

Home Energy Management - Connection and Configuration Guide, Europe & APAC

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Revision History

- Terminology update:
 - Home Energy Management (instead of Device Control)
 - AC Switch with Metering
- Updated Smart Save definition
- Home Energy Management *cannot* be used where zero export limitation is required

Introduction

Overview

The SolarEdge Smart Energy Management solutions allow increasing the self-consumption of a site. One method used for this purpose is controlling the usage (consumption) of loads using home automation Home Energy Management products.

These products divert power to a load according to pre-configured schedules, using the following modes:

- **Schedule** - The device diverts power to the load during the configured time-slots, using excess PV power or, if none is available, using grid power.
- **Smart Save** - The device (typically a boiler or water pump) is controlled automatically to maximize self-consumption. Grid power is used only if PV power is insufficient to meet the user’s “Ready by” time. For example, to heat water for 2 hours and have hot water by 18:00, set the Duration value to 2 hours and Ready by to 18:00. The boiler may work before 16:00 if there is available PV power, but in any case you are guaranteed to have hot water by 18:00.

Refer to Figure 1 for examples of the device modes of operation.

You can re-configure the schedules at any time and manually switch appliances on and off.

You can configure the Home Energy Management products locally through the SolarEdge inverter or remotely, via the SolarEdge monitoring platform.

The SolarEdge Immersion Heater Controller (referred to as "the device" throughout) is a Home Energy Management product that diverts excess energy produced by the PV system to a load, normally a hot water heater. The Immersion Heater Controller saves energy and reduces utility bills by storing energy as hot water during the day when surplus energy is high, and providing free hot water later on in the day.

Home Energy Management can be used together with the export limitation application, however *cannot* be used where zero export limitation is required. For details on export limitation, refer to http://www.solaredge.com/sites/default/files/feed_in_limitation_application_note.pdf.

This document describes how to connect and configure Home Energy Management products.



NOTE

Home Energy Management requires inverter CPU version 3.21xx and above. If an upgrade is required the latest version can be downloaded [here](#); for upgrade instructions refer to the following application note: http://www.solaredge.com/sites/default/files/upgrading_an_inverter_using_micro_sd_card.pdf.

System Components

A Home Energy Management system includes the following components:

- **Home Energy Management products**, one or several of each:
 - **Immersion Heater Controller** - Automatically divert excess PV power to provide free hot water & highly cost effective energy storage
 - **Plug-In Socket with Metering** - Wireless plug for controlling electrical loads, typically home appliances, pool pumps, etc.
 - **AC Switch with Metering** - Wireless relay for controlling electrical loads, typically home appliances, pool pumps, etc.
 - **Dry Contact Switch** (without metering) - Wireless switch for controlling loads using an external control interface, such as smart grid-ready supported heat pumps
- **Home Energy Management ZigBee Card** - Home Energy Management network manager, installed in the inverter; one card can manage up to 10 Home Energy Management products
- **SolarEdge Modbus Meter and Current Transformers (CTs)** – the meter is used by the inverter for import/export or consumption readings, and manages Home Energy Management network accordingly; the meter readings are displayed in the SolarEdge monitoring portal



NOTE

It is recommended to connect the meter to the inverter which is connected to the monitoring portal.

- **Optional: RS485 Expansion Kit** – the kit is used for multi-inverter systems, and provides an additional RS485 port within the inverter

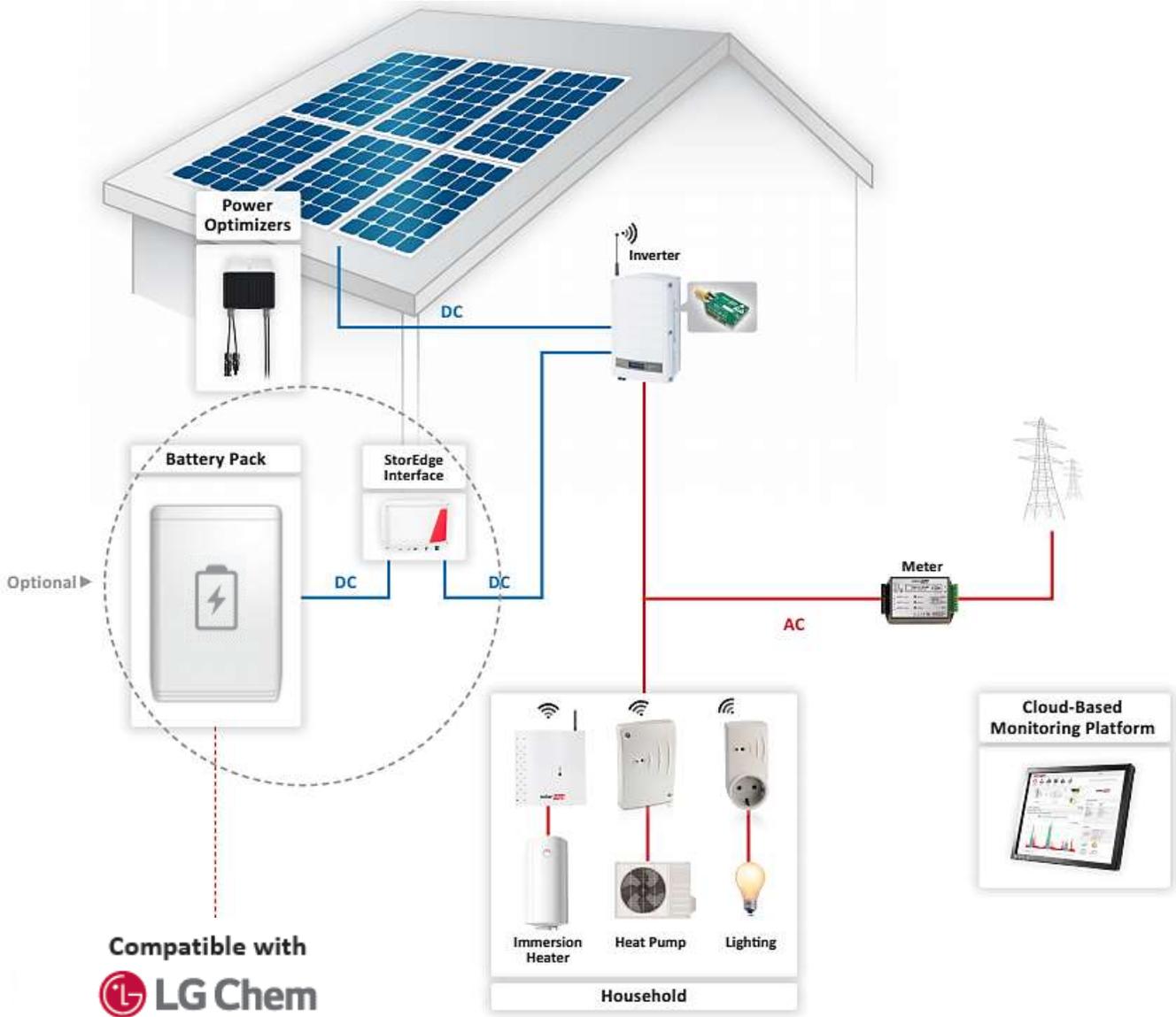


Figure 1: Home Energy Management - system overview

System Configurations

The configuration described in this document are the following:

Configuration	Description	Page
Home Energy Management with StorEdge (without Backup)	Home Energy Management products can be installed in a StorEdge system, further increasing the self-consumption of the site.	4
Home Energy Management with StorEdge (with Backup)		6
Connection to Monitoring Portal, Single Inverter	How to connect a Home Energy Management single inverter system (with or without StorEdge) to the SolarEdge monitoring portal	9
Connection to Monitoring Portal, Multiple Inverters	How to connect a Home Energy Management multiple inverter system (with or without StorEdge) to the SolarEdge monitoring portal	10

Related Documentation

For detailed installation and configuration instructions of the system components, refer to the following installation guides:

- **Immersion Heater Controller:** <http://www.solaredge.com/sites/default/files/se-device-control-immersion-heater-controller-installation-guide.pdf>
- **Plug-In Socket with Metering:** <http://www.solaredge.com/sites/default/files/se-device-control-plugin-socket-installation-guide.pdf>
- **Switch with Metering:** <http://www.solaredge.com/sites/default/files/se-device-control-switch-installation-guide.pdf>
- **Dry Contact Switch:** <http://www.solaredge.com/sites/default/files/se-device-control-dry-contact-switch-installation-guide.pdf>
- **Home Energy Management ZigBee Card:** <http://www.solaredge.com/sites/default/files/se-device-control-zigbee-card-installation-guide.pdf>
- **Modbus Meter:** <http://www.solaredge.us/files/pdfs/solaredge-meter-installation-guide.pdf>
- **RS485 Expansion Kit:** http://www.solaredge.com/files/pdfs/RS485_expansion_kit_installation_guide.pdf

For details on installation and configuration of additional related products and features, refer to:

- **Export Limitation:** http://www.solaredge.com/sites/default/files/feed-in_limitation_application_note.pdf
- **StorEdge Interface Installation Guide:** http://www.solaredge.com/sites/default/files/storedge_interface_installation_guide.pdf
- **StorEdge Inverter Installation Guide:** http://www.solaredge.com/sites/default/files/storedge_backup_installation_guide.pdf
- **StorEdge Solution Applications Connection and Configuration Guide:** http://www.solaredge.com/sites/default/files/storedge_applications_connection_and_configuration_guide.pdf
- **GSM Installation Guide:** http://www.solaredge.com/sites/default/files/cellular_gsm_installation_guide.pdf

System Configuration Options

Home Energy Management with StorEdge (without Backup)

Home Energy Management products can be installed in a StorEdge system, further increasing the self-consumption of the site. In such a case, excess PV power is used first for Home Energy Management and only then for StorEdge (i.e. battery charge).

The Home Energy Management ZigBee Card can be installed in any inverter with an available ZigBee/Wi-Fi connector (i.e. in any inverter where the connector is not used for ZigBee/Wi-Fi communications to the monitoring portal).

► **Configure the System:**

- 1** Configure the StorEdge system as described in the StorEdge guides: http://www.solaredge.com/sites/default/files/storedge_interface_installation_guide.pdf and http://www.solaredge.com/sites/default/files/storedge_applications_connection_and_configuration_guide.pdf
- 2** Configure the Home Energy Management system as described in the product installation guides. Refer to *Related Documentation* above.

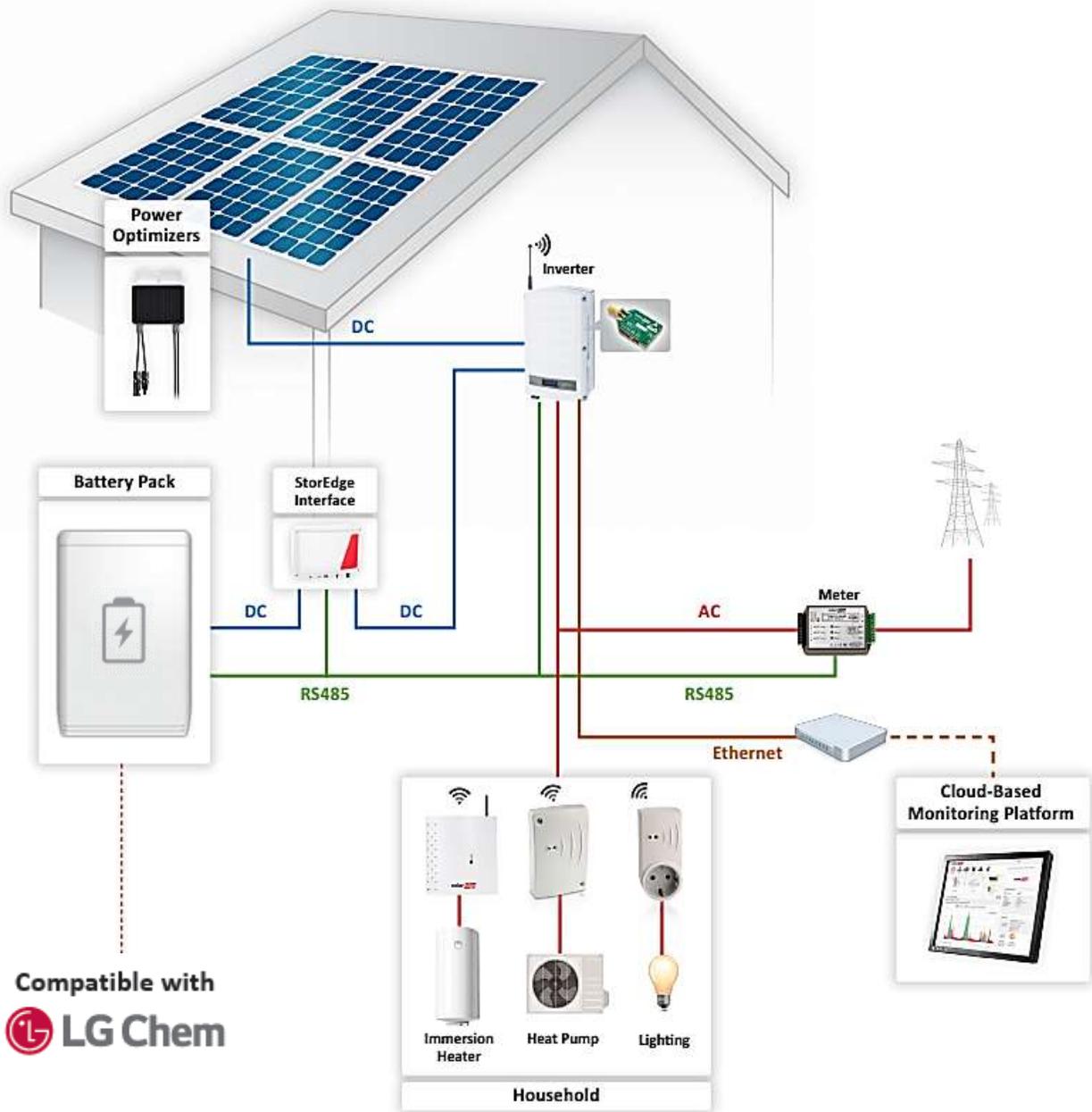


Figure 2: Home Energy Management with StorEdge (without Backup), single inverter

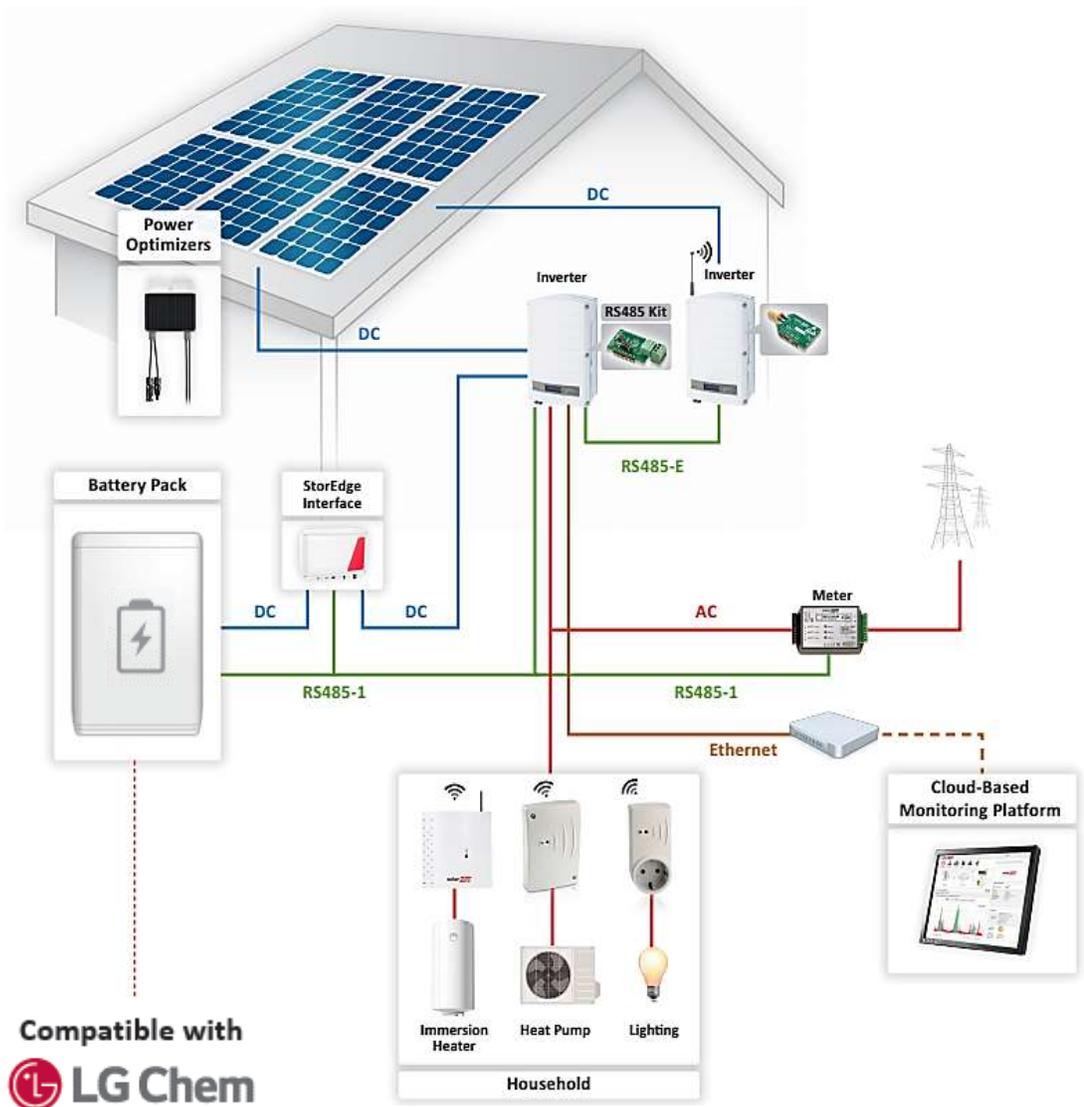


Figure 3: Home Energy Management with StorEdge (without Backup), multiple inverters

Home Energy Management with StorEdge (with Backup)

Home Energy Management products can be installed in a StorEdge system, further increasing the self-consumption of the site. In such a case, excess PV power is used first for Home Energy Management and only then for StorEdge (i.e. battery charge).

The Home Energy Management ZigBee Card can be installed in any inverter with an available ZigBee/Wi-Fi connector.



NOTE

When the system is in backup mode, Home Energy Management is automatically set to mode **Manual** → **OFF**; the mode can be changed as described in the Home Energy Management product installation guides.

► **Configure the System:**

- 1 Configure the StorEdge system as described in the StorEdge Solution with Backup installation guide: http://www.solaredge.com/sites/default/files/storedge_backup_installation_guide.pdf
- 2 Configure the Home Energy Management system as described in the product installation guides. Refer *Related Documentation* on page 4.

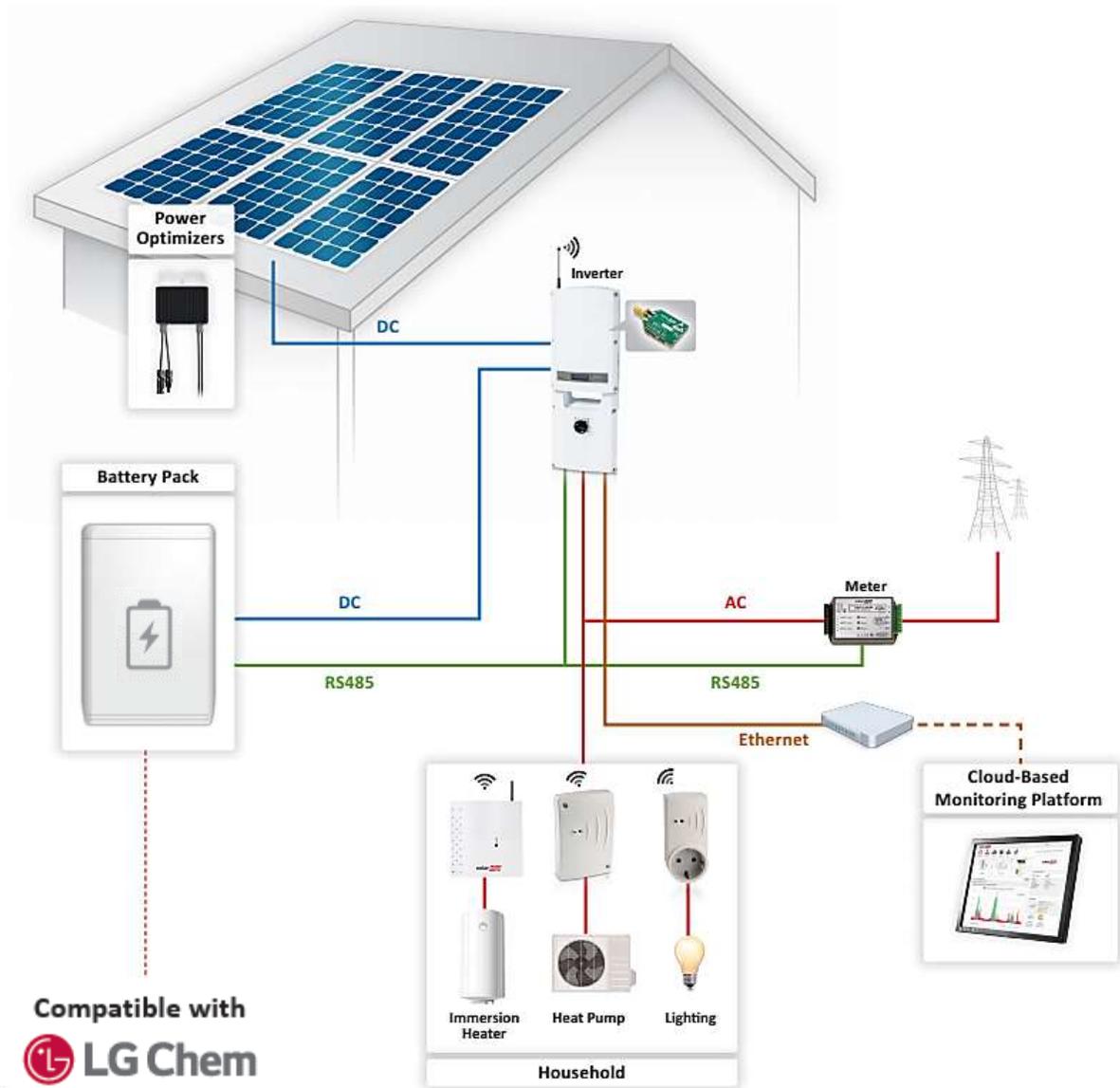


Figure 4: Home Energy Management with StorEdge (with Backup), Single Inverter

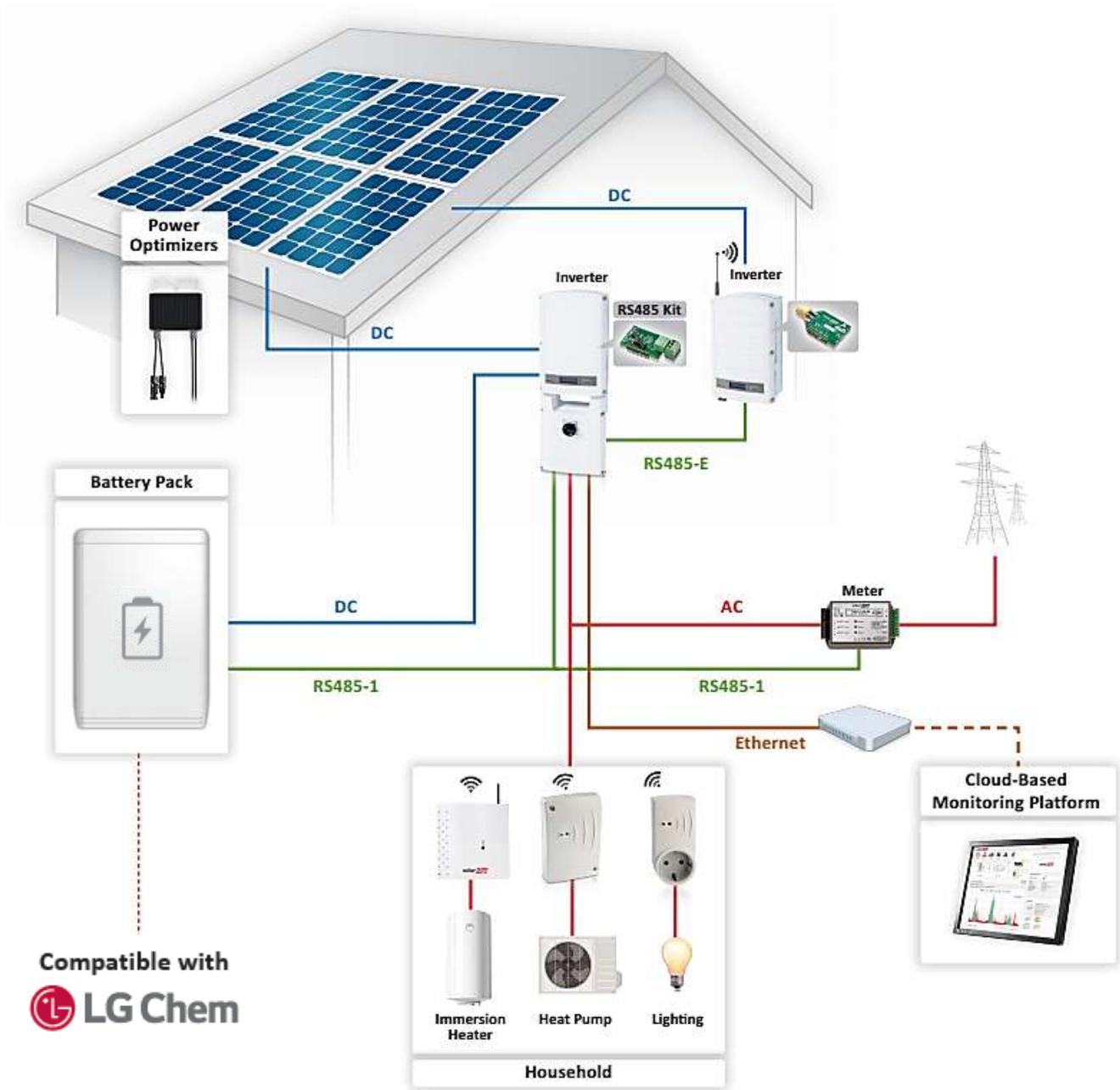


Figure 5: Home Energy Management with StorEdge (with Backup), Multiple Inverters

Connection to Monitoring Portal, Single Inverter

In a single inverter Home Energy Management system the Home Energy Management ZigBee Card occupies the inverter’s ZigBee/Wi-Fi connector. Therefore, the inverter should be connected to the SolarEdge monitoring portal with Ethernet (LAN). No communication configuration is needed – the inverter default communication mode is LAN.

Alternately, the inverter may be connected using the GSM Cellular Modem. This option requires a SIM card with a 1GB data plan that should be purchased from a cellular provider. If using GSM, configure the communications as described in the GSM installation guide: http://www.solaredge.com/sites/default/files/cellular_gsm_installation_guide.pdf.

NOTE
 The Home Energy Management ZigBee Card cannot be used for communication to the monitoring portal.

NOTE
 To use the GSM Cellular Modem install an inverter with a built-in GSM modem or purchase a GSM upgrade kit (for inverters with CPU V3.xxxx and above).

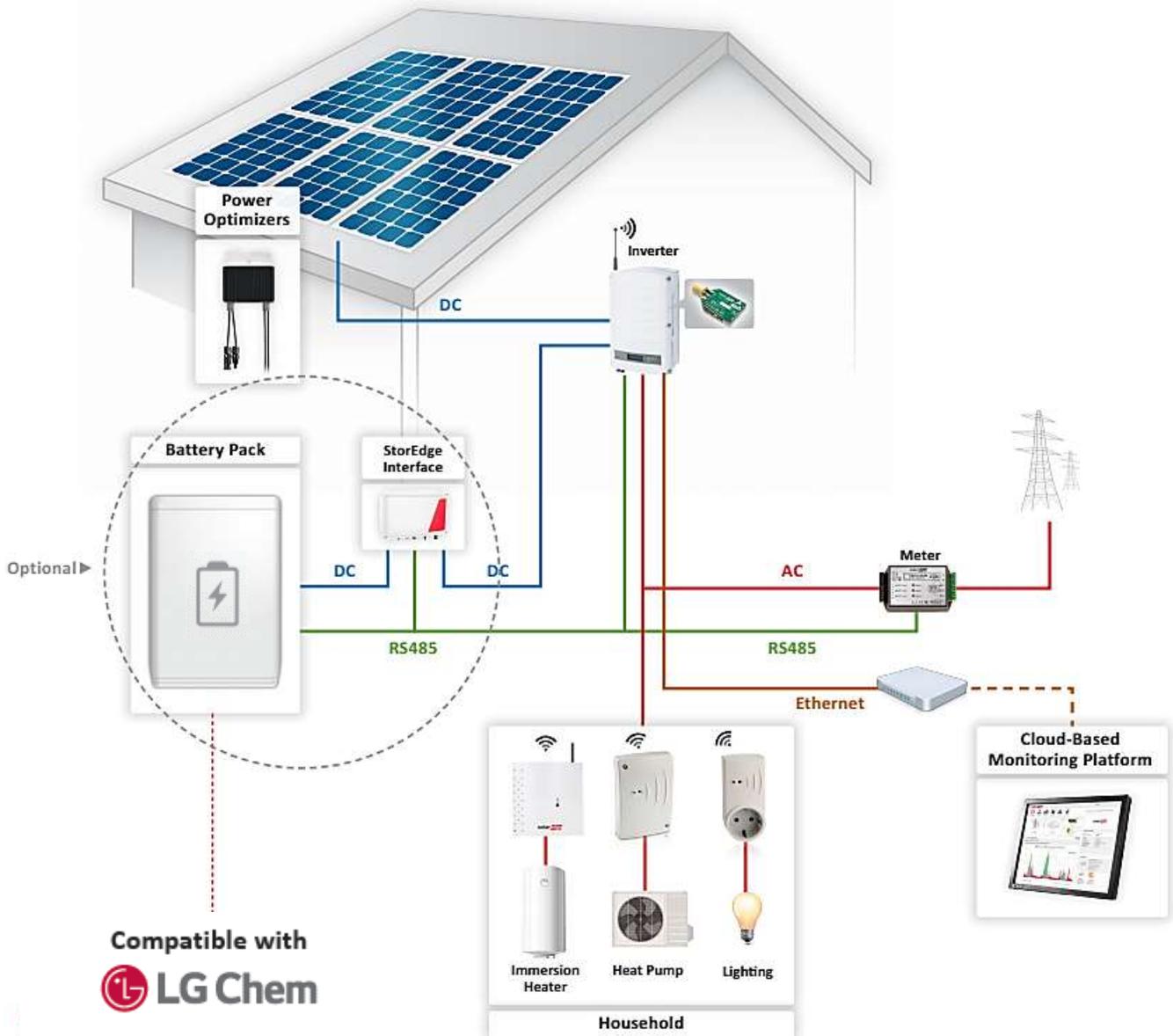


Figure 6: Connection to Monitoring Portal, Single Inverter

Connection to Monitoring Portal, Multiple Inverters

In a multiple inverter Home Energy Management system, the inverters are connected on an RS485 bus. Since the meter (and the battery in a StorEdge system) is connected to one of the inverters' RS485 connectors (RS485-1), an RS485 Expansion Kit is installed in this inverter and is used to connect the inverter RS485 bus (RS485-E).

The Home Energy Management ZigBee Card can be installed in any inverter with an available ZigBee/Wi-Fi connector.

Since the RS485 Expansion Kit occupies one inverter's ZigBee/Wi-Fi connector and the Home Energy Management ZigBee card occupies a second inverter's ZigBee/Wi-Fi connector, the RS485-E master should be connected to the SolarEdge monitoring portal with Ethernet (LAN). No communication configuration is needed – the inverter default communication mode is LAN.

Alternately, the inverter may be connected using the GSM Cellular Modem. This option requires a SIM card with a 1GB data plan that should be purchased from a cellular provider.



NOTE

The Home Energy Management ZigBee Card cannot be used for communication to the monitoring portal.

► System Configuration – Communication to Monitoring Portal:

Configure the inverter RS485 bus and the server communications from the RS485-E master.

1 Configure RS485 communication:

- a. Select **Communication** → RS485-E Conf.
- b. Select **Protocol** → Master
- c. Select **Slave Detect**. Verify that the inverter reports the correct number of slaves (the number of connected devices).

2 Configure communications from the RS485-E master:

- If using Ethernet, no communication configuration is needed – the inverter default communication mode is LAN
- If using GSM, configure the communications as described in the GSM installation guide: http://www.solaredge.com/sites/default/files/cellular_gsm_installation_guide.pdf

► System Configuration – Meter (and Battery):

Configure the meter and optionally the battery from the RS485-1 master.

1 Configure the meter:

- a. Select **Communication** → RS485-1 Conf → **Device Type** → **Multi-devices**. A list of devices is displayed.
- b. Select **Meter 2**. The meter configuration screen is displayed.
- c. Configure the meter:
 - Select **Device Type** → Revenue Meter
 - Set the CT value that appears on the CT label: **CT Rating** → <xxxxA> (use the up/down arrows to set each character, press Enter to set the character and move to the next one, long press on Enter to set the value)
 - Select **Meter Func.** and select the function according to the meter CT(s) location:
 - **Export + Import**: meter CT(s) at grid connection point (as shown in the diagram above)
 - **Consumption**: meter CT(s) at load consumption point

2 In a StorEdge system, configure the battery as described in the relevant StorEdge guide.

► System Configuration – Home Energy Management:

Configure the Home Energy Management system from the inverter with the Home Energy Management ZigBee Card.

1 Configure the Home Energy Management ZigBee Card as described in its installation guide:

<http://www.solaredge.com/sites/default/files/se-device-control-zigbee-card-installation-guide.pdf>

2 Configure Home Energy Management as described in the product installation guides. Refer to *Related Documentation* on page 4.

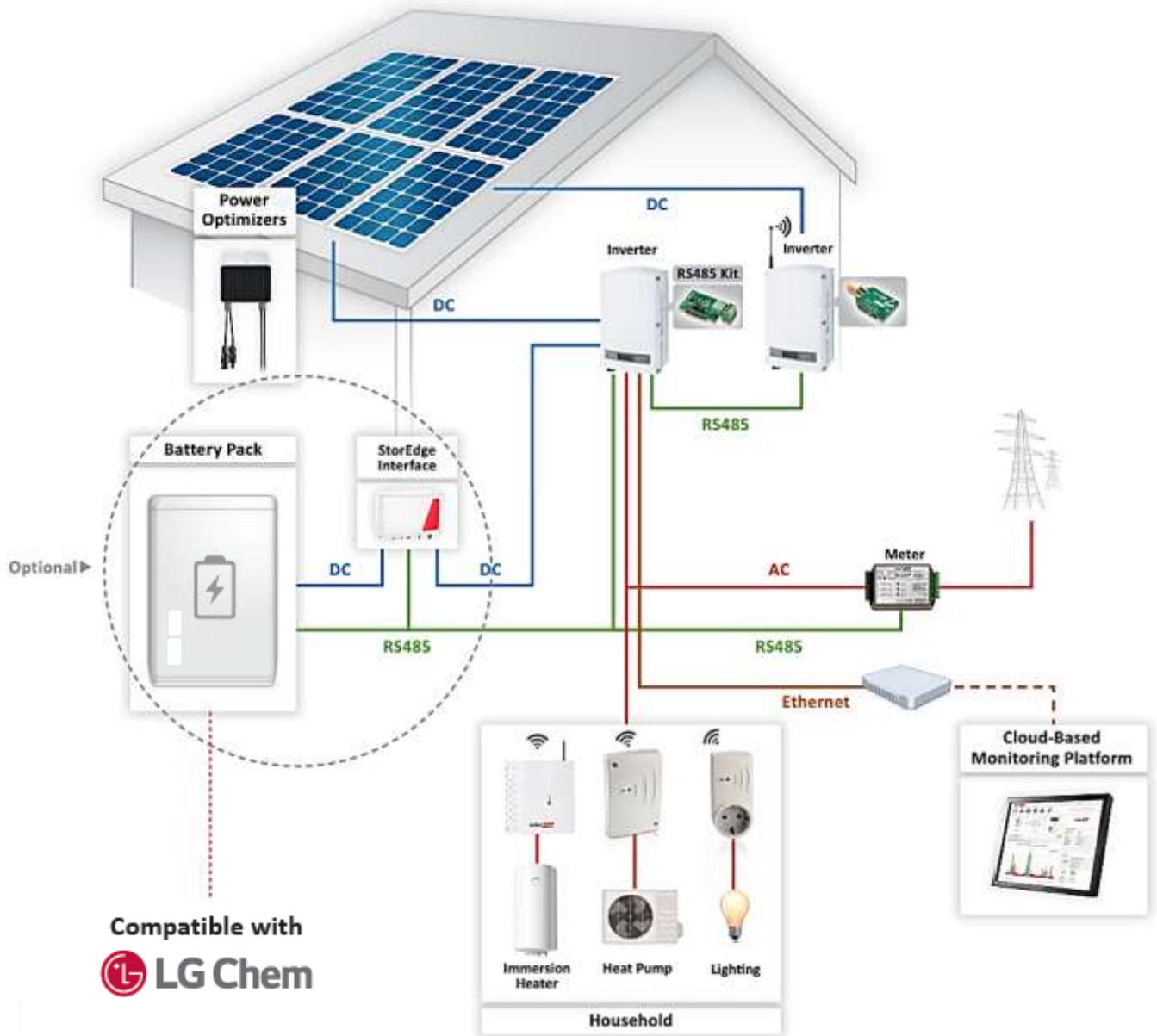


Figure 7: Connection to Monitoring Portal, Multiple Inverters