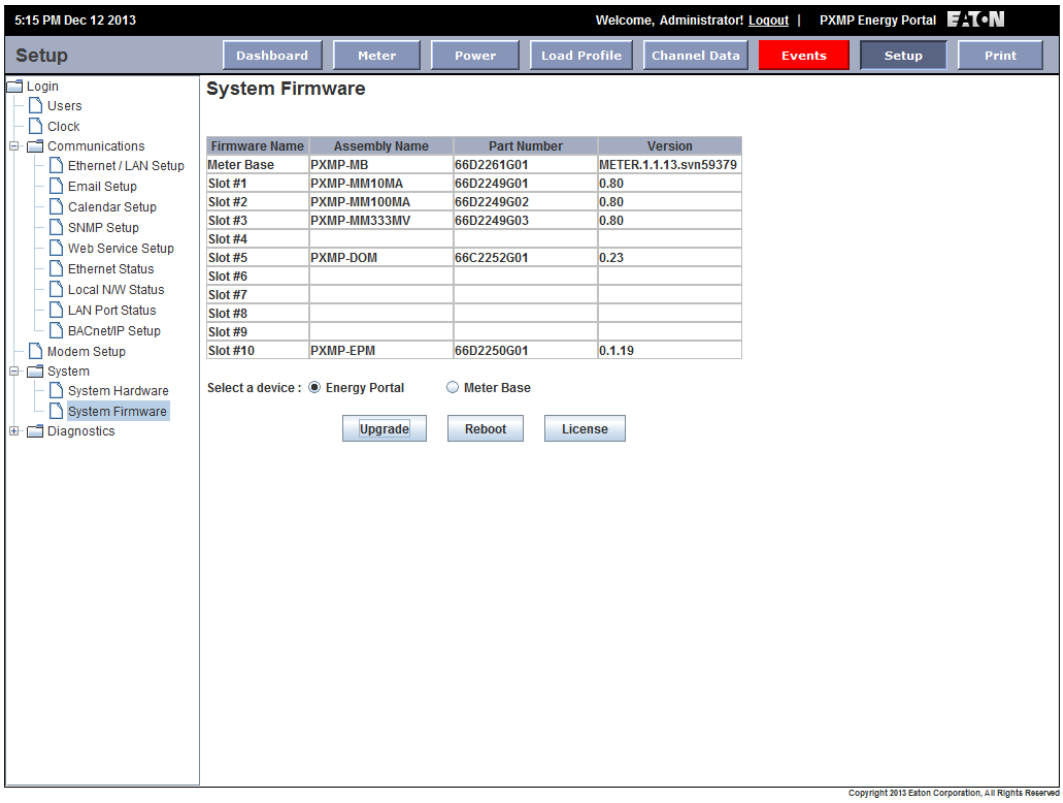


Figure 73. Reboot a Device from System Firmware Page.

To view PXMP-EPM(-M) firmware licenses, click the "License" button (see Figure 73). A screen similar to the one shown in Figure 74 appears. Click the folder name to view individual license.

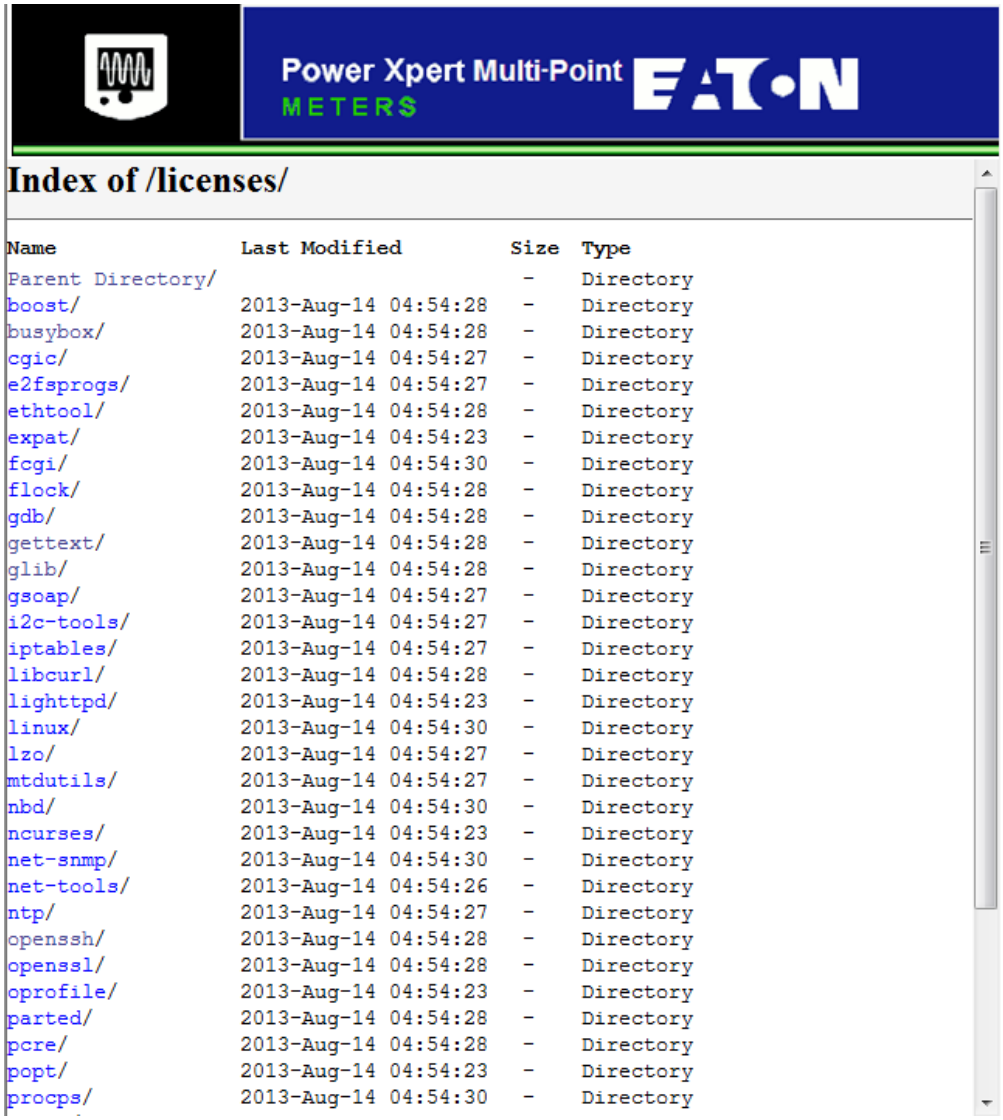


Figure 74. View Firmware Licenses Page.

5.10.2 Diagnostics Information

The Facility Manager can view system log and communications status by clicking the "+" symbol next to the "Diagnostics Information" node on the left side of the screen to expand it. The Facility Manager can also reset the system log.

5.10.2.1 System Log

A system log stores system information in the PXMP-MB. The PXMP-EPM(-M) retrieves the system information from the PXMP-MB in the background, and stores them in the PXMP-EPM(-M)'s non-volatile memory. The System Log screen provides a list of past events and the time associated with each event (see Figure 75). The Facility Manager can copy all existing system log entries to clipboard by clicking the "Copy All" button. Click the "Reset All" button will reset and clear all existing system log entries in the PXMP-EPM(-M).

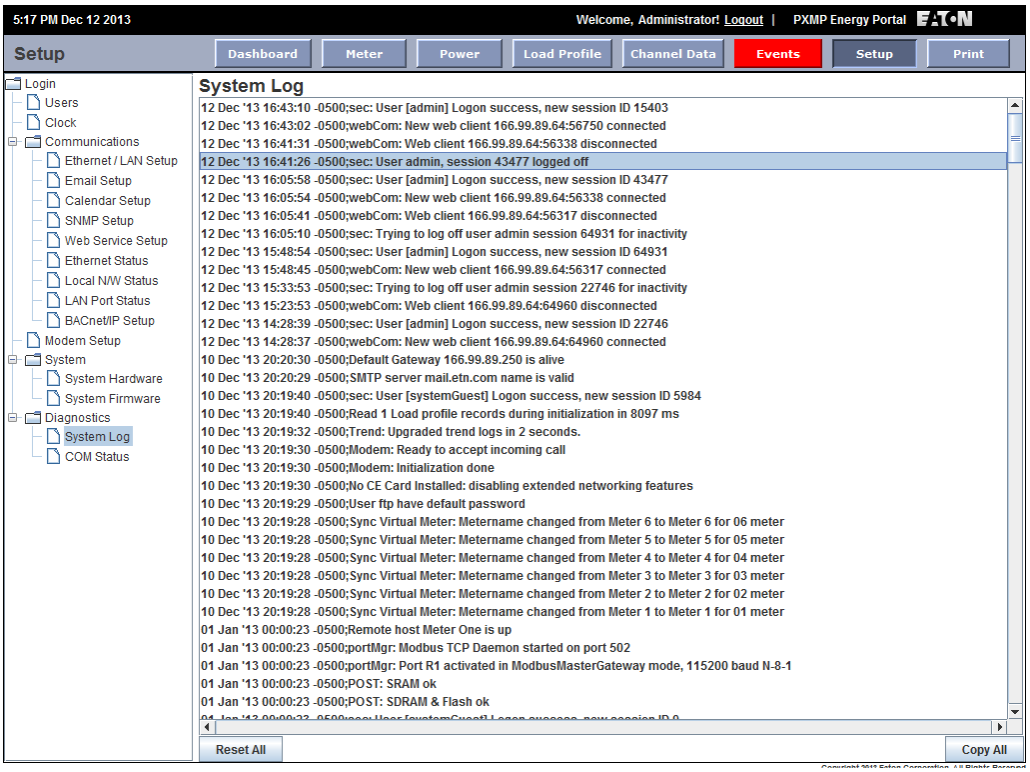


Figure 75. System Log Screen.

5.10.2.2 COM Status

The COM Status page (see Figure 76) shows detailed information about the communications status. The page is for display information only, and cannot be edited.

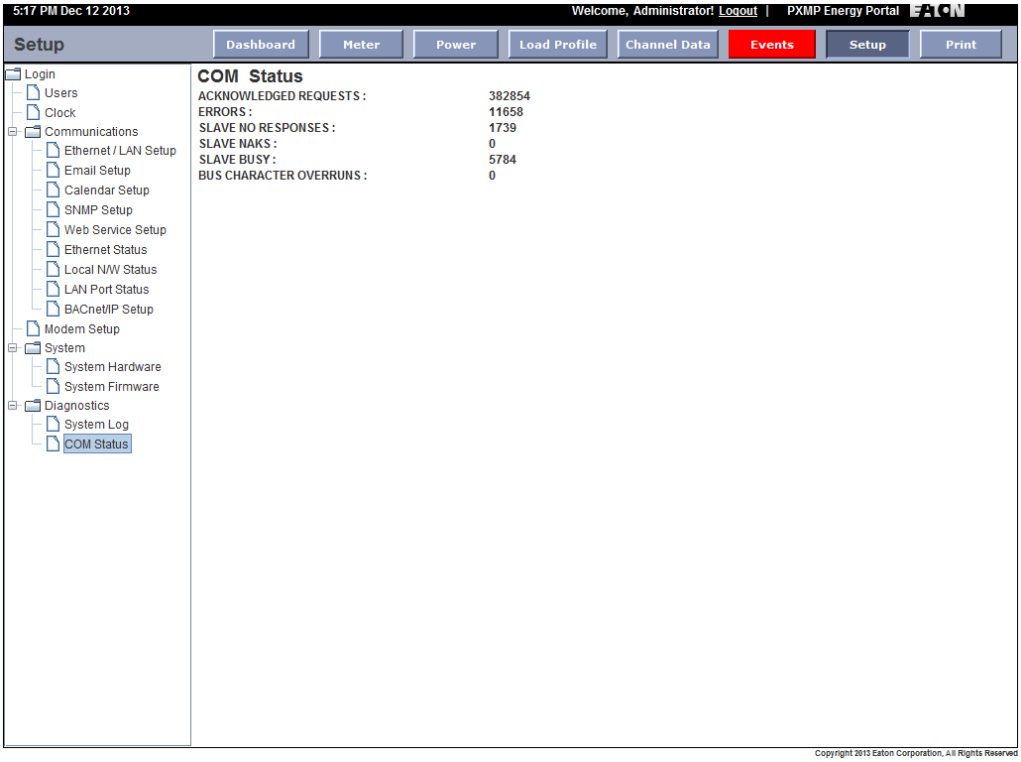


Figure 76. COM Status Page.

6 PXMP-EPM(-M) Secure FTP Service

The PXMP-EPM(-M) is equipped with 4 GB of non-volatile memory and is capable of storing up to 10 years of load profile data at 15-minute interval. The PXMP-EPM(-M) uses secure file transfer protocol (SFTP) to provide access, transfer, and management functionalities to the stored load profile data and other information. Both SFTP commands and data are encrypted to prevent Passwords and sensitive information from being transmitted openly over the network.

6.1 Client Access to PXMP-EPM(-M) SFTP Service

To access the PXMP-EPM(-M) SFTP service, an SFTP client is needed. An SFTP client is a software program that uses secure shell (SSH) network protocol to access, transfer and manage files. SFTP clients with graphical user interface for Microsoft Windows include WinSCP and Filezilla. Other command-line SFTP clients include sftp and psftp.

Access to PXMP-EPM(-M) SFTP service is illustrated in this manual using a WinSCP client. A copy of the WinSCP client may be obtained from http://winscp.net/eng/download.php.

Figure 77 shows a WinSCP Login screen. The information needed to log into the PXMP-EPM(-M) SFTP service is listed in Table 7.

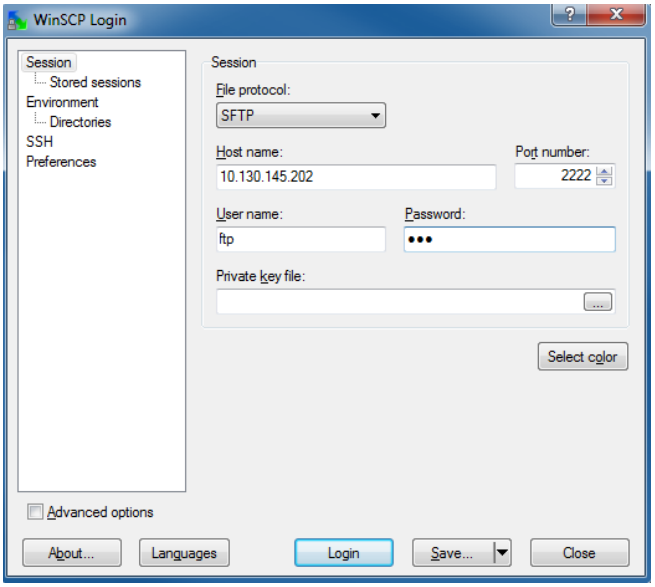


Figure 77. WinSFTP Login Screen.

Table 7. SFTP Login Information.

File Protocol	Supported file transfer protocols. Select SFTP to access PXMP-EPM(-M) SFTP Service.
Host Name	PXMP-EPM(-M) Ethernet/LAN IP address. See Section 5.2.1.1 on how to obtain PXMP-EPM(-M) Ethernet/LAN IP address.
Port Number	PXMP-EPM(-M) SFTP service uses port 2222.
Username	PXMP-EPM(-M) SFTP service uses "**ftp**" (without quotation marks) as Username.
Password	PXMP-EPM(-M) SFTP service uses "**ftp**" (without quotation marks) as default Password. See Section 5.9.2.1 on how to change the SFTP default Password.

Note: The PXMP-EPM(-M) SFTP service uses port 2222. This is different from conventional FTP services that use port 22 for connection.

Upon a successful login, the User gains access to the energy and trend folders in the PXMP-EPM(-M) (see Figure 78).

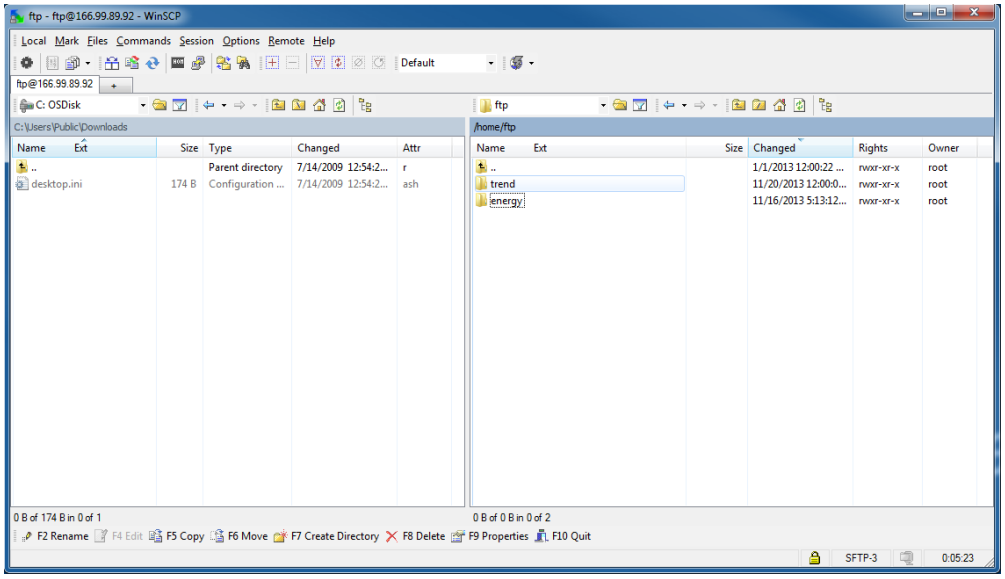


Figure 78. PXMP-EPM(-M) SFTP Folders.

6.2 SFTP Folders and Files

The PXMP-EPM(-M) stores metered data in two separate folders. The energy folder contains load profile data, and the trend folder contains minimum, maximum, and average values of metered data at five-minute intervals.

6.2.1 SFTP Energy Folder and Files

The energy folder contains load profile data files. The load profile data files are partitioned into groups and stored in separate files. In addition, data for pulse meters are stored in an individual file (see Figure 79).

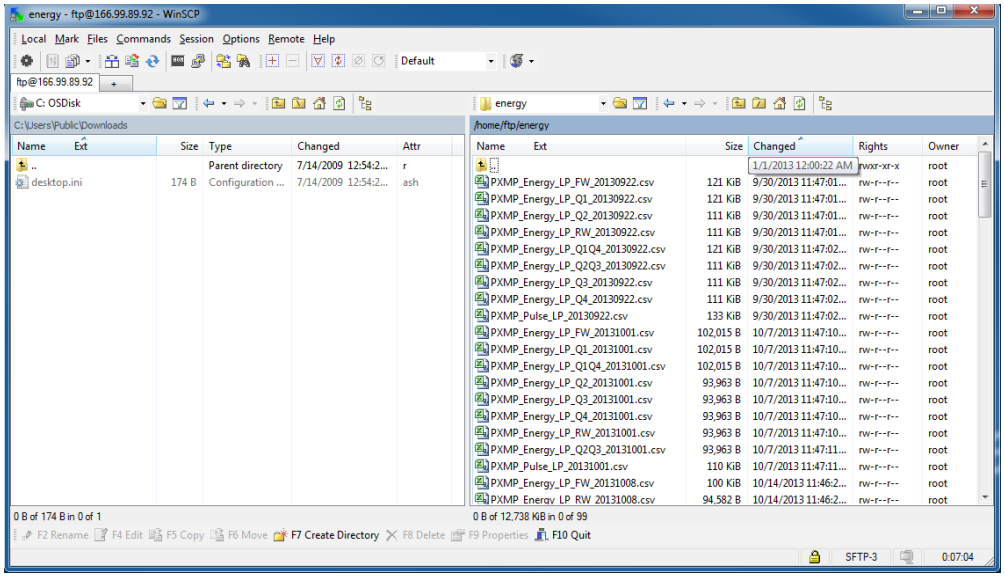


Figure 79. PXMP-EPM(-M) SFTP Energy Folder.

Each file contains metered data in comma-separated values (CSV) format. Table 8 describes the contents of each file.

Table 8. Energy Folder Filenames and Contents

Filename	Content
PXMP_Energy_LP_FW_YYYYMMDD.csv[1]	Forward kW demand (import)
PXMP_Energy_LP_RW_YYYYMMDD.csv	Reverse kW demand (export)
PXMP_Energy_LP_Q1_YYYYMMDD.csv	Q1 kVAR demand (inductive/motor load)
PXMP_Energy_LP_Q2_YYYYMMDD.csv	Q2 kVAR demand (inductive generator)
PXMP_Energy_LP_Q3_YYYYMMDD.csv	Q3 kVAR demand (capacitive generator)
PXMP_Energy_LP_Q4_YYYYMMDD.csv	Q4 kVAR demand (capacitive load)
PXMP_Energy_LP_Q1Q4_YYYYMMDD.csv	Q1 and Q4 KVA demand (import)
PXMP_Energy_LP_Q2Q3_YYYYMMDD.csv	Q2 and Q3 KVA demand (export)
PXMP_Pulse_LP_YYYYMMDD.csv	Data for pulse meters

[1] YYYY: 4-digit year; MM: 2-digit month; DD: 2-digit day.

6.2.1.1 Load Profile Data Files

Figure 80 shows an example of contents of a sample load profile data file "PXMP_Energy_LP_FW_20131108.csv." The rows provide time-stamped load profile data records, and the columns give channel-related information. According to Table 8, the sample load profile data file contains forward demand values in kilowatts. Similarly, load profile data file "PXMP_Energy_LP_Q2_20131108.csv" contains Q2 demand (inductive generator) in kVARs, and load profile data file "PXMP_Energy_LP_Q2Q3_20131108.csv" contains Q2 and Q3 demand (export) in kVAs.

Date	Time	RTP	0	1	2	…	59	60
			Main Meter	Office	Lab	…	HVAC	N/A
12/1/2013	0:00	0	63.039	3.389	2.368	…	35.522	0
12/1/2013	0.01	1	63.495	3.428	2.377	…	35.821	0
12/1/2013	0.02	1	63.599	3.426	2.402	…	35.892	0
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
12/7/2013	23:58	0	63.311	3.411	2.377	…	35.596	0
12/7/2013	23:59	0	63.051	3.396	2.368	…	35.892	0

Figure 80. Energy Load Profile Data File.

The first row of the load profile data file provides general header information, and the second row gives channel names. Load profile data records are listed starting from the third row. In the example shown in Figure 80, the load profile is recorded at one-minute interval. Depending on the User's selection, the load profile may be recorded at 5-, 10-, 15-, 30- or 60-minute interval. Each load profile data file contains up to seven days of data records.

The first column of the load profile data file gives the date of the data records. The second column provides time of the data records. The third column gives the real time pricing (RTP) information. The real time pricing information is a binary flag. For a given load profile data record, a "0" means that the real time pricing is disabled for the record, while a "1" indicates that the real time pricing is enabled.

The fourth column of the load profile data file is Channel 0, Main Meter. This channel is associated with the load profile data at the PXMP Meter Base. The 5th through the 64th columns list up to 60 channels of load profile data. If a channel is not defined or used, its load profile data records are filled with zeros. In the example shown in Figure 80, Channel 60 is not defined, and its corresponding load profile data records are filled with zeros.

6.2.1.2 Pulse Input Data Files

Figure 81 shows the contents of a sample pulse input data file "PXMP_Pulse_LP_20131115.csv." The rows provide time-stamped pulse input data records, and the columns give channel-related information. In the example shown in Figure 81, the load profile is recorded at one-minute intervals. Depending on the User's selection, the pulse inputs may be recorded at 5-, 10-, 15-, 30- or 60-minute interval. Each pulse input data file contains up to seven days of data records.

Date	Time	RTP	ONE	TWO	THREE	I11	I12	…	I18	I21	…	I97	I98
			Water	Gas	Steam	Office Water	Office Gas	…	Office Steam	N/A	…	Lab Water	Gas Lab
12/1/2013	0:00	0	1.843	9.190	18.078	3.201	11.715	…	0	0	…	0.167	5.233
12/1/2013	0.01	1	1.847	9.310	18.234	3.016	10.123	…	0	0	…	0.149	5.125
12/1/2013	0.02	1	1.863	9.231	19.037	2.985	10.705	…	0	0	…	0.134	5.295
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
12/7/2013	23:58	0	1.839	9.413	19.256	4.156	8.807	…	0	0	…	0.145	5.066
12/7/2013	23:59	0	1.859	9.514	19.243	4.073	8.780	…	0	0	…	0.118	4.929

Figure 81. Pulse Input Data File.

The first row of the pulse input data file provides general header information, and the second row gives channel names. Pulse input data records are listed starting from the third row. The contents in this pulse input data file are scaled pulse input values. In the example shown in Figure 81, if a specific pulse input channel receives N pulses during a one-minute interval, and the input multiplier is X, then the pulse input data file will contain a scaled pulse input value of N•X for this channel during the one-minute interval. The unit of the scaled pulse input value is defined in the configuration software. For information on how to set input multiplier and unit, please refer to the Power Xpert Multi-Point Meter Configuration Software User Manual (MN150002EN).

The first column of the pulse input data file gives the date of the data records. The second column provides time of the data records. The third column gives the real time pricing (RTP) information. The real time pricing information is a binary flag. For a given pulse input data record, a "0" means that the real time pricing is disabled for the record, while a "1" indicates that the real time pricing is enabled.

The fourth through sixth columns of the pulse input data file (Channel ONE, TWO, THREE) are for pulse input channels at the PXMP Meter Base. The 7th through the 78th columns list up to 72 channels of pulse input data. If a channel is not defined or used, its pulse input data records are filled with zeros. In the example shown in Figure 81, Channel I18 is defined but not used, and Channel I21 is not defined. In this case, both channels are filled with zeros.

6.2.2 SFTP Trend Folder and Files

The trend folder provides minimum, maximum, and average values of metered data at five-minute intervals (see Figure 82). The trend data files are partitioned into groups and stored in separate files.

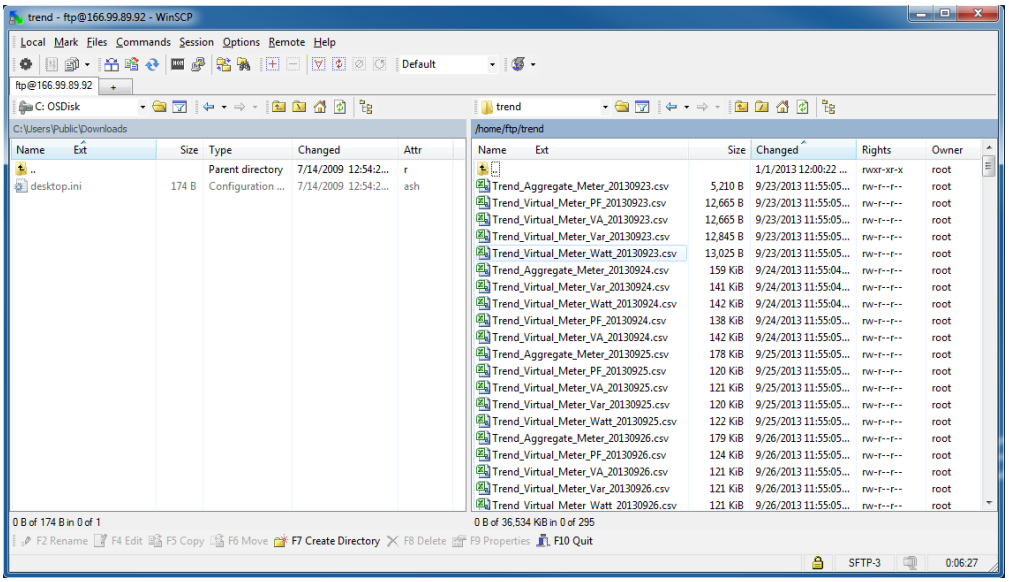


Figure 82. PXMP-EPM(-M) SFTP Trend Folder.

Each file contains metered data in CSV format. Table 9 describes the contents of each file.

Table 9. Trend Folder Filenames and Contents.

Filename	Content
Trend_Aggregate_Meter_YYYYMMDD.csv	Aggregate meter data
Trend_Virtual_Meter_Watt_YYYYMMDD.csv	Virtual meter real power in watts
Trend_Virtual_Meter_Var_YYYYMMDD.csv	Virtual meter reactive power in vars
Trend_Virtual_Meter_VA_YYYYMMDD.csv	Virtual meter apparent power in V•As
Trend_Virtual_Meter_PF_YYYYMMDD.csv	Virtual meter power factor

6.2.2.1 Aggregate Meter Data Files

Figure 83 shows contents of a sample aggregate meter data file "Trend_Aggregate_Meter_20131121.csv." The rows provide time-stamped aggregate meter data, and the columns give channel-related information.

Date	Time	Ia(avg)	Ia(min)	Ia(max)	…	Ptotal(avg)	…	Vab(min)	…	Fsys(max)	…	PFc(max)
12/9/2013	0:00	122.141	119.672	138.281	…	63400.802	…	206.338	…	59.999	…	1.000
12/9/2013	0.05	123.882	124.841	133.614	…	63399.521	…	206.339	…	59.998	…	0.999
12/9/2013	0.10	124.674	121.945	133.626	…	63399.760	…	206.341	…	59.999	…	1.000
□	□	□	□	□	□	□	□	□	□	□	□	□
12/9/2013	23:50	122.545	124.717	134.668	…	63399.420	…	206.336	…	59.999	…	1.000
12/9/2013	23:55	124.042	121.754	135.733	…	63401.003	…	206.341	…	60.000	…	1.000

Figure 83. Aggregate Meter Data File.

The first row of the aggregate meter data file provides general header information. Aggregate meter data records are listed starting from the second row. The meter data are recorded at a five-minute interval. Each aggregate meter data file contains up to 24 hours of data records.

The first column of the aggregate meter data file gives the date of the data records. The second column provides time of the data records. Starting from the third column, quantities listed in Table 10 are recorded with their respective minimum, maximum and average values.

Table 10. Aggregate Meter Data Contents.

Name	Description
Ia, Ib, Ic	Current in phase a, b, c (in amperes)
Pa, Pb, Pc	Real power in phase a, b, c (in watts)
Ptotal	Three-phase total real power (in watts)
Qa, Qb, Qc	Reactive power in phase a, b, c (in Vars)
Qtotal	Three-phase total reactive power (in Vars)
Sa, Sb, Sc	Apparent power in phase a, b, c (in VAs)
Stotal	Three-phase total apparent power (in VAs)
Van, Vbn, Vcn	Line-neutral voltages (in volts)
Vab, Vbc, Vca	Line-line voltages (in volts)
Fsys	System frequency (in hertz)
PFsys	System power factor
Temperature	PXMP-EPM(-M) temperature (in degrees Celsius)
PFa, PFb, PFc	Power factor in phase a, b, c

6.2.2.2 Virtual Meter Data Files

Figure 84 shows contents of a sample virtual meter data file "Trend_Virtual_Meter_Watt_20131121.csv." The rows provide time-stamped virtual meter data records, and the columns give channel-related information.

Date	Time	Meter_01 _Watt(avg)	Meter_01 _Watt(min)	Meter_01 _Watt(max)	…	Meter_60 _Watt(avg)	Meter_60 _Watt(min)	Meter_60 _Watt(max)
12/9/2013	0:00	3415.848	3415.231	3416.952	…	17894.994	17891.160	17898.889
12/9/2013	0.05	3415.829	3415.366	3416.483	…	17894.650	17891.275	17897.750
12/9/2013	0.10	3415.961	3415.186	3416.781	…	17894.508	17891.521	17897.578
□	□	□	□	□	□	□	□	□
12/9/2013	23:50	3415.887	3415.186	3416.564	…	17894.520	17891.637	17898.645
12/9/2013	23:55	3415.948	3415.132	3416.655	…	17894.914	17890.656	17898.889

Figure 84. Virtual Meter Data File.

The first row of the virtual meter data file provides general header information. Virtual meter data records are listed starting from the second row. The meter data is recorded at a five-minute interval. Each virtual meter data file contains up to 24 hours of data records.

The first column of the virtual meter data file gives the date of the data records. The second column provides time of the data records. The 3rd through the 182nd columns list up to 60 channels of virtual meter data with their respective minimum, maximum, and average values. If a channel is not defined or used, its virtual meter data records are filled with zeros.

Appendix A Specifications

General Specifications:

- Operational Temperature Range -20 to 70°C (-4 to 158°F)
- Storage Temperature Range -40 to 85°C (-40 to 185°F)
- Elevation 0-9,849 ft. (0-3000 m)
- Humidity 5-95%, non-condensing environment
- Housing IP20 when installed in PXMP-MB and cables inserted into connectors
- Pollution Degree 2
- CE Mark
- EMC EN61326
- Emissions conducted and radiated as part of PXMP Meter System.
- FCC Part 15 Class B
- CISPR 11 Class B
- Product Safety:
  - IEC/EN61010-1
  - UL61010-1 File E185559
  - CNL Evaluation to CAN/C22.2 No 1010.1.92
- PXMP-MB (-AB) Meter Base slot position '10' only
- Internal Memory 4GB NAND Flash
  - For Energy/Demand profiles, trending and general logs
- Web Services
  - Up to five simultaneous clients

Communication Ports:

- Configuration Ethernet RJ45 Cat5 STP/UTP
  - 10 Base T/100 Base Tx
  - Auto Cross-over Capability supported.
  - Java Web Browser interface
  - IP address 192.168.1.1 by default
- Bottom Facing LAN/WAN Ethernet Port
  - RJ45 Cat5 STP/UTP 10 Base T/100 Base Tx
  - STP required for full electromagnetic immunity
  - Auto Cross-over capability supported.
  - Supports Modbus TCP and Java Web Browser interface
  - DHCP by default
- Bottom Facing Telephone Modem Interface
  - V.92 Modem
  - RJ11 field interface

Appendix B Modbus Registers Map

Table B.1. Summary of Modbus Register Blocks.

	Start	Start (Hex)	Regs.
Time	2921	B68	8
Time Zone (32 Character ASCII)	2929	B70	16
Product ID	4607	11FE	2
Product Status	4609	1200	2
Standard (Aggregate Meter)	4611	1202	6
	4621	120C	18
	4651	122A	6
	4659	1232	4
	4667	123A	18
	4691	1252	6
	6305	18A0	20
	6329	18B8	4
Control (with ID & Password)	10000	270F	10
Event Index	10010	2719	2
Event PushDown List (ASCII)	10020	2723	580
Event PushDown List (Enum/value)	10600	2967	320
System Information	12000	2EDF	27
Card Information	13000	32C7	1470
Per-Channel Meter Data	14500	38A3	20
System/Aggregate Meter	15000	3A97	490
Virtual Meter Data (by Tenant)	28000	6D5F	7320
Virtual Meter (Selected by Display)	35500	8AAB	131
80 Inputs (by Parameter)	40500	9E33	2640
3 Built-In Inputs	51500	C92B	126
	51700	C9F3	51
1 Built-In Output	51800	CA57	30

Table B.2. Time Register 2921.

	Start	Start (Hex)
Month	2921	B68
Day	2922	B69
Year	2923	B6A
Day of Week (Deprecated)	2924	B6B
Hour	2925	B6C
Minute	2926	B6D
Second	2927	B6E
1/100th Second (Deprecated)	2928	B6F

Table B.3.A. Secure Control Register 10000.

Start	Start (Hex)	Regs.	Description	Data Type
10000	270F	2	Control Function (See Table B.3B)	Uint32
10002	2711	4	8 Character User ID	ASCII
10006	2715	4	8 Character Password	ASCII

Table B.3.B. Secure Control Register 10000 (Byte3, Byte2, Byte1 & Byte0).

Byte 3	Byte 2	Byte 1	Byte 0	Standard Control Definitions BYTE 3=0)
0x00	0x00	0x00	0x04	Reset Peak Demand (W, var, VA, A)
0x00	0x00	0x00	0x08	Reset Energy
0x00	0x00	0x00	0x10	Reset Device Software (reboot)
0x00	0x00	0x00	0x20	Clear All Eevents
0x00	0x00	0x00	0x40	Reset (Synchronize) Demand Windows
0x00	0x00	0x01	0x04	Reset All Min./Max. Values
0x00	0x00	0x01	0x06	Reset Discrete Input Counters
0x00	0x03	0x00	0x03	Reset Com Port Statistics
0x00	0x03	0x00	0x04	Acknowledge Triggered Events (clear unread events flag from status)
0x00	0x03	0x00	0x0A	Begin Real Time Pricing
0x00	0x00	0x03	0x0B	End Real Time Pricing
X	0x04	0x01	YY	Activate Relay Outputs on Slot X According to 8-bit Mask YY
X	0x04	0x02	YY	De-activate Relay Outputs on Slot X According to 8-bit Mask YY
X	0x04	0x03	YY	Turn on CT LEDs on Slot X According to 6-bit Mask YY
X	0x04	0x04	YY	Turn off CT LEDs on Slot X According to 6-bit Mask YY
X	0x04	0x05	YY	Blink CT LEDs on Slot X According to 6-bit Mask YY
0x00	0x05	0x00	0x0F	Reset All Data

Table B.4. Product Status/Cause of Status Register 4609.

Register	Cause of Status	Code	Description
4609	Primary Status (Upper Byte)	b15	Unacknowledged Event Flag
		b14	Rate Alert Flag/ Real-Time Pricing (RTP)
		b11-8	4 = Alarmed, 9 = Normal
	Secondary Status (Lower Byte)	b7	Tenant Overload Flag
		b3-0	1 = N/A, Normal 2 = Program/Discovery, 7 = Powered-up/Normal

Table B.5. Cause of Status Register 4610.

Register	Cause of Status	Code	Description
4610	Meter ID (Upper Byte)		If the Tenant Overload Flag is set, this byte indicates the associated MeterID.
			If more than 1 Overload is active, the byte is FF (255)
			Otherwise the byte is 00
	Cause of Status (Lower Byte)	0	N/A
		1	Normal
		11	Overvoltage
		12	Undervoltage
		18	Voltage Unbalance
		23	System Power
		26	Watt or Watt Demand
		27	VA or VA Demand
		28	VAR or VAR Demand
		70	Voltage Phase Loss (outage)

Table B.6. Aggregate Meter (Eaton Standard Registers).

Start	Start (Hex)	Register Count	Description	TypeId	Units
2921	0B68	8	Time (MM/DD/YY day HH:MM:SS 100th) (see Register 2921 Table B.2)	Uint16	Misc
4607	11FE	2	Product ID (constant, 0x200C)	Uint32	
4609	1200	1	Primary/Secondary Status	Uint16	Encoded
4610	1201	1	Cause-Of-Status	Uint16	Encoded
4611	1202	2	IA	Float	Amps
4613	1204	2	IB	Float	Amps
4615	1206	2	IC	Float	Amps
4621	120C	2	Iavg	Float	Amps
4623	120E	2	VAB	Float	Volts
4625	1210	2	VBC	Float	Volts
4627	1212	2	VCA	Float	Volts
4629	1214	2	VLLavg	Float	Volts
4631	1216	2	VAN	Float	Volts
4633	1218	2	VBN	Float	Volts
4635	121A	2	VCN	Float	Volts
4637	121C	2	VLNavg	Float	Volts

Table B.6. Aggregate Meter (Eaton Standard Registers). (Cont.)

Start	Start (Hex)	Register Count	Description	TypeId	Units
4651	122A	2	Real Power (Watts)	Float	Watts
4653	122C	2	Reactive Power (Var)	Float	VAr
4655	122E	2	Apparent Power (VA)	Float	VA
4659	1232	2	Power Factor	Float	
4661	1234	2	Frequency	Float	Hz
4667	123A	2	Phase A Watts	Float	Watts
4669	123C	2	Phase B Watts	Float	Watts
4671	123E	2	Phase C Watts	Float	Watts
4673	1240	2	Phase A var	Float	Var
4675	1242	2	Phase B var	Float	Var
4677	1244	2	Phase C var	Float	Var
4679	1246	2	Phase A VA	Float	VA
4681	1248	2	Phase B VA	Float	VA
4683	124A	2	Phase C VA	Float	VA
4691	1252	2	Phase A PFa [Apparent\ True Power Factor]	Float	
4693	1254	2	Phase B PFa	Float	
4695	1256	2	Phase C PFa	Float	
6305	18A0	4	Forward Wh	Energy	0.1 kWh
6309	18A4	4	Reverse Wh	Energy	0.1 kWh
6313	18A8	4	Sum Total Wh	Energy	0.1 kWh
6317	18AC	4	Delivered/Leading varh	Energy	0.1 kvarh
6321	18B0	4	Received/Lagging varh	Energy	0.1 kvarh
6329	18B8	4	VAh	Energy	0.1 kVAh

Table B.7. System Information.

Start	Start (Hex)	Regs.	SunSpec Name	Description
12000	2EDF	10	Assembly Name (Meter Base)	20 characters (PXM-MB-AB)
12010	2EE9	6	Part Number	12 characters (66C2261G01)
12016	2EEF	1	Assembly Rev	2 characters
12017	2EF0	1	SubAssembly Rev (board)	2 characters
12018	2EF1	8	Serial Number	16 characters

Table B.8. Module Data.

Start	Start (Hex)	Regs.	Each up to 60 channels	Description
13000	32C7	100	Assembly Name	20 characters x 10 cards
13100	332B	60	Part Number	12 characters x 10 cards (e.g. 66C2652G01)
13160	3367	20	Assembly Rev (2char), SubAssembly Rev (2char)	4 characters x 10 cards
13180	337B	80	Serial Number	16 characters x 10 cards
13390	344D	60	Associated meter (1-60)	16-bit unsigned integer x 10 cards x 6 channels
13450	3489	120	Load (% of Rating)	IEEE 754 32-bit float x 10 cards x 6 channels
13570	3501	120	Current	IEEE 754 32-bit float x 10 cards x 6 channels
13690	3579	120	Voltage	IEEE 754 32-bit float x 10 cards x 6 channels
13810	35F1	120	Watts	IEEE 754 32-bit float x 10 cards x 6 channels
13930	3669	120	var	IEEE 754 32-bit float x 10 cards x 6 channels
14050	36E1	120	VA	IEEE 754 32-bit float x 10 cards x 6 channels
14170	3759	120	PF	IEEE 754 32-bit float x 10 cards x 6 channels
14290	37D1	60	CT ID (enumeration)	16-bit unsigned integer x 10 cards x 6 channels
14350	380D	120	CT Rating	IEEE 754 32-bit float x 10 cards x 6 channels

Table B.9. Per-Channel Data.

Start	Start (Hex)	Regs.	Each up to 60 meters	Data Type
14500	38A3	1	Meter Card Selection (1-10)	16-bit unsigned integer
14501	38A4	1	Channel Selection (1-6)	16-bit unsigned integer
14502	38A5	1	Associated meter (1-60)	16-bit unsigned integer
14503	38A6	2	Load (% of Rating)	IEEE 754 32-bit float
14505	38A8	2	Current	IEEE 754 32-bit float
14507	38AA	2	Voltage	IEEE 754 32-bit float
14509	38AC	2	Watts	IEEE 754 32-bit float
14511	38AE	2	var	IEEE 754 32-bit float
14513	38B0	2	VA	IEEE 754 32-bit float
14515	38B2	2	PF	IEEE 754 32-bit float
14517	38B4	1	CT ID (enumeration)	16-bit unsigned integer
14518	38B5	2	CT Rating	IEEE 754 32-bit float x 10 cards x 6 channels

Table B.10. System/Aggregate Meter Data.

Start	Start (Hex)	Regs	System Values	Data Type
15000	3A97	2	Phase 1 Watts	IEEE 754 32-bit float
15002	3A99	2	Phase 2 Watts	IEEE 754 32-bit float
15004	3A9B	2	Phase 3 Watts	IEEE 754 32-bit float
15006	3A9D	2	System Watts	IEEE 754 32-bit float
15008	3A9F	2	Phase 1 var	IEEE 754 32-bit float
15010	3AA1	2	Phase 2 var	IEEE 754 32-bit float
15012	3AA3	2	Phase 3 var	IEEE 754 32-bit float
15014	3AA5	2	System var	IEEE 754 32-bit float
15016	3AA7	2	Phase 1 VA	IEEE 754 32-bit float
15018	3AA9	2	Phase 2 VA	IEEE 754 32-bit float
15020	3AAB	2	Phase 3 VA	IEEE 754 32-bit float
15022	3AAD	2	System VA	IEEE 754 32-bit float
15024	3AAF	2	V1	IEEE 754 32-bit float
15026	3AB1	2	V2	IEEE 754 32-bit float
15028	3AB3	2	V3	IEEE 754 32-bit float
15030	3AB5	2	Vab	IEEE 754 32-bit float
15032	3AB7	2	Vbc	IEEE 754 32-bit float
15034	3AB9	2	Vca	IEEE 754 32-bit float
15036	3ABB	2	Freq	IEEE 754 32-bit float
15038	3ABD	2	System PF	IEEE 754 32-bit float
15040	3ABF	2	Temperature	IEEE 754 32-bit float
15042	3AC1	2	Minimum Phase 1 Watts	IEEE 754 32-bit float
15044	3AC3	2	Minimum Phase 2 Watts	IEEE 754 32-bit float
15046	3AC5	2	Minimum Phase 3 Watts	IEEE 754 32-bit float
15048	3AC7	2	Minimum System Watts	IEEE 754 32-bit float
15050	3AC9	2	Minimum Phase 1 var	IEEE 754 32-bit float
15052	3ACB	2	Minimum Phase 2 var	IEEE 754 32-bit float
15054	3ACD	2	Minimum Phase 3 var	IEEE 754 32-bit float
15056	3ACF	2	Minimum System var	IEEE 754 32-bit float
15058	3AD1	2	Minimum Phase 1 VA	IEEE 754 32-bit float
15060	3AD3	2	Minimum Phase 2 VA	IEEE 754 32-bit float
15062	3AD5	2	Minimum Phase 3 VA	IEEE 754 32-bit float
15064	3AD7	2	Minimum System VA	IEEE 754 32-bit float
15066	3AD9	2	Minimum V1	IEEE 754 32-bit float
15068	3ADB	2	Minimum V2	IEEE 754 32-bit float
15070	3ADD	2	Minimum V3	IEEE 754 32-bit float
15072	3ADF	2	Minimum Vab	IEEE 754 32-bit float
15074	3AE1	2	Minimum Vbc	IEEE 754 32-bit float
15076	3AE3	2	Minimum Vca	IEEE 754 32-bit float
15078	3AE5	2	Minimum Freq	IEEE 754 32-bit float
15080	3AE7	2	Minimum System PF	IEEE 754 32-bit float
15082	3AE9	2	Minimum Temperature	IEEE 754 32-bit float

Table B.10. System/Aggregate Meter Data. (Cont.)

Start	Start (Hex)	Regs	System Values	Data Type
15084	3AEB	2	Maximum Phase 1 Watts	IEEE 754 32-bit float
15086	3AED	2	Maximum Phase 2 Watts	IEEE 754 32-bit float
15088	3AEF	2	Maximum Phase 3 Watts	IEEE 754 32-bit float
15090	3AF1	2	Maximum System Watts	IEEE 754 32-bit float
15092	3AF3	2	Maximum Phase 1 var	IEEE 754 32-bit float
15094	3AF5	2	Maximum Phase 2 var	IEEE 754 32-bit float
15096	3AF7	2	Maximum Phase 3 var	IEEE 754 32-bit float
15098	3AF9	2	Maximum System var	IEEE 754 32-bit float
15100	3AFB	2	Maximum Phase 1 VA	IEEE 754 32-bit float
15102	3AFD	2	Maximum Phase 2 VA	IEEE 754 32-bit float
15104	3AFF	2	Maximum Phase 3 VA	IEEE 754 32-bit float
15106	3B01	2	Maximum System VA	IEEE 754 32-bit float
15108	3B03	2	Maximum Va	IEEE 754 32-bit float
15110	3B05	2	Maximum Vb	IEEE 754 32-bit float
15112	3B07	2	Maximum Vc	IEEE 754 32-bit float
15114	3B09	2	Maximum Vab	IEEE 754 32-bit float
15116	3B0B	2	Maximum Vbc	IEEE 754 32-bit float
15118	3B0D	2	Maximum Vca	IEEE 754 32-bit float
15120	3B0F	2	Maximum Freq	IEEE 754 32-bit float
15122	3B11	2	Maximum System PF	IEEE 754 32-bit float
15124	3B13	2	Maximum Temperature	IEEE 754 32-bit float
15126	3B15	6	Min. Timestamp Phase 1 Watts	yyyy,mm,dd,hh,mm,ss
15132	3B1B	6	Min. Timestamp Phase 2 Watts	yyyy,mm,dd,hh,mm,ss
15138	3B21	6	Min. Timestamp Phase 3 Watts	yyyy,mm,dd,hh,mm,ss
15144	3B27	6	Min. Timestamp System Watts	yyyy,mm,dd,hh,mm,ss
15150	3B2D	6	Min. Timestamp Phase 1 var	yyyy,mm,dd,hh,mm,ss
15156	3B33	6	Min. Timestamp Phase 2 var	yyyy,mm,dd,hh,mm,ss
15162	3B39	6	Min. Timestamp Phase 3 var	yyyy,mm,dd,hh,mm,ss
15168	3B3F	6	Min. Timestamp System var	yyyy,mm,dd,hh,mm,ss
15174	3B45	6	Min. Timestamp Phase 1 VA	yyyy,mm,dd,hh,mm,ss
15180	3B4B	6	Min. Timestamp Phase 2 VA	yyyy,mm,dd,hh,mm,ss
15186	3B51	6	Min. Timestamp Phase 3 VA	yyyy,mm,dd,hh,mm,ss
15192	3B57	6	Min. Timestamp System VA	yyyy,mm,dd,hh,mm,ss
15198	3B5D	6	Min. Timestamp Va	yyyy,mm,dd,hh,mm,ss
15204	3B63	6	Min. Timestamp Vb	yyyy,mm,dd,hh,mm,ss
15210	3B69	6	Min. Timestamp Vc	yyyy,mm,dd,hh,mm,ss
15216	3B6F	6	Min. Timestamp Vab	yyyy,mm,dd,hh,mm,ss
15222	3B75	6	Min. Timestamp Vbc	yyyy,mm,dd,hh,mm,ss
15228	3B7B	6	Min. Timestamp Vca	yyyy,mm,dd,hh,mm,ss

Table B.10. System/Aggregate Meter Data. (Cont.)

Start	Start (Hex)	Regs	System Values	Data Type
15234	3B81	6	Min. Timestamp Freq	yyyy,mm,dd,hh,mm,ss
15240	3B87	6	Min. Timestamp System PF	yyyy,mm,dd,hh,mm,ss
15246	3B8D	6	Min. Timestamp Temperature	yyyy,mm,dd,hh,mm,ss
15252	3B93	6	Max. Timestamp Phase 1 Watts	yyyy,mm,dd,hh,mm,ss
15258	3B99	6	Max. Timestamp Phase 2 Watts	yyyy,mm,dd,hh,mm,ss
15264	3B9F	6	Max. Timestamp Phase 3 Watts	yyyy,mm,dd,hh,mm,ss
15270	3BA5	6	Max. Timestamp System Watts	yyyy,mm,dd,hh,mm,ss
15276	3BAB	6	Max. Timestamp Phase 1 var	yyyy,mm,dd,hh,mm,ss
15282	3BB1	6	Max. Timestamp Phase 2 var	yyyy,mm,dd,hh,mm,ss
15288	3BB7	6	Max. Timestamp Phase 3 var	yyyy,mm,dd,hh,mm,ss
15294	3BBD	6	Max. Timestamp System var	yyyy,mm,dd,hh,mm,ss
15300	3BC3	6	Max. Timestamp Phase 1 VA	yyyy,mm,dd,hh,mm,ss
15306	3BC9	6	Max. Timestamp Phase 2 VA	yyyy,mm,dd,hh,mm,ss
15312	3BCF	6	Max. Timestamp Phase 3 VA	yyyy,mm,dd,hh,mm,ss
15318	3BD5	6	Max. Timestamp System VA	yyyy,mm,dd,hh,mm,ss
15324	3BDB	6	Max. Timestamp Va	yyyy,mm,dd,hh,mm,ss
15330	3BE1	6	Max. Timestamp Vb	yyyy,mm,dd,hh,mm,ss
15336	3BE7	6	Max. Timestamp Vc	yyyy,mm,dd,hh,mm,ss
15342	3BED	6	Max. Timestamp Vab	yyyy,mm,dd,hh,mm,ss
15348	3BF3	6	Max. Timestamp Vbc	yyyy,mm,dd,hh,mm,ss
15354	3BF9	6	Max. Timestamp Vca	yyyy,mm,dd,hh,mm,ss
15360	3BFF	6	Max. Timestamp Freq	yyyy,mm,dd,hh,mm,ss
15366	3C05	6	Max. Timestamp System PF	yyyy,mm,dd,hh,mm,ss
15372	3C0B	6	Max. Timestamp Temperature	yyyy,mm,dd,hh,mm,ss
15378	3C11	2	W forward 1-minute demand (import)	IEEE 754 32-bit float
15380	3C13	2	W reverse 1-minute demand (export)	IEEE 754 32-bit float
15382	3C15	2	Q1 var 1-minute demand (inductive/motor load)	IEEE 754 32-bit float
15384	3C17	2	Q2 var 1-minute demand (inductive generator)	IEEE 754 32-bit float
15386	3C19	2	Q3 var 1-minute demand (capacitive generator)	IEEE 754 32-bit float
15388	3C1B	2	Q4 var 1-minute demand (capacitive load)	IEEE 754 32-bit float
15390	3C1D	2	Q1,Q4 VA 1-minute demand (import)	IEEE 754 32-bit float
15392	3C1F	2	Q2,Q3 VA 1-minute demand (export)	IEEE 754 32-bit float
15394	3C21	2	W forward demand (import)	IEEE 754 32-bit float

Table B.10. System/Aggregate Meter Data. (Cont.)

Start	Start (Hex)	Regs	System Values	Data Type
15396	3C23	2	W reverse demand (export)	IEEE 754 32-bit float
15398	3C25	2	Q1 var demand (inductive/ motor load)	IEEE 754 32-bit float
15400	3C27	2	Q2 var demand (inductive generator)	IEEE 754 32-bit float
15402	3C29	2	Q3 var demand (capacitive generator)	IEEE 754 32-bit float
15404	3C2B	2	Q4 var demand (capacitive load)	IEEE 754 32-bit float
15406	3C2D	2	Q1,Q4 VA demand (import)	IEEE 754 32-bit float
15408	3C2F	2	Q2,Q3 VA demand (export)	IEEE 754 32-bit float
15410	3C31	2	pk W forward demand (import)	IEEE 754 32-bit float
15412	3C33	2	pk W reverse demand (export)	IEEE 754 32-bit float
15414	3C35	2	pk Q1 var demand (inductive/ motor load)	IEEE 754 32-bit float
15416	3C37	2	pk Q2 var demand (inductive generator)	IEEE 754 32-bit float
15418	3C39	2	pk Q3 var demand (capacitive generator)	IEEE 754 32-bit float
15420	3C3B	2	pk Q4 var demand (capacitive load)	IEEE 754 32-bit float
15422	3C3D	2	pk Q1,Q4 VA (import)	IEEE 754 32-bit float
15424	3C3F	2	pk Q2,Q3 VA (export)	IEEE 754 32-bit float
15426	3C41	6	pk Timestamp W forward demand (import)	yyyy,mm,dd,hh,mm,ss
15432	3C47	6	pk Timestamp W reverse demand (export)	yyyy,mm,dd,hh,mm,ss
15438	3C4D	6	pk Timestamp Q1 var demand (inductive/motor load)	yyyy,mm,dd,hh,mm,ss
15444	3C53	6	pk Timestamp Q2 var demand (inductive generator)	yyyy,mm,dd,hh,mm,ss
15450	3C59	6	pk Timestamp Q3 var demand (capacitive generator)	yyyy,mm,dd,hh,mm,ss
15456	3C5F	6	pk Timestamp Q4 var demand (capacitive load)	yyyy,mm,dd,hh,mm,ss
15462	3C65	6	pk Timestamp Q1,Q4 VA (import)	yyyy,mm,dd,hh,mm,ss
15468	3C6B	6	pk Timestamp Q2,Q3 VA (export)	yyyy,mm,dd,hh,mm,ss
15474	3C71	2	Forward 0.1 kWh (import)	32-bit unsigned integer
15476	3C73	2	Reverse 0.1 kWh (export)	32-bit unsigned integer
15478	3C75	2	Q1 0.1 kvarh (inductive/motor load)	32-bit unsigned integer
15480	3C77	2	Q2 0.1 kvarh (inductive generator)	32-bit unsigned integer

Table B.10. System/Aggregate Meter Data. (Cont.)

Start	Start (Hex)	Regs	System Values	Data Type
15482	3C79	2	Q3 0.1 kvarh (capacitive generator)	32-bit unsigned integer
15484	3C7B	2	Q4 0.1 kvarh (capacitive load)	32-bit unsigned integer
15486	3C7D	2	Q1,Q4 0.1 kVAh (import)	32-bit unsigned integer
15488	3C7F	2	Q2,Q3 0.1 kVAh (export)	32-bit unsigned integer

Table B.11. Sub-Meter Data (Organized by Sub-meter/ Tenant Number). (Cont.)

Start	Start (Hex)	Regs.	Each up to 60 meters	Data Type
28000	6D5F	16	Customer/Load Name	ASCII strings (32 characters)
28016	6D6F	1	Card Number.[1-10]	16-bit unsigned integer
28017	6D70	1	Channel Mask [6bits]	16-bit x 60 [bitmapped channels]
28018	6D71	2	kW	IEEE 754 32-bit float
28020	6D73	2	kvar	IEEE 754 32-bit float
28022	6D75	2	kVA	IEEE 754 32-bit float
28024	6D77	2	PF	IEEE 754 32-bit float
28026	6D79	2	W forward demand (import)	IEEE 754 32-bit float
28028	6D7B	2	W reverse demand (export)	IEEE 754 32-bit float
28030	6D7D	2	Q1 var demand (inductive/motor load)	IEEE 754 32-bit float
28032	6D7F	2	Q2 var demand (inductive generator)	IEEE 754 32-bit float
28034	6D81	2	Q3 var demand (capacitive generator)	IEEE 754 32-bit float
28036	6D83	2	Q4 var demand (capacitive load)	IEEE 754 32-bit float
28038	6D85	2	Q1,Q4 VA demand (import)	IEEE 754 32-bit float
28040	6D87	2	Q2,Q3 VA demand (export)	IEEE 754 32-bit float
28042	6D89	2	pk W forward demand (import)	IEEE 754 32-bit float
28044	6D8B	2	pk W reverse demand (export)	IEEE 754 32-bit float
28046	6D8D	2	pk Q1 var demand (inductive/motor load)	IEEE 754 32-bit float
28048	6D8F	2	pk Q2 var demand (inductive generator)	IEEE 754 32-bit float
28050	6D91	2	pk Q3 var demand (capacitive generator)	IEEE 754 32-bit float
28052	6D93	2	pk Q4 var demand (capacitive load)	IEEE 754 32-bit float

Table B.11. Sub-Meter Data (Organized by Sub-meter/ Tenant Number). (Cont.)

Start	Start (Hex)	Regs.	Each up to 60 meters	Data Type
28054	6D95	2	pk Q1,Q4 VA (import)	IEEE 754 32-bit float
28056	6D97	2	pk Q2,Q3 VA (export)	IEEE 754 32-bit float
28058	6D99	6	pk Timestamp W forward demand (import)	yyyy,mm,dd,hh,mm,ss
28064	6D9F	6	pk Timestamp W reverse demand (export)	yyyy,mm,dd,hh,mm,ss
28070	6DA5	6	pk Timestamp Q1 var demand (inductive/motor load)	yyyy,mm,dd,hh,mm,ss
28076	6DAB	6	pk Timestamp Q2 var demand (inductive generator)	yyyy,mm,dd,hh,mm,ss
28082	6DB1	6	pk Timestamp Q3 var demand (capacitive generator)	yyyy,mm,dd,hh,mm,ss
28088	6DB7	6	pk Timestamp Q4 kvar demand (capacitive load)	yyyy,mm,dd,hh,mm,ss
28094	6DBD	6	pk Timestamp Q1,Q4 VA (import)	yyyy,mm,dd,hh,mm,ss
28100	6DC3	6	pk Timestamp Q2,Q3 VA (export)	yyyy,mm,dd,hh,mm,ss
28106	6DC9	2	Forward 0.1 kWh (import)	32-bit unsigned integers
28108	6DCB	2	Reverse 0.1 kWh (export)	32-bit unsigned integers
28110	6DCD	2	Q1 0.1 kvarh (inductive/ motor load)	32-bit unsigned integers
28112	6DCF	2	Q2 0.1 kvarh (inductive generator)	32-bit unsigned integers
28114	6DD1	2	Q3 0.1 kvarh (capacitive generator)	32-bit unsigned integers
28116	6DD3	2	Q4 0.1 kvarh (capacitive load)	32-bit unsigned integers
28118	6DD5	2	Q1,Q4 0.1 kVAh (import)	32-bit unsigned integers
28120	6DD7	2	Q2,Q3 0.1 kVAh (export)	32-bit unsigned integers
28122	6DD9	122	Virtual Meter #2	
28244	6E53	122	Virtual Meter #3	
28366	6ECD	122	Virtual Meter #4	
28488	6F47	122	Virtual Meter #5	
28610	6FC1	122	Virtual Meter #6	
28732	703B	122	Virtual Meter #7	
28854	70B5	122	Virtual Meter #8	
28976	712F	122	Virtual Meter #9	
29098	71A9	122	Virtual Meter #10	
29220	7223	122	Virtual Meter #11	
29342	729D	122	Virtual Meter #12	
29464	7317	122	Virtual Meter #13	

Table B.11. Sub-Meter Data (Organized by Sub-meter/ Tenant Number). (Cont.)

Start	Start (Hex)	Regs.	Each up to 60 meters	Data Type
29586	7391	122	Virtual Meter #14	
29708	740B	122	Virtual Meter #15	
29830	7485	122	Virtual Meter #16	
29952	74FF	122	Virtual Meter #17	
30074	7579	122	Virtual Meter #18	
30196	75F3	122	Virtual Meter #19	
30318	766D	122	Virtual Meter #20	
30440	76E7	122	Virtual Meter #21	
30562	7761	122	Virtual Meter #22	
30684	77DB	122	Virtual Meter #23	
30806	7855	122	Virtual Meter #24	
30928	78CF	122	Virtual Meter #25	
31050	7949	122	Virtual Meter #26	
31172	79C3	122	Virtual Meter #27	
31294	7A3D	122	Virtual Meter #28	
31416	7AB7	122	Virtual Meter #29	
31538	7B31	122	Virtual Meter #30	
31660	7BAB	122	Virtual Meter #31	
31782	7C25	122	Virtual Meter #32	
31904	7C9F	122	Virtual Meter #33	
32026	7D19	122	Virtual Meter #34	
32148	7D93	122	Virtual Meter #35	
32270	7E0D	122	Virtual Meter #36	
32392	7E87	122	Virtual Meter #37	
32514	7F01	122	Virtual Meter #38	
32636	7F7B	122	Virtual Meter #39	
32758	7FF5	122	Virtual Meter #40	
32880	806F	122	Virtual Meter #41	
33002	80E9	122	Virtual Meter #42	
33124	8163	122	Virtual Meter #43	
33246	81DD	122	Virtual Meter #44	
33368	8257	122	Virtual Meter #45	
33490	82D1	122	Virtual Meter #46	
33612	834B	122	Virtual Meter #47	
33734	83C5	122	Virtual Meter #48	
33856	843F	122	Virtual Meter #49	
33978	84B9	122	Virtual Meter #50	
34100	8533	122	Virtual Meter #51	
34222	85AD	122	Virtual Meter #52	
34344	8627	122	Virtual Meter #53	
34466	86A1	122	Virtual Meter #54	

Table B.11. Sub-Meter Data (Organized by Sub-meter/ Tenant Number). (Cont.)

Start	Start (Hex)	Regs.	Each up to 60 meters	Data Type
34588	871B	122	Virtual Meter #55	
34710	8795	122	Virtual Meter #56	
34832	880F	122	Virtual Meter #57	
34954	8889	122	Virtual Meter #58	
35076	8903	122	Virtual Meter #59	
35198	897D	122	Virtual Meter #60	

Table B.12. Sub-Meter Data (Organized to Query by Virtual-meter/Tenant Number).

Start	Start (Hex)	Regs.	Each up to 60 meters	Data Type
35500	8AAB	1	Virtual Meter Selection (1-60) (Write Meter ID here)	16-bit unsigned integer
35501	8AAC	16	Customer/Load Name	ASCII strings (32 characters)
35517	8ABC	1	Card Number.[1-10]	16-bit unsigned integer
35518	8ABD	1	Channel Mask [6bits]	16-bit [bitmapped channels]
35519	8ABE	2	W	IEEE 754 32-bit float
35521	8AC0	2	var	IEEE 754 32-bit float
35523	8AC2	2	VA	IEEE 754 32-bit float
35525	8AC4	2	PF	IEEE 754 32-bit float
35527	8AC6	2	W forward demand (import)	IEEE 754 32-bit float
35529	8AC8	2	W reverse demand (export)	IEEE 754 32-bit float
35531	8ACA	2	Q1 var demand (inductive/ motor load)	IEEE 754 32-bit float
35533	8ACC	2	Q2 var demand (inductive generator)	IEEE 754 32-bit float
35535	8ACE	2	Q3 var demand (capacitive generator)	IEEE 754 32-bit float
35537	8AD0	2	Q4 var demand (capacitive load)	IEEE 754 32-bit float
35539	8AD2	2	Q1,Q4 VA demand (import)	IEEE 754 32-bit float
35541	8AD4	2	Q2,Q3 VA demand (export)	IEEE 754 32-bit float
35543	8AD6	2	pk W forward demand (import)	IEEE 754 32-bit float
35545	8AD8	2	pk W reverse demand (export)	IEEE 754 32-bit float
35547	8ADA	2	pk Q1 var demand (inductive/motor load)	IEEE 754 32-bit float
35549	8ADC	2	pk Q2 var demand (inductive generator)	IEEE 754 32-bit float

Table B.12. Sub-Meter Data (Organized to Query by Virtual-meter/Tenant Number). (Cont.)

Start	Start (Hex)	Regs.	Each up to 60 meters	Data Type
35551	8ADE	2	pk Q3 var demand (capacitive generator)	IEEE 754 32-bit float
35553	8AE0	2	pk Q4 var demand (capacitive load)	IEEE 754 32-bit float
35555	8AE2	2	pk Q1,Q4 VA (import)	IEEE 754 32-bit float
35557	8AE4	2	pk Q2,Q3 VA (export)	IEEE 754 32-bit float
35559	8AE6	6	pk Timestamp W forward demand (import)	yyyy,mm,dd,hh,mm,ss
35565	8AEC	6	pk Timestamp W reverse demand (export)	yyyy,mm,dd,hh,mm,ss
35571	8AF2	6	pk Timestamp Q1 var demand (inductive/motor load)	yyyy,mm,dd,hh,mm,ss
35577	8AF8	6	pk Timestamp Q2 var demand (inductive generator)	yyyy,mm,dd,hh,mm,ss
35583	8AFE	6	pk Timestamp Q3 var demand (capacitive generator)	yyyy,mm,dd,hh,mm,ss
35589	8B04	6	pk Timestamp Q4 var demand (capacitive load)	yyyy,mm,dd,hh,mm,ss
35595	8B0A	6	pk Timestamp Q1,Q4 VA (import)	yyyy,mm,dd,hh,mm,ss
35601	8B10	6	pk Timestamp Q2,Q3 VA (export)	yyyy,mm,dd,hh,mm,ss
35607	8B16	2	Forward 0.1 kWh (import)	32-bit unsigned integers
35609	8B18	2	Reverse 0.1 kWh (export)	32-bit unsigned integers
35611	8B1A	2	Q1 0.1 kvarh (inductive/ motor load)	32-bit unsigned integers
35613	8B1C	2	Q2 0.1 kvarh (inductive generator)	32-bit unsigned integers
35615	8B1E	2	Q3 0.1 kvarh (capacitive generator)	32-bit unsigned integers
35617	8B20	2	Q4 0.1 kvarh (capacitive load)	32-bit unsigned integers
35619	8B22	2	Q1,Q4 0.1 kVAh (import)	32-bit unsigned integers
35621	8B24	2	Q2,Q3 0.1 kVAh (export)	32-bit unsigned integers
35623	8B26	2	V1	IEEE 754 32-bit float
35625	8B28	2	V2	IEEE 754 32-bit float
35627	8B2A	2	V3	IEEE 754 32-bit float
35629	8B2C	2	Freq	IEEE 754 32-bit float

Table B.13. Input Slot Data (Organized by Parameter).

Start	Start (Hex)	Regs.	Each up to 80 Inputs	Data Type
40500	9E33	1280	Input Name	ASCII strings (32 characters) x 80 inputs
41780	A333	80	Card Number.[1-10]	16-bit unsigned integer x 80 inputs
41860	A383	80	Channel Number [1-8]	16-bit x 80 inputs
41940	A3D3	80	Input Rollover Counter	16-bit unsigned integers x 80 inputs
42020	A423	160	Input Counter	32-bit unsigned integers x 80 inputs
42180	A4C3	160	Input Multiplier Setting	IEEE 754 32-bit float x 80 inputs
42340	A563	640	Units	ASCII strings (16 characters) x 80 inputs
42980	A7E3	160	Input Profile	IEEE 754 32-bit float x 80 inputs

Table B.14. Built-In Inputs (Organized by Parameter).

Start	Start (Hex)	Regs.	3 Onboard	Data Type
51500	C92B	48	Input Name	ASCII strings (32 characters) x 3 inputs
51548	C95B	3	Input Function (0-3)	None/PulseInputs/RateAlert/ DemandSync (0-3)
51551	C95E	3	Channel Number [1-3]	16-bit x 4 inputs
51554	C961	3	Input State	16-bit unsigned int. 0=>Opened, 1=>Closed
51557	C964	24	Input State (string)	ASCII strings (16 characters) x 3 inputs
51581	C97C	3	Input Rollover Counter	16-bit unsigned integers x 3 inputs
51584	C97F	6	Input Counter	32-bit unsigned integers x 3 inputs
51590	C985	6	Input Multiplier Setting	IEEE 754 32-bit float x 3 inputs
51596	C98B	24	Units	ASCII strings (16 characters) x 3 inputs
51620	C9A3	6	Input Profile	IEEE 754 32-bit float x 3 inputs

Table B.15. Built-in Inputs (Organized by Input).

Start	Start (Hex)	Regs.	Built-In Inputs	Data Type
51700	C9F3	1	Input Function (0-3)	None/PulseInputs/RateAlert/ DemandSync (0-3)
51701	C9F4	1	Input State	16-bit unsigned int. 0=>Opened, 1=>Closed
51702	C9F5	1	Input Rollover Counter	16-bit unsigned integer
51703	C9F6	2	Input Counter	32-bit unsigned integer
51705	C9F8	2	Input Multiplier	IEEE 754 32-bit float
51707	C9FA	8	Units	ASCII strings (16 characters)
51715	CA02	2	Input Profile	IEEE 754 32-bit float (average value)
51717	CA04	17	Input #2	Built-In Input#2
51734	CA15	17	Input #3	Built-In Input#3

Table B.16. Built-in Output.

Start	Start (Hex)	Regs.	Built-In Output	Data Type
51800	CA57	16	Meter (or Null)	ASCII strings (32 characters)
51816	CA67	1	Output Function (2-3)	16-bit unsigned int. PulseOutput(3),DemandSync(2)
51817	CA68	8	Measurement	ASCII strings (16 characters)
51825	CA70	2	Pulse Constant	IEEE 754 32-bit float (for PulseOutput)
51827	CA72	1	Output State	0=>Opened, 1=>Closed
51828	CA73	2	Output Counter	32-bit integer

Table B.17. Event Push-Down Lists of Most Recent 20 Events.

Start	Start (Hex)	Regs.	Description	Data Type
10010	2719	1	Event Count/Index	Uint16
10020	2723	1	EventID [most recent event]	Uint16
10021	2724	6	EventTime	Date (yyyy,mm,dd,hh,mm,ms)
10027	272A	6	Clear/Reset Time	Date (yyyy,mm,dd,hh,mm,ms)
10033	2730	16	ASCII string (Null terminated)	32 Char
10049	2740	29	2nd Oldest Event	
10078	275D	29	3rd Oldest Event	
10107	277A	29	4th Oldest Event	
10136	2797	29	5th Oldest Event	
10165	27B4	29	6th Oldest Event	
10194	27D1	29	7th Oldest Event	
10223	27EE	29	8th Oldest Event	
10252	280B	29	9th Oldest Event	
10281	2828	29	10th Oldest Event	
10310	2845	29	11th Oldest Event	
10339	2862	29	12th Oldest Event	
10368	287F	29	13th Oldest Event	
10397	289C	29	14th Oldest Event	
10426	28B9	29	15th Oldest Event	
10455	28D6	29	16th Oldest Event	
10484	28F3	29	17th Oldest Event	
10513	2910	29	18th Oldest Event	
10542	292D	29	19th Oldest Event	
10571	294A	29	20th Oldest Event	
10600	2967	1	EventID [Most Recent Event]	Uint16
10601	2968	6	EventTime	Date (yyyy,mm,dd,hh,mm,ms)
10607	296E	6	Clear/Reset Time	Date (yyyy,mm,dd,hh,mm,ms)
10613	2974	1	Cause of Event	Enumeration
10614	2975	2	Value Related to Event Type	IEEE 754 32-bit float or 32-bit integer
10616	2977	16	2nd Event	
10632	2987	16	3rd Event	
10648	2997	16	4th Event	
10664	29A7	16	5th Event	
10680	29B7	16	6th Event	
10696	29C7	16	7th Event	
10712	29D7	16	8th Event	

Table B.17. Event Push-Down Lists of Most Recent 20 Events. (Cont.)

Start	Start (Hex)	Regs.	Description	Data Type
10728	29E7	16	9th Event	
10744	29F7	16	10th Event	
10760	2A07	16	11th Event	
10776	2A17	16	12th Event	
10792	2A27	16	13th Event	
10808	2A37	16	14th Event	
10824	2A47	16	15th Event	
10840	2A57	16	16th Event	
10856	2A67	16	17th Event	
10872	2A77	16	18th Event	
10888	2A87	16	19th Event	
10904	2A97	16	20th Event	

Appendix C Glossary, Acronyms, and Constructs

Glossary and Acronyms

Event Details	A list of events caused by alarms. The PXMP Meter Base (PXMP-MB) generates the Event Details and holds 20. The PXMP Energy Portal Module (PXMP-EPM) keeps a longer copy of the Event Details.
Event Log	A large list of strings that describe every event that has occurred. It is held on the PXMP-MB.
Main Meter	A Sub-meter that is selected to represent the sum of all other Sub-meters. The Main Meter can be disabled if no Sub-meter is selected.
Profile Data	A time-value data set that is generated by and held on the PXMP-MB. The PXMP-EPM reads and keeps a copy.
Pulse Meter	A pulse counter associated with a PXMP Pulse Input Module (PXMP-PIM).
Real-time Data	Values that are updated on the PXMP-MB and polled by the PXMP-EPM to create the Trend Data.
Sub-meter	A group of channels, defined on the PXMP-MB.
System Log	A large list strings that describe any system notifications. It is generated and held by the PXMP-MB.

Energy Portal Web Interface Constructs

Facility Manager (Admin User)	A User of the Energy Portal GUI that has administrative rights to change settings on the PXMP-EPM.
Tenant Group	A group of Sub-meters and Pulse Meters, defined only on the PXMP-EPM.
Tenant User	A user of the Energy Portal GUI that has guest access to the PXMP-EPM. Access only includes one Tenant Group.
Trend Data	A time-value data set that is generated by the PXMP-EPM from the Real-time Data on the PXMP-MB.
Energy Portal Configuration Port	A 10/100 base T, RJ45 Ethernet Local configuration port restricted to address 192.168.1.1 or 10.0.0.1 for direct connection to a notebook computer for configuration purposes and not to be used on a LAN/WAN.
Energy Portal LAN/ WAN Port	A 10/100 base T, RJ45 Ethernet Port for direct connection to a notebook computer for LAN/WAN communication purposes.
Energy Portal Modem Port	An RJ11 connection to land line telephone system.

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