



# Energy Management Unit

CET-HD-EMU-1



## Product User Manual

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# Safety Notices

1. Please read and follow the warning and instructions contained in this document carefully.
2. This product is approved for indoor use only and must not be used near water.
3. Do not block any ventilation openings on the product enclosure.
4. This product must not be operated outside of the specified Operating Temperature Range.
5. Do not install this product near any heat sources such as radiators, stoves, or other apparatus that produce heat.
6. Only use the supplied power cable with this product.
7. The socket-outlet shall be installed near the equipment and shall be easily accessible.
8. Do not connect this product to a power supply outside of the range specified in the Technical Specifications.
9. Repair and maintenance of this product can be performed by qualified service personnel only. Do not attempt to repair the product if damaged. If the product is damaged or inoperable please contact Combined Energy.
10. This product is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience or knowledge, unless they have been given supervision or instruction concerning use of the product by a person responsible for their safety.
11. This product incorporates a lithium battery for time keeping purposes.  
CAUTION: RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE.  
DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.
12. This product should be unplugged during lightning storms.

# Introduction

The CET-HD-EMU Energy Management Unit (EMU) is a powerful site edge gateway and desktop controller developed in Australia by Combined Energy Technologies Pty Ltd (CET).

The EMU performs multiple functions depending on individual site and project requirements:

## **Home Energy Management System (HEMS) Gateway**

- Acting as a HEMS Gateway, the EMU controls Connected Appliances to make the most of installed solar and preferentially use the cheapest grid energy.
- The HEMS uses weather forecast information and an understanding of the site's retail electricity plan to decide whether to power Connected Appliances from the grid or wait for solar power to become available.
- For a list of supported Connected Appliances that can be integrated with the HEMS, please see <https://www.combined.energy/hems/supported-devices>

## **OCPP (Open Charge Point Protocol) server**

- The EMU can operate as a local OCPP management server for one or many OCPP compliant EV / V2G charging stations.

## **CSIP-AUS Gateway**

- The EMU is a CSIP-AUS Compliant Gateway currently approved by DNSPs for DER control in all states in Australia with mandatory and voluntary CSIP-AUS requirements.
- A single EMU can coordinate any number of compatible solar/battery inverters, EV chargers, and V2G bidirectional chargers at a site to comply with dynamic import/export limits.
- To check compatibility of a specific device with the EMU for CSIP-AUS compliance, please see <https://www.combined.energy/csip-aus/compatibility>

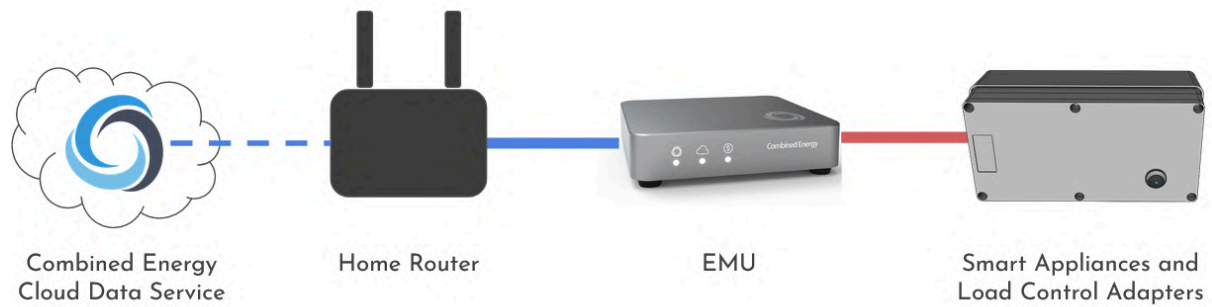
## **Grid Services and FCAS**

- In conjunction with the Combined Energy CET-HD-PM2-1 Power Meter, the EMU enables aggregated participation of site devices in Frequency Controlled Ancillary Services (FCAS) for grid security.

## **Combined Energy *inCharge* Gateway**

- The EMU powers Combined Energy's *inCharge* platform, coordinating EV chargers in apartment buildings and commercial carparks to stay within the limits of the existing site electrical system. This system helps owners avoid expensive upgrades when adding EV charging infrastructure to their building.
- Combined Energy *inCharge* prevents power theft by providing authenticated access to charging, with tools for collecting payments for EV charging on common-area power.

The EMU communicates with smart appliances and control devices within the home via Power Line Communications (PLC) using the existing building wiring.



The EMU connects to the Internet to download weather and tariff data via either the home network or a dedicated cellular connection. Direct connection to the local network is made by connecting an Ethernet cable to the home router, or by joining to the home Wi-Fi via an optional Wi-Fi USB dongle. The USB expansion port also supports a range of commodity USB cellular modems for standalone operation.

Historical energy consumption and cost data collected by the EMU from smart appliances and load control adapters in the home can be viewed on the Combined Energy *atHome* website.

Site commissioning and configuration is performed using the Combined Energy *onSite* Installer web app.

# Technical Specifications

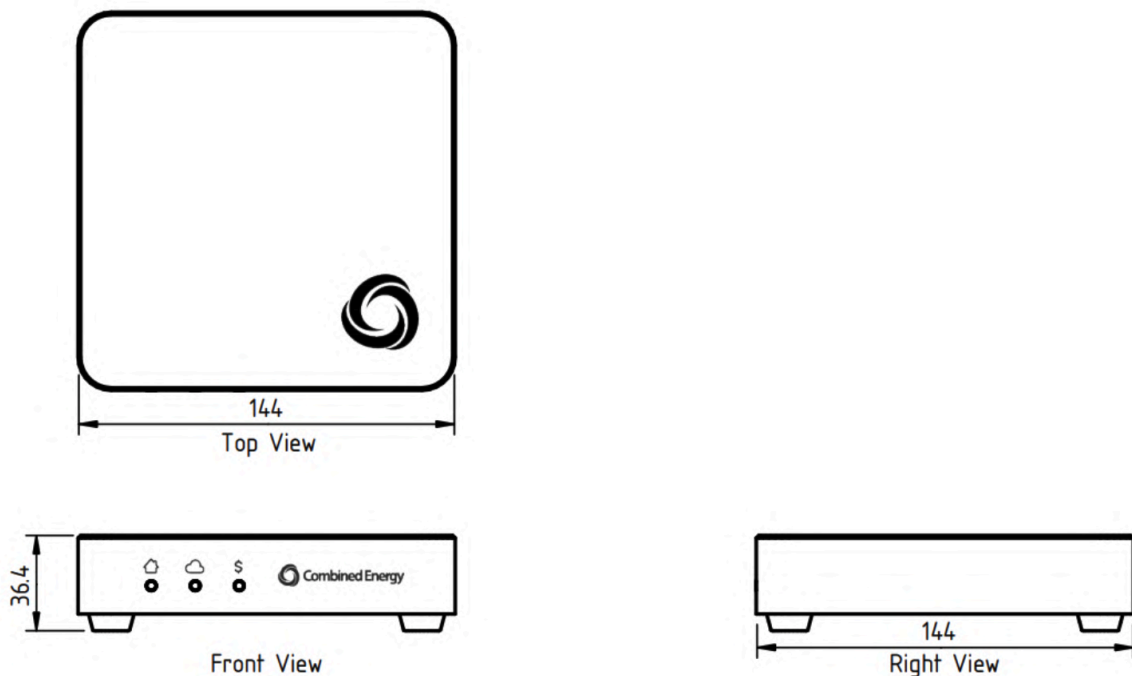
**Type:** Energy Management Unit

**Model:** CET-HD-EMU-1

**Power Supply:** 100 - 240VAC 1W + N + E 50/60Hz 80-30mA

**Average power consumption:** <8W

**Dimensions:** 144 x 144 x 36.4mm



**Mass:** 0.47kg

**Operating Temperature Range:** 0C to +40C

**Standards:**

- IEC 60950-1, AS/NZS 60950-1 - Information Technology Directive
- EN 50561-1 - Electromagnetic Compatibility for PLC products
- IEEE 2030.5 CSIP-AUS - Compliant Gateway

# Product Features

## **Core Compute:**

- NXP i.MX6 UltraLite (Cortex™-A7)
- 512MB Flash
- 512MB RAM

## **Communications Interfaces:**

- 1 x Power-Line Communications (PLC) modem
- 1 x USB 2.0 port (Wi-Fi and cellular expansion options)
- 1 x Wired Ethernet (10/100 Base-T)

## **Human Interfaces:**

- Tactile switch for manual network reset and diagnostics view
- Three LEDs for network status and price signal indications

## **Included Accessories:**

- 1.2m Power Cable
- 1.2m Ethernet Cable

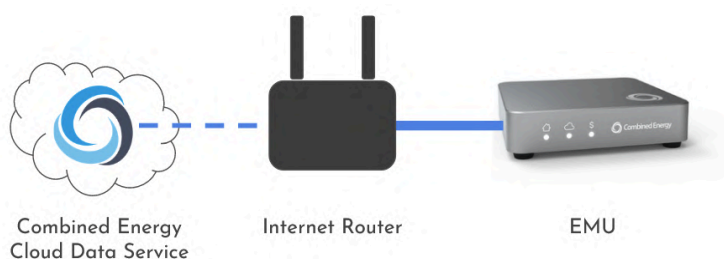
# Setup Guide

## Requirements

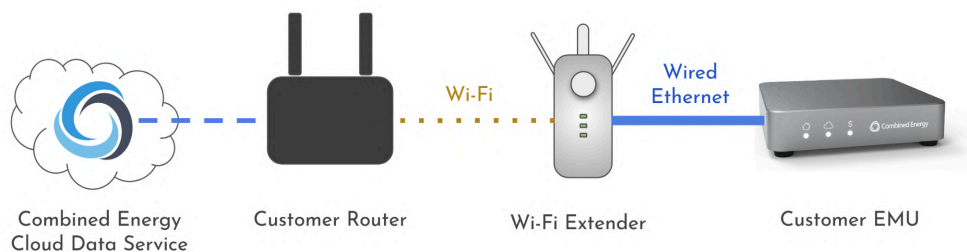
Before setting up your EMU, please consider the following system requirements:

1. **The EMU requires a reliable connection to the Internet to function properly.** Internet connectivity can be provided to the EMU through one of the following methods:

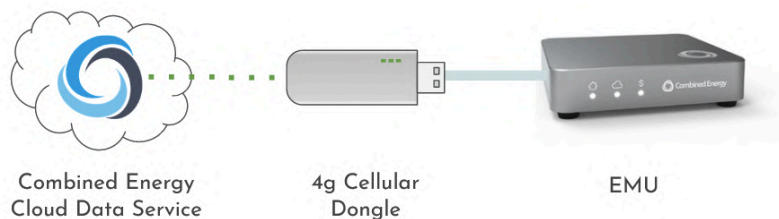
- **OPTION 1:** Direct Ethernet connection to your home Internet router (using the included blue Ethernet cable)



- **OPTION 2:** Ethernet connection to a third-party Wi-Fi extender (extender joined to home Wi-Fi network)



- **OPTION 3:** By connecting directly to a cellular data service (note: an additional cellular USB modem and data plan are required for this option)

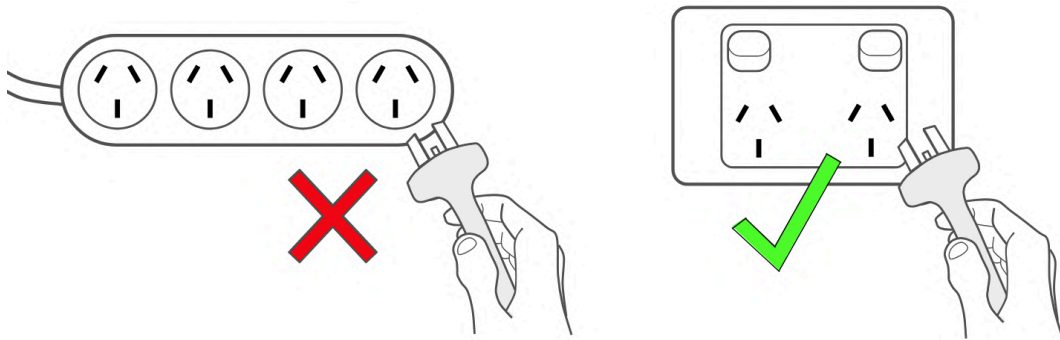


2. **You must have a user account set up with Combined Energy to use the EMU.** This account should have been created for you by the company that is installing your energy management system. Your account login will be either your email address or mobile phone number.



## Installation

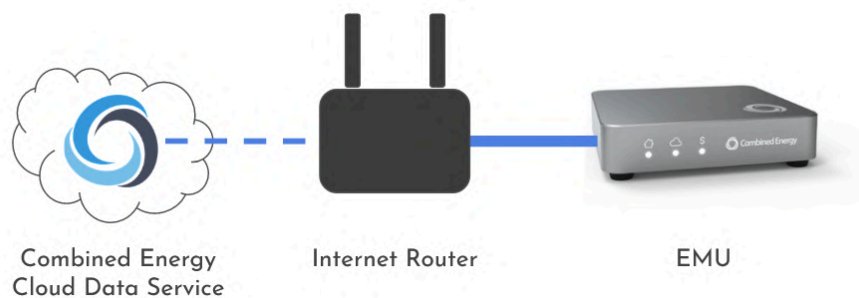
1. Find a suitable location for your EMU. If you are using the **Ethernet** connection option, the ideal location for the EMU is close to the Internet Router and nearby to a spare wall power outlet.
2. **Plug the EMU power cable directly into a wall outlet** if possible, rather than into a power board.



The socket-outlet shall be installed near the equipment and shall be easily accessible.

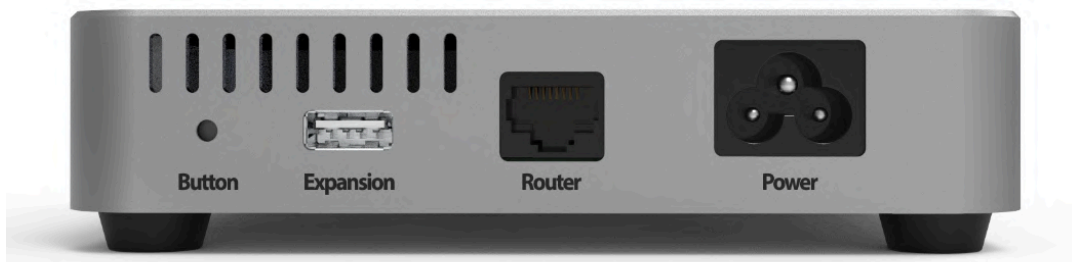
3. Follow the appropriate connection setup guide below depending on your chosen connection method:

### Connection Option 1: Wired Ethernet



Use an Ethernet cable to connect the EMU to the Internet router.

On the EMU end, plug the cable into the port marked **Router**:



At the router, the Ethernet cable should be plugged into one of the numbered **LAN** ports:

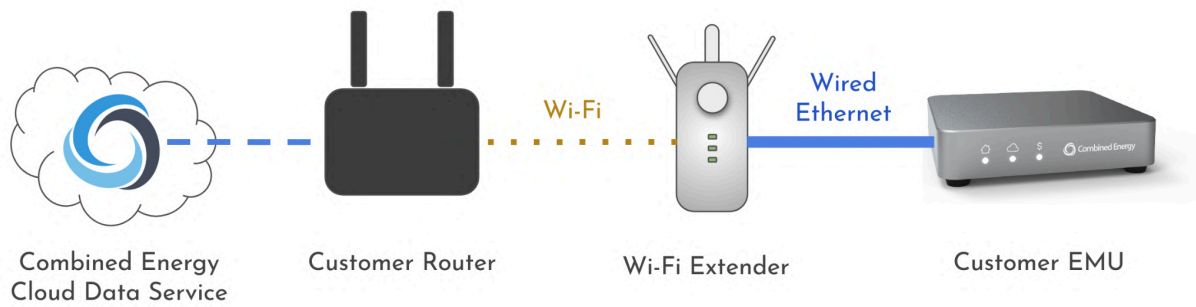


If your router does not have an Ethernet port:

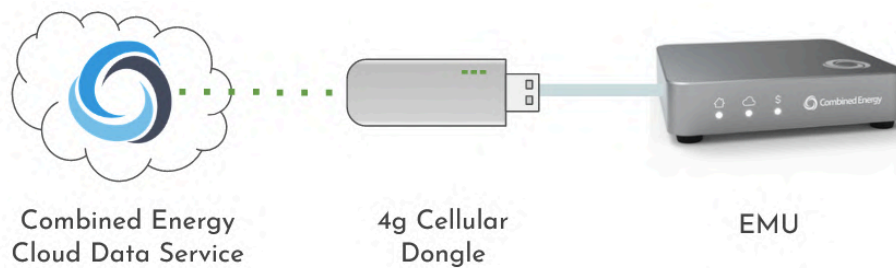
- Confirm that the unit is an Internet router and not another device like an NBN box.
- Check if you have any other devices that use Ethernet in your home (e.g. laptops, PCs), as sometimes it may not be obvious which device is the router (rather than a modem, for example).
- Use one of the alternative connection methods.

## Connection Option 2: Wi-Fi

An additional Wi-Fi extender with an Ethernet port is required for this connection option. First join the Wi-Fi extender to your home network, following the installation instructions included with the Wi-Fi extender. Connect the EMU Ethernet cable to the Wi-Fi extender to provide an Internet connection to the EMU.

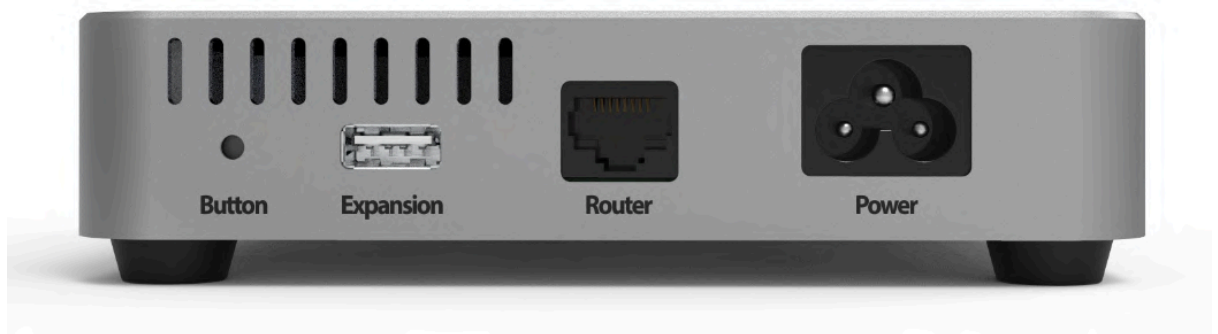



### Connection Option 3: Cellular



A compatible USB cellular modem is required for this connection option. Please contact Combined Energy for information on supported USB cellular modems.

1. Ensure the USB cellular modem has a SIM inserted with an active data service.
2. Plug the USB cellular modem into the **Expansion** port on the back of the EMU:



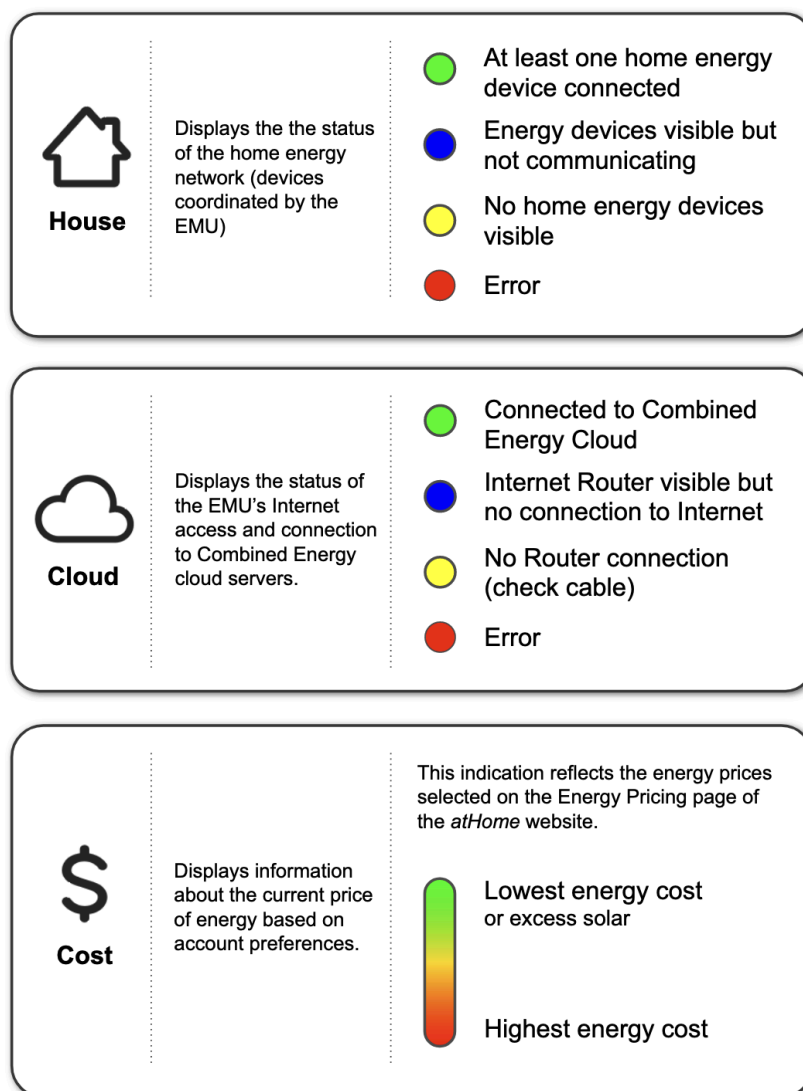
3. The **Cloud**  indicator on the front panel will change to green when the EMU is connected to the Combined Energy cloud service.

For more information on the UI light indications, please see the *User Interface* section of this manual.

# User Interface

## Standard Light Indications

The three lights on the front face of the EMU display important information about the status of the system:



## Button

In some cases it may be necessary to manually reset the Powerline Communications (PLC) network. This can be done by pressing and holding the tactile push button on the back panel of the EMU for at least 20 seconds and releasing the button when the lights turn RED.