



Introduction for Dealers and Installers

For EMU Installations

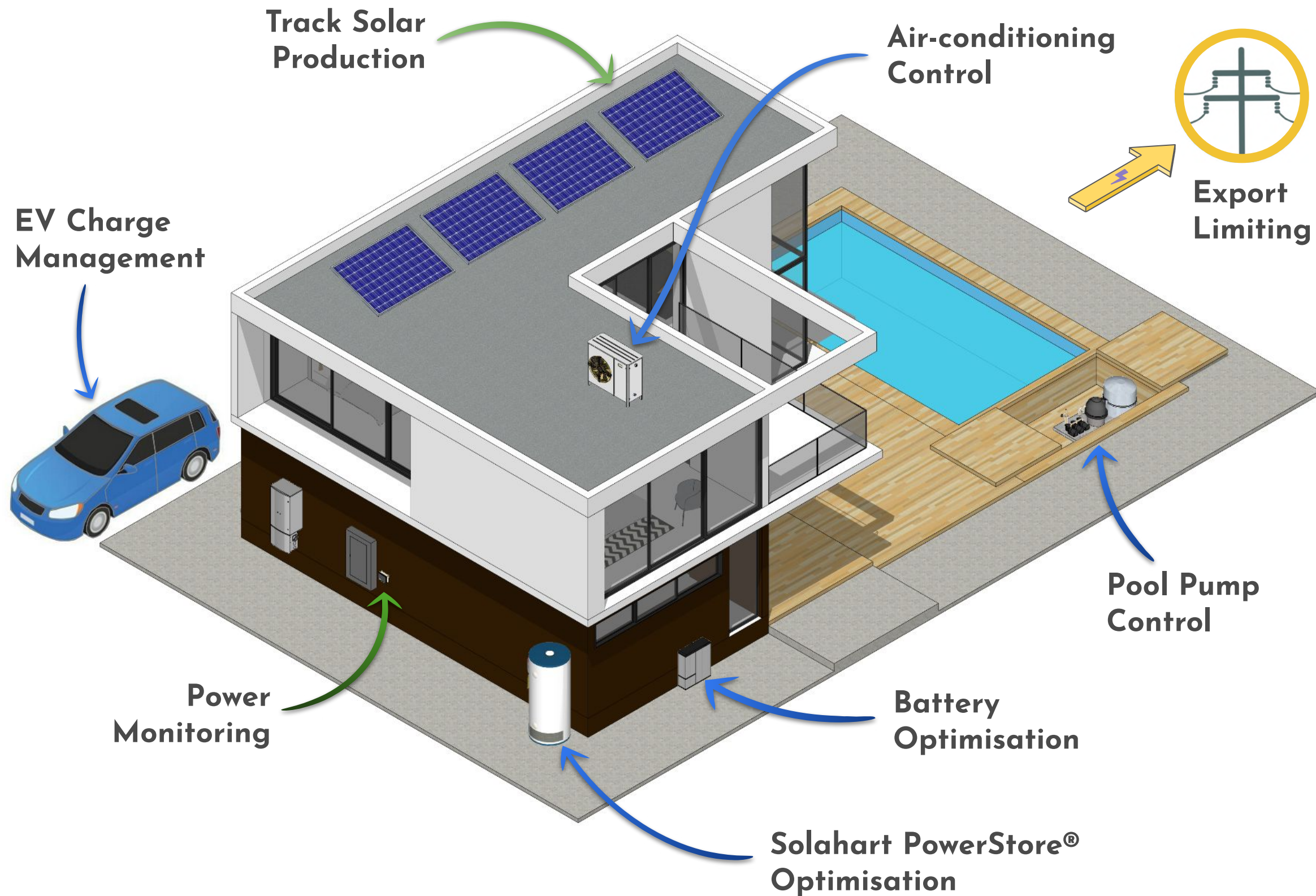
Combined Energy Introduction

Contents

- **What it does**
 - Overview
 - System Overview Video
 - Intelligent Tank Control Video (PowerStore)
 - Export limiting
 - Grid Services
- **How it works**
 - EMU Overview
 - Power Meter Overview
 - Powerline Communications
 - Inverter Communications
 - Supported brands
 - Load Control Adapters
 - Retrofit Tank Adapter
 - IR Air-Conditioning Adapter
 - HEMS and batteries
- **CET Apps and Services**
 - *onWatch* Portal
 - Overview
 - Resources
 - Adding Staff and Installers
 - Adding Customers / Installations
 - *atHome*
 - Live View
 - Analysis
 - Charts
- **Installations**
 - Site Requirements
 - EMU Installation
 - Power Meter Installation
 - CTs + CT Harness
- **Support**
 - *onWatch* and *atHome* queries
 - When to contact CET Support
 - Installer support through *onSite*
- **Products and Part Numbers**
- **Questionnaire**

What it does

Summary



The purpose of the Combined Energy system is to **minimise the total cost of energy** for the customer by:

- Maximising solar self-consumption
- Using the cheapest grid energy possible
- Understanding energy usage patterns in the home
- Managing solar export limits intelligently

The system monitors power consumption in the home in real-time and makes regular adjustments to the setpoint of each connected appliance to match the solar production as closely as possible during the day, and to shift loads into low-price tariff periods.

What it does

System Overview video

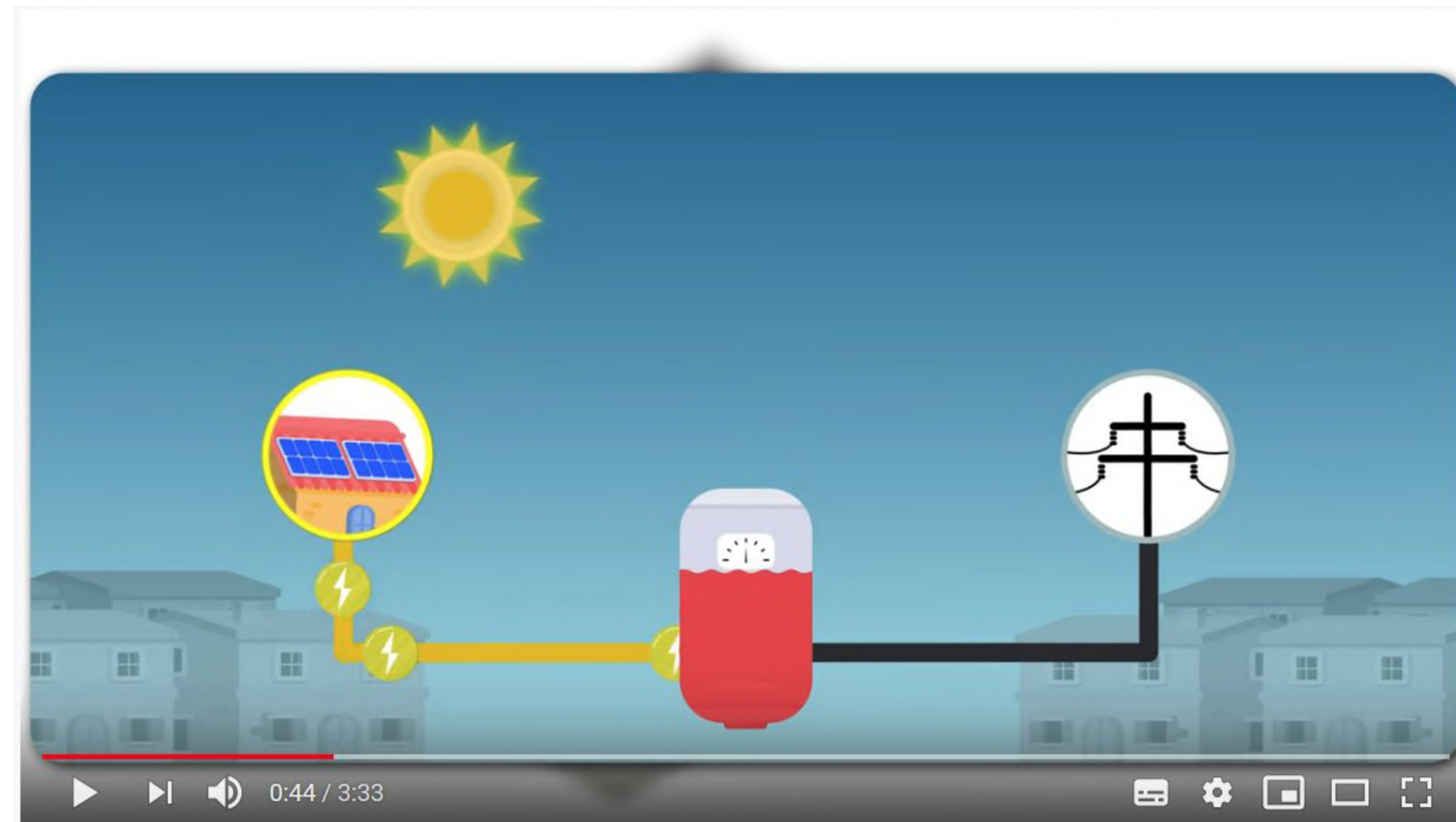


Video: ***Welcome to Combined Energy***

- Introduction to concepts of energy management and solar self-consumption
 - System controls load to match available solar
 - System uses weather information to predict solar availability
 - System learns use patterns in home to predict energy consumption
- Briefly discusses high-level install concepts:
 - Energy Management Unit (EMU) coordinates connected appliances
 - System uses in-home wiring to communicate
- Shows overview of customer portal / web interface:
 - Energy supply and cost statistics
 - Charts of energy usage, with separate contribution from solar shown
- Video available at <https://youtu.be/FjRM232brEI>

What it does

PowerStore video

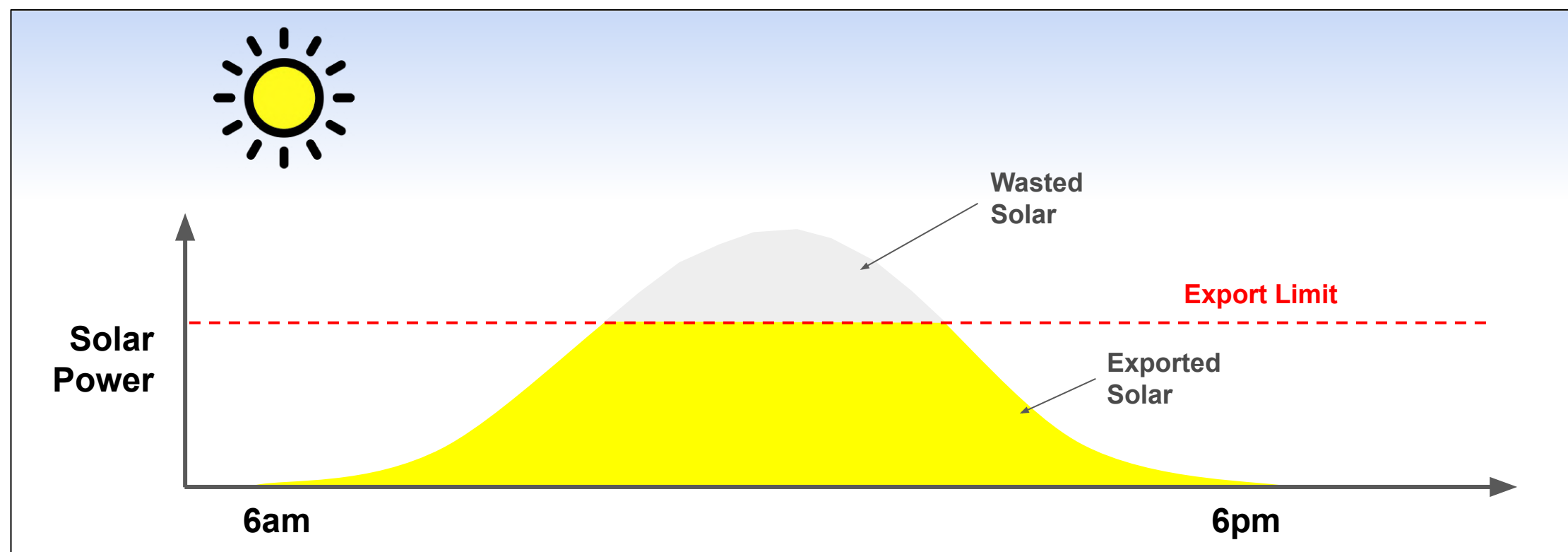


Video: ***Combined Energy Intelligent Tank Control***

- Describes the role of the Combined Energy system in maximising the value of installing a PowerStore water heater through intelligent control
- Video available at <https://youtu.be/kXG9P24xIMI>

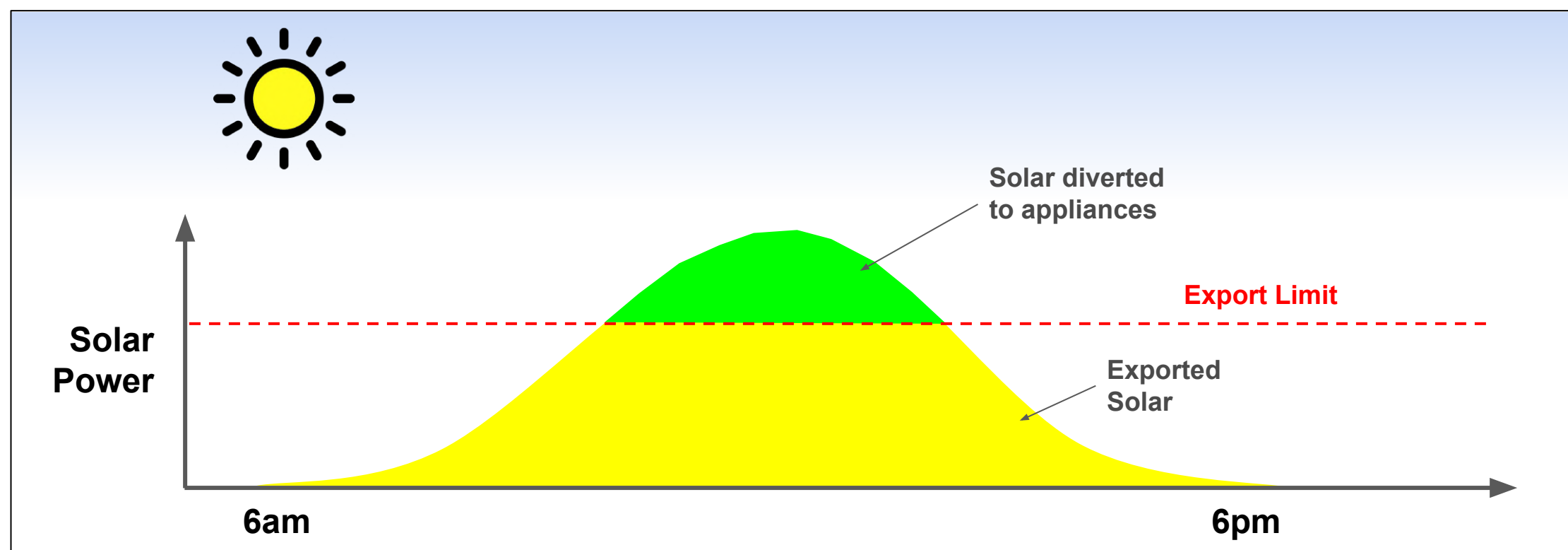
What it does

Intelligent Export Limiting



Standard Export Limiting reduces solar production to stay under the export limit:

Total solar production: **16kWh**
Wasted solar production: **4kWh**

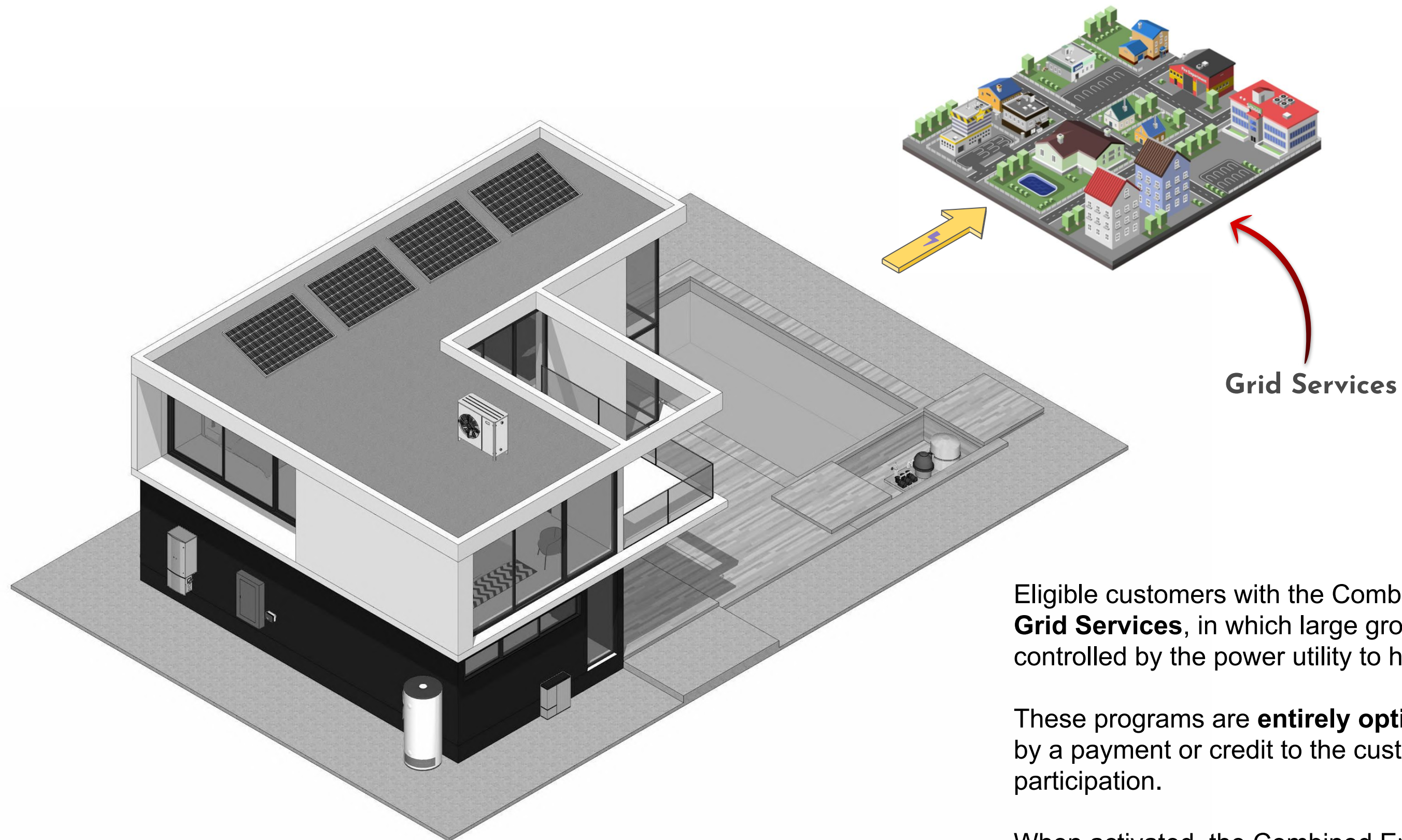


Intelligent Export Limiting diverts power to household appliances in order to stay below the export limit, meaning solar production is not curtailed:

Total solar production: **20kWh**
Solar diverted to appliances: **4kWh**

What it does

Grid Services



Eligible customers with the Combined Energy system can opt-in to **Grid Services**, in which large groups of customer loads are controlled by the power utility to help manage the grid.

These programs are **entirely optional** and are often accompanied by a payment or credit to the customer in exchange for participation.

When activated, the Combined Energy system manages the amenity of storage loads in the home to ensure no disruption to the customer when participating in grid services.

Grid services are currently being trialled in a number of states, including as part of the SA Smart Network program.

Question 1: Which of the following does the Combined Energy System do to minimise the total cost of energy for the customer

1. Maximise solar self-consumption
2. Control the dimming level of lights in the home
3. Use the cheapest grid energy possible
4. Help homeowners understand the energy usage patterns in the home
5. Managing solar export limits intelligently

Correct answers are 1, 3, 4, 5

Question 2: Which of the following data sources are used by the Home Energy Management System to optimise appliances?

1. Pricing data from the customer's energy retailer
2. Weather forecast data
3. Data from financial markets
4. Historical household energy usage patterns

Correct answers are 1, 2, 4

Question 3: How does a Home Energy Management System intelligently add value to PowerStore for the customer?

1. By reducing the flow rate of water from the PowerStore
2. By pre-charging the water heater with cheaper grid energy if the next day's weather will be bad and there will not be enough excess solar
3. By sending the customer an alert to tell them not to have a shower

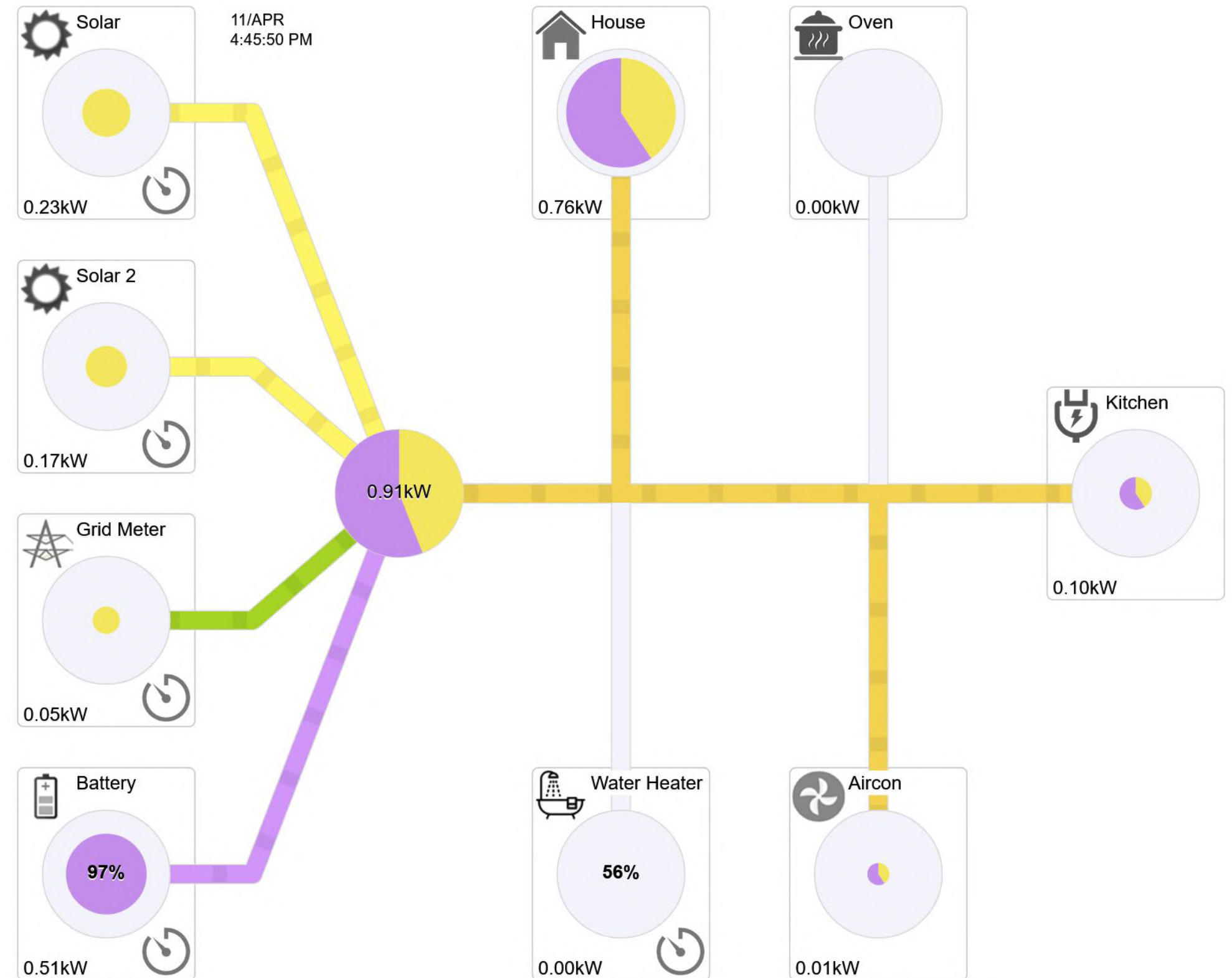
Correct answer is 2

How it works

Energy Management Unit (EMU)



- The brains of the Home Energy Management System (HEMS)
- Connects to customer's Internet router
- Communicates with Power Meters, Connected Appliances (e.g. PowerStore), and Inverters
- Analyses home energy data to detect usage patterns
- Receives weather forecast and energy price information from the cloud
- Coordinates major appliances to make best use of Solar, and to use the cheapest grid energy possible

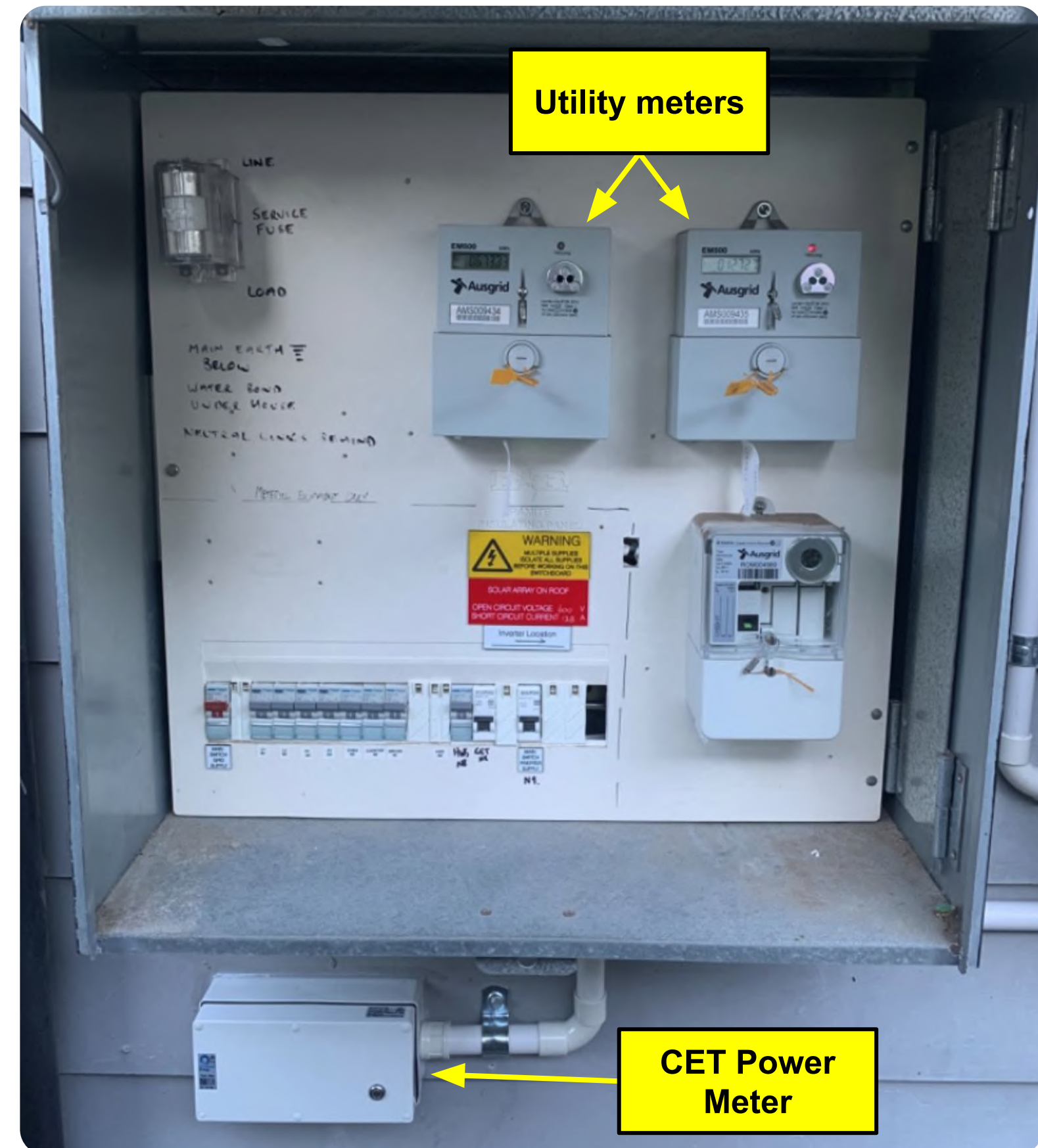


How it works

Power Meter (PM2)

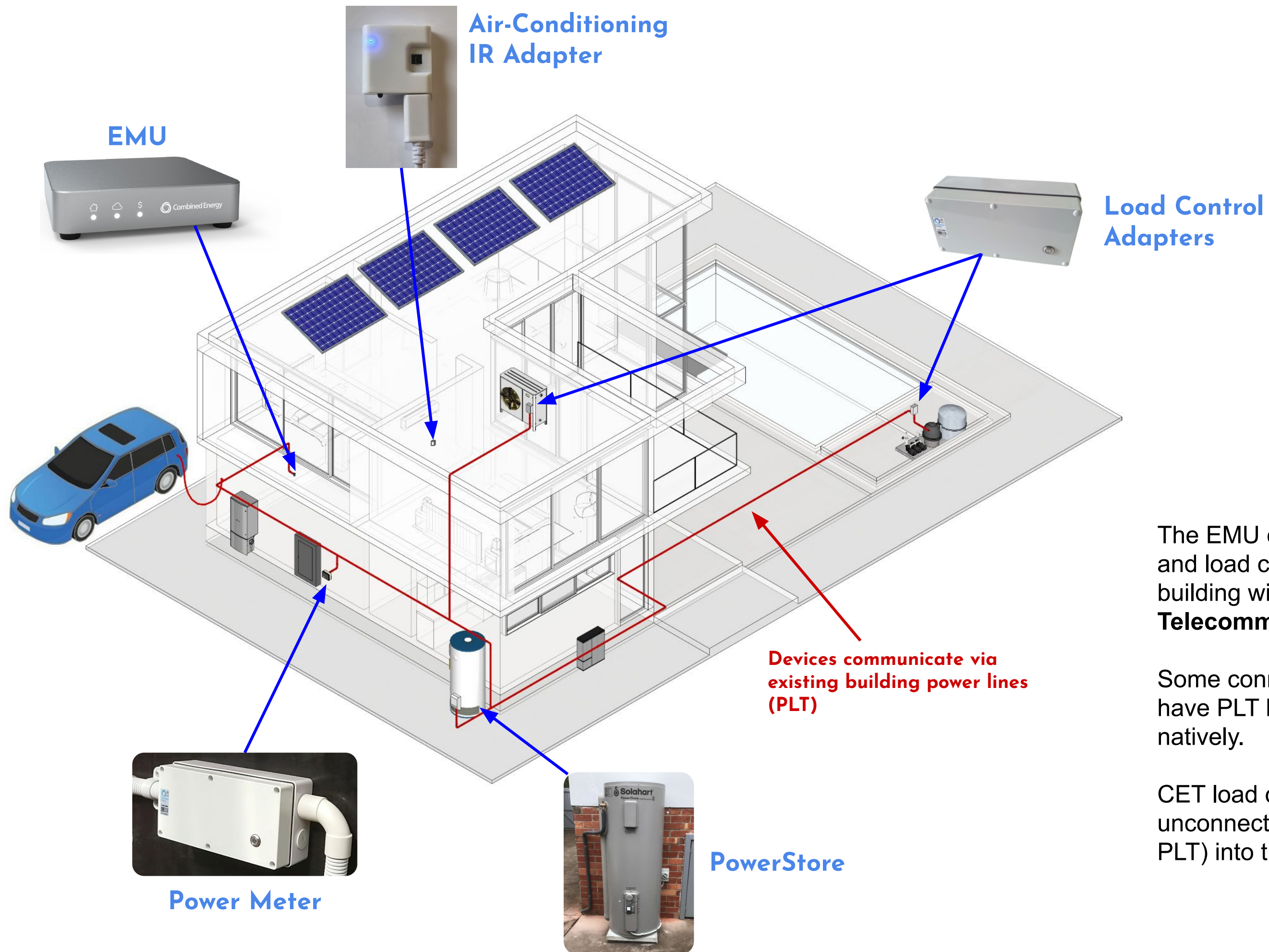


- Installed in or near the electrical switchboard
- Grid supply monitoring
 - Single-phase, 2-phase, 3-phase
- Solar Monitoring
 - Total production
 - Excess solar (export from site)
- Optional monitoring of unconnected appliances
 - Visibility of appliance energy costs
 - Useful for identifying system improvements (e.g. add more solar, add PowerStore)
- Connects to Inverters via data connection
 - Ethernet / RS485
 - Export limiting control
 - Battery control



How it works

Powerline Communications



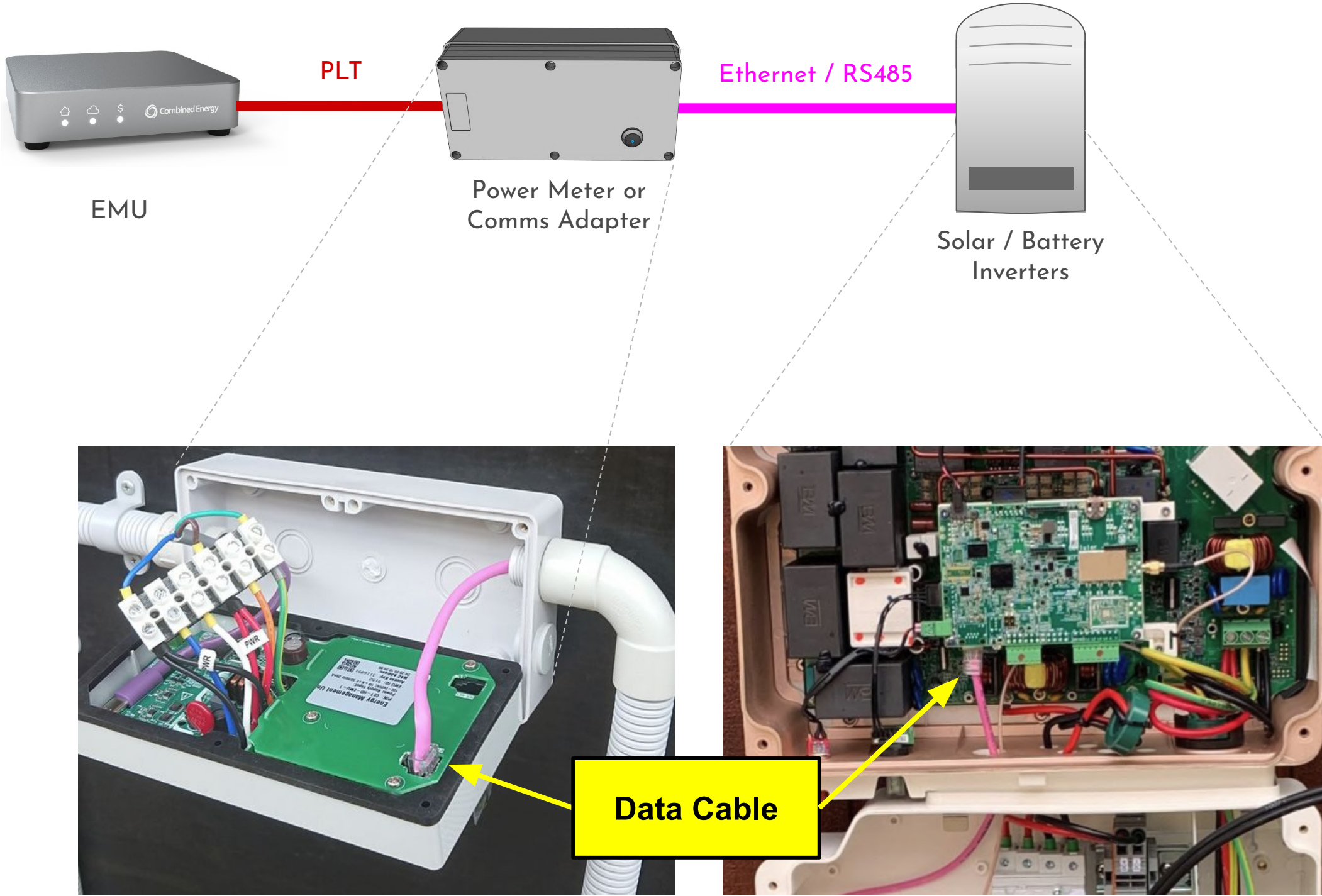
The EMU communicates with connected appliances and load control adapters using the existing building wiring via **Powerline Telecommunications (PLT)**.

Some connected appliances (e.g. PowerStore) have PLT built in, and communicate with the EMU natively.

CET load control adapters are used to integrate unconnected appliances (i.e. appliances without PLT) into the Home Energy Management System.

How it works

Inverter Communications



Solar and Battery Inverters are connected to the system by installing a data cable from a CET Power Meter or Comms Adapter to the Inverter's data port.

A data connection is required for the HEMS to access export control functionality on Inverters.

The two most common data connection types are supported: Ethernet and RS485

Many major Inverter brands supported with more added regularly:



How it works

HEMS and Batteries

Batteries **must** be integrated into HEMS for the HEMS to be able to function.

There are two ways that batteries can be integrated into the system:

- Option 1: Via a data connection that enables monitoring and control of the battery
 - **Strongly recommended**
 - Supported by most battery brands
 - HEMS can ensure that the solar resource is shared between the battery and other appliances
 - HEMS can ensure that the battery does not discharge to heat the PowerStore

- Option 2: Battery monitored by CT, HEMS yields to battery system
 - e.g. Tesla (no local control capability)
 - HEMS can not coordinate simultaneous charge of battery and connected appliances with solar
 - The HEMS has to wait until the battery is fully charged, and only then charge other appliances
 - Can work OK if there is a lot of solar PV installed

Easier to maximise the customer's financial and energy benefits with Option 1.

Question 1: Which of the following does the EMU do to manage energy at a home? Tick all that apply.

1. Analyse home energy data to detect usage patterns
2. Receive weather forecast and energy price information from the cloud
3. Coordinate major appliances to make best use of Solar, and to use the cheapest grid energy possible

Correct answers are 1, 2, 3

Question 2: True or false: A Power Meter is required at every site

Answer: True

Question 3: When would more than one Power Meter be required at a site? Tick all that apply.

1. If there are multiple switchboards at a site where CT monitoring is required
2. If the customer would like monitoring for more than 6 circuits at a switchboard

Correct answers are 1, 2

Question 4: How does the EMU track solar production at the site?

1. Via a data connection (Ethernet or RS485) between the Inverter and Power Meter
2. Using CTs if the addition of a data connection is not possible

Correct answers are 1, 2

Question 5: True or false: Does the EMU communicate with connected appliances using the existing home power lines via Powerline Telecommunications (PLT)?

Answer: True

Question 6: What is the preferred method for integrating batteries into the Home Energy Management System?

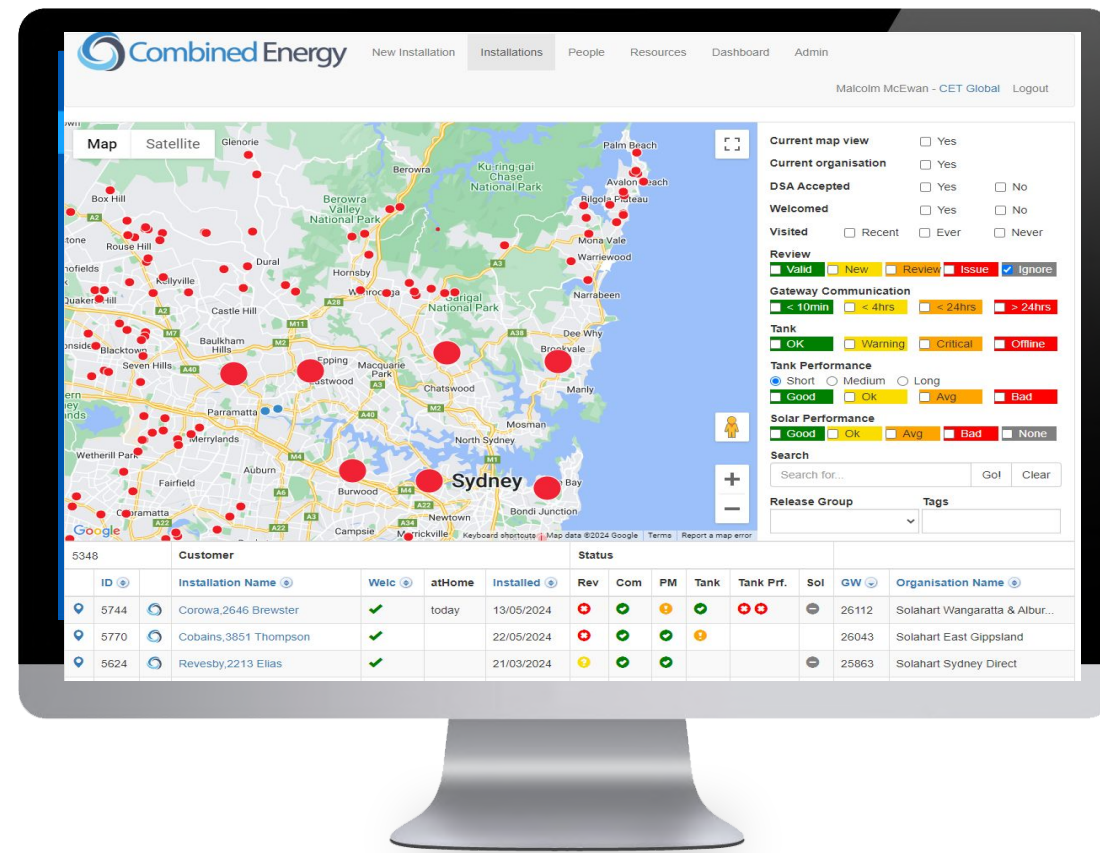
1. Via a data connection to the Inverter (Ethernet or RS485)
2. By monitoring the battery with a CT

Answer: 1

Combined Energy Apps and Services



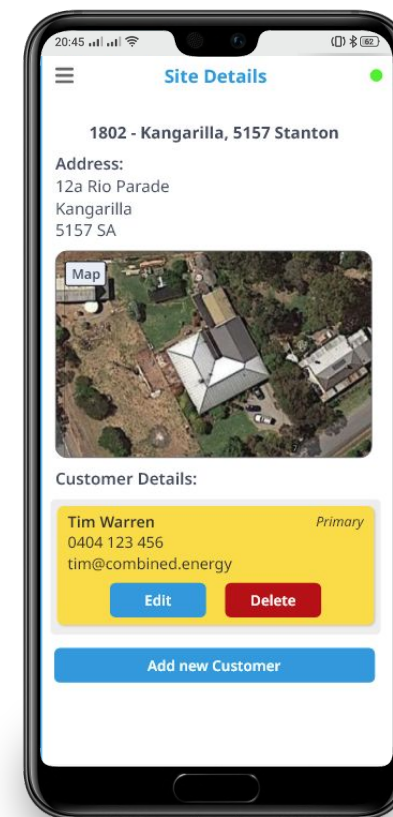
onWatch Management Portal
<https://onwatch.combined.energy/>



Used by **Organisations** to:

- Monitor the state of all sites and customer systems
- Add new customers and sites
- Add and manage Installers and support team members
- Access latest documentation

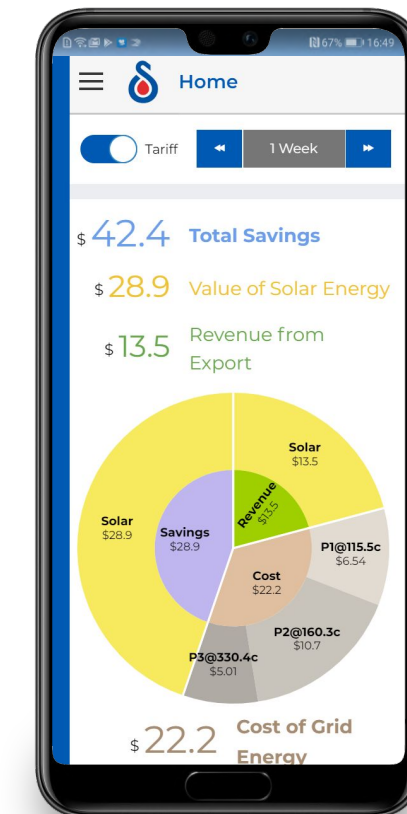
onSite Installer Web App
<https://onsite.combined.energy/>



Used by **Installers** to:

- Configure and test new Installations
- Access the latest Installation resources and documentation
- Contact CET Support

atHome Customer Web App
<https://athome.combined.energy/>



Used by **Customers** to:

- Monitor household energy use history and costs
- See a breakdown of where energy is being used in the home
- Check charge state of storage loads and solar performance

Combined Energy onWatch Portal Overview



Combined Energy New Installation Installations People Resources Logout

Map Satellite

Current map view Yes
 Current organisation Yes
 DSA Received Yes No
 Welcomed Yes No
 Visited Recent Ever Never
 Review Valid New Review Issue Ignore
 Gateway Communication < 10min < 4hrs < 24hrs > 24hrs
 Tank OK Warning Critical Offline
 Tank Performance Short Medium Long
 Good Ok Avg Bad
 Solar Performance Good Ok Avg Bad None
 Search Search for... Go! Clear

The last time the customer viewed the atHome website

Date that EMU was installed

Use these controls to filter Installations in the list e.g. show only 'unwelcomed' customers

Search for a customer by surname or ID

Click the CET logo to open atHome for this Installation

Customer		Status										
ID	Installation Name	Welc	atHome	Installed	Rev	Com	PM	Tank	Tank Prf.	Sol	GW	Organisation Name
950		✓	21 days	30/04/2020	✓	✓				?	636	Solahart Sydney Direct
948		✓	679 days	29/04/2020	✓	✓				!	1407	Solahart Sydney Direct
947		✓	6 days	28/04/2020	✓	✓				?	1446	Solahart Sydney Direct
945		✓	today	27/04/2020	✓	✓				?	1430	Solahart Sydney Direct
942		✓	today	22/04/2020	✓	✓				?	1426	Solahart Sydney Direct

Combined Energy onWatch Portal Overview



New Installation
Installations
People
Resources
Logout

Map
Satellite

Current map view Yes

Current organisation Yes

DSA Received Yes No

Welcomed Yes No

Visited Recent Ever Never

Review

Valid New Review Issue Ignore

Gateway Communication

< 10min < 4hrs < 24hrs > 24hrs

Tank

OK Warning Critical Offline

Tank Performance

Short Medium Long

Good Ok Avg Bad

221		Customer	Status									
ID	Installation Name	Welc	atHome	Installed	Rev	Com	PM	Tank	Tank Prf.	Sol	GW	Organisation Name
3084		✓	today	06/06/2022	✓	✓	✓	✓	! ? ?	!	10311	Solahart Sydney Direct
2896		✓	2 days	25/03/2022	✓	✓	✓	✓	✓ ✓ ✓	?	10191	Solahart Sydney Direct
2875		✓	today	18/03/2022	✓	✓	✓	✓	* ✓ ✓	?	10761	Solahart Sydney Direct
2782		✓	130 days	10/02/2022	✓	✓	✓	✓	✓ ✓ ✓	?	11121	Solahart Sydney Direct

Review status
(i.e. has CET validated site)

EMU Connection
Status

Power Meter Status

PowerStore Status

Combined Energy onWatch Portal Overview



The screenshot shows the Combined Energy onWatch Portal interface. At the top, there are navigation tabs: New Installation, Installations, People, Resources, and a Logout button. Below the navigation is a map of the Sydney region with red dots indicating installation locations. To the right of the map is a filter panel with various checkboxes and dropdowns for filtering installations based on map view, organisation, DSA Received, Welcomed, Visited, Review status, Gateway Communication, and Tank status.

Below the map is a table of installations. The table has columns for ID, Installation Name, Welc, atHome, Installed, Rev, Com, PM, Tank, Tank Prf., Sol, GW, and Organisation Name. The 'Tank Prf.' column contains icons representing different performance levels: a green checkmark, a yellow question mark, and a red 'X'.

PowerStore Solar Self-consumption efficiency
Indicates proportion of water heater energy from solar vs. grid

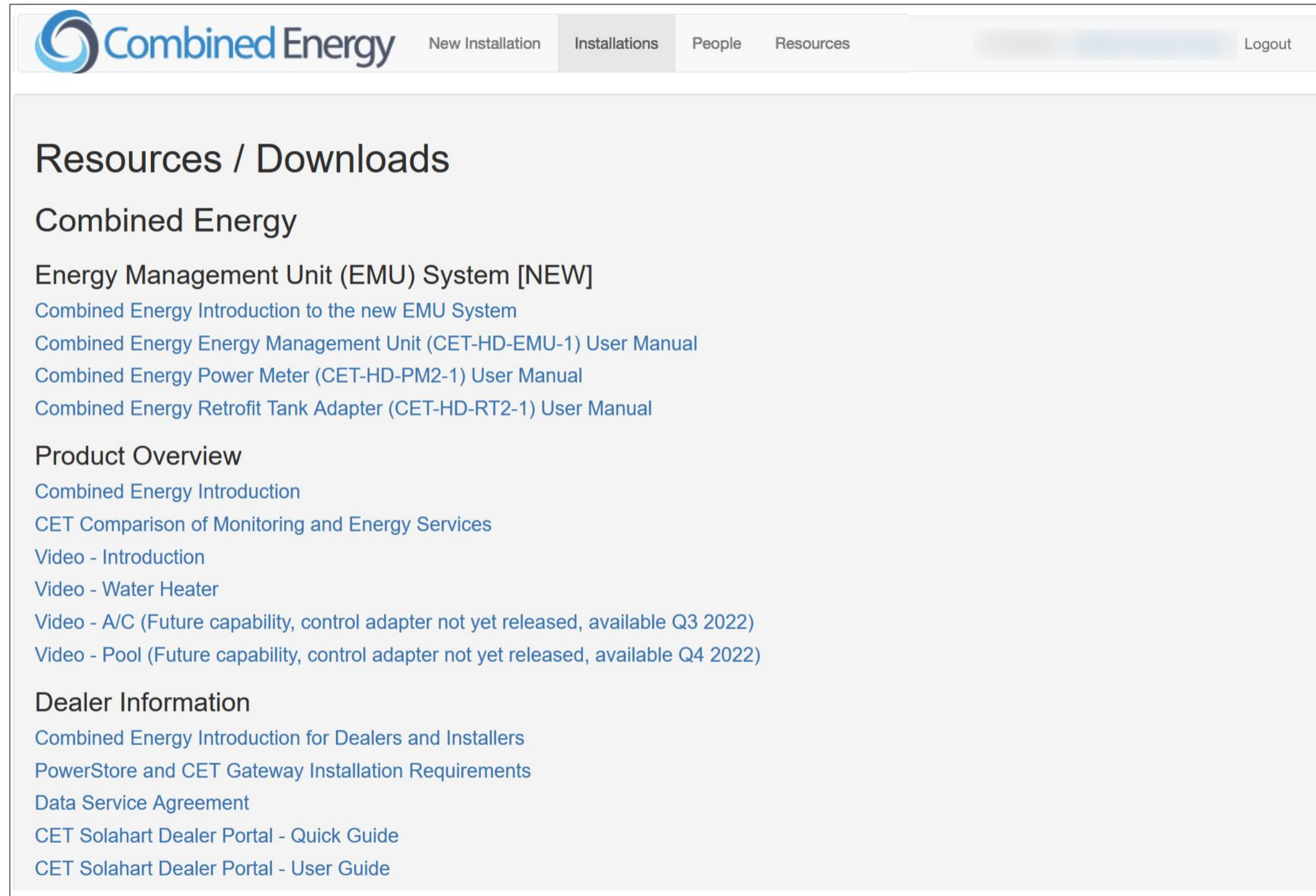
Last 24 hrs In last week In last fortnight

Tank	Tank Prf.	Sol	GW	Org
✓	?	!	10530	Sol
✗	?	!	Short term (1 day sample): 70%	Sol

Hint: Hover mouse over icon for a brief description

e.g. this site had low excess solar (or unusually high water usage) in last 24hrs, causing high PowerStore grid consumption

Solar production as percentage of maximum production observed at this site in last 30 days
e.g. indicates bad weather



The screenshot shows the 'Resources / Downloads' page of the Combined Energy onWatch Portal. The page has a navigation bar with the following items: 'New Installation', 'Installations', 'People', 'Resources', and 'Logout'. The main content area is titled 'Resources / Downloads' and is organized into three sections: 'Combined Energy', 'Product Overview', and 'Dealer Information'. Each section contains a list of links to various documents and videos.

Combined Energy

- [Energy Management Unit \(EMU\) System \[NEW\]](#)
- [Combined Energy Introduction to the new EMU System](#)
- [Combined Energy Energy Management Unit \(CET-HD-EMU-1\) User Manual](#)
- [Combined Energy Power Meter \(CET-HD-PM2-1\) User Manual](#)
- [Combined Energy Retrofit Tank Adapter \(CET-HD-RT2-1\) User Manual](#)

Product Overview

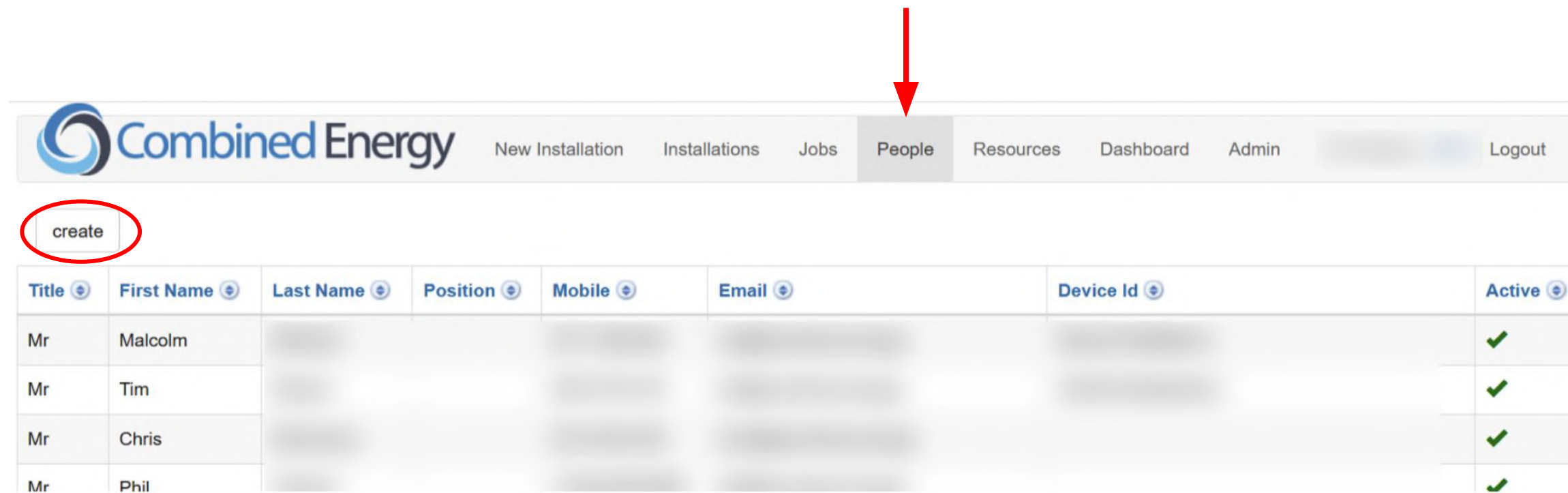
- [Combined Energy Introduction](#)
- [CET Comparison of Monitoring and Energy Services](#)
- [Video - Introduction](#)
- [Video - Water Heater](#)
- [Video - A/C \(Future capability, control adapter not yet released, available Q3 2022\)](#)
- [Video - Pool \(Future capability, control adapter not yet released, available Q4 2022\)](#)

Dealer Information

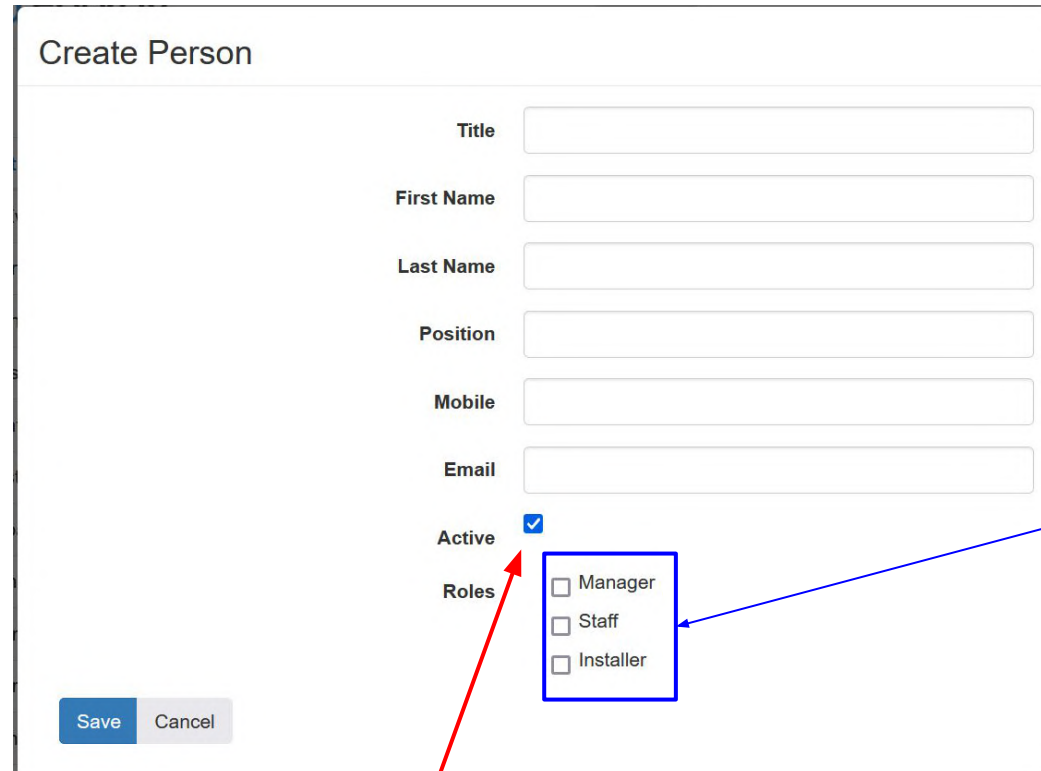
- [Combined Energy Introduction for Dealers and Installers](#)
- [PowerStore and CET Gateway Installation Requirements](#)
- [Data Service Agreement](#)
- [CET Solahart Dealer Portal - Quick Guide](#)
- [CET Solahart Dealer Portal - User Guide](#)

Combined Energy *onWatch* Portal

Adding Staff and Installers to an Organisation



Title	First Name	Last Name	Position	Mobile	Email	Device Id	Active
Mr	Malcolm						✓
Mr	Tim						✓
Mr	Chris						✓
Mr	Phil						✓



Create Person

Title

First Name

Last Name

Position

Mobile

Email

Active

Roles

- Manager
- Staff
- Installer

Save Cancel

Use **Manager** role for individuals who should be able to add/remove Staff and Installers.

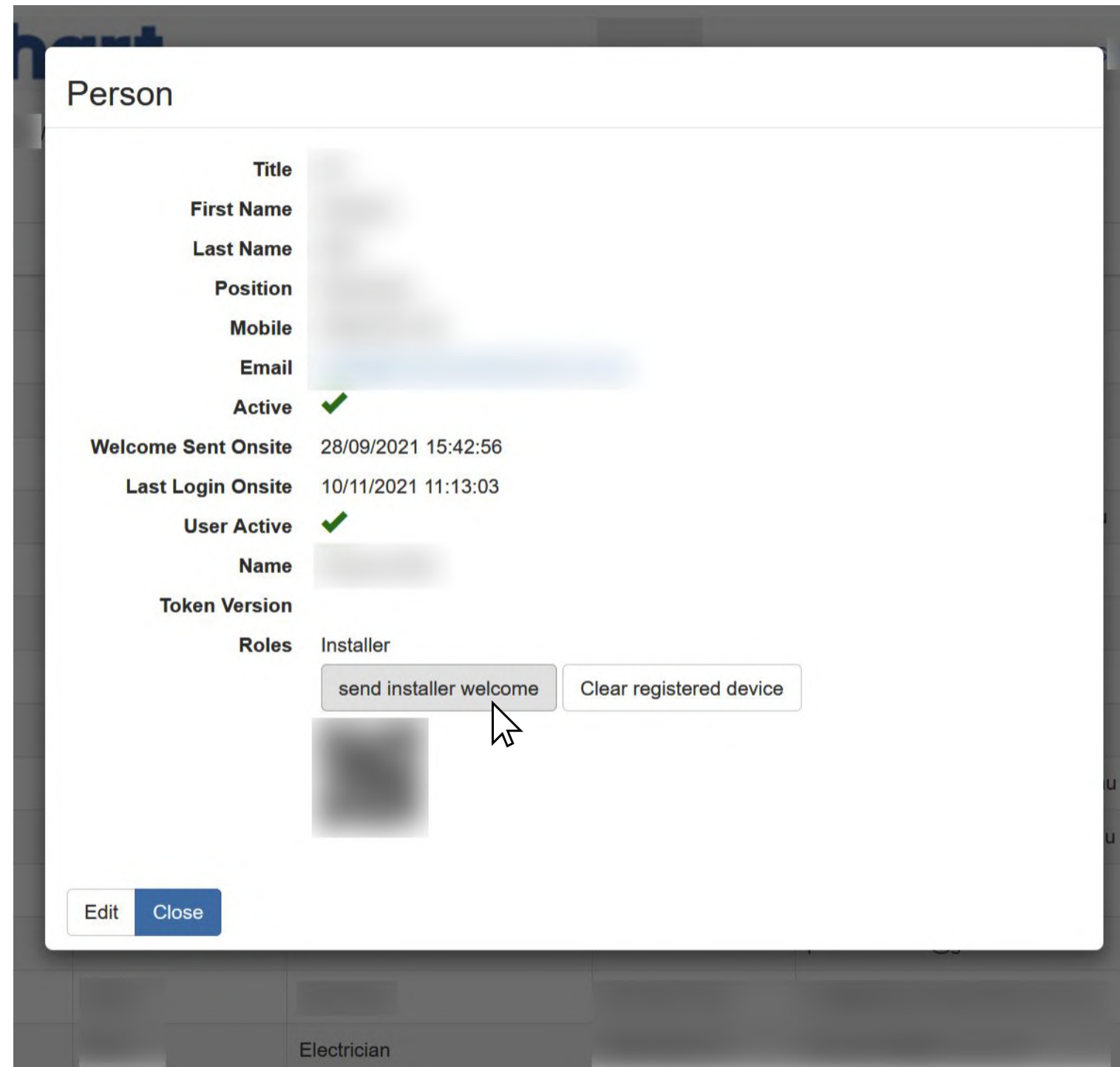
Use **Staff** role for individuals who will be adding and managing customers.

Use **Installer** role for anyone who will be visiting site and requires access to the *onSite* Installer webapp.

Remember to deactivate team members who leave the Organisation.

Combined Energy *onWatch* Portal

Welcoming Installers



Remember to send the **installer welcome** to new Installers once they have been added to the Organisation.

The installer welcome message includes a link to the *onSite* web app.

It is recommended that Installers save a shortcut to *onSite* to their home screen.

Once welcomed, Installers can use the *onSite* web app to configure sites, request support, and access documentation.

Combined Energy *onWatch* Portal

Customer Onboarding



Step 1: Click New Installation



Step 2: Enter Street Address

Address Customers Details Agreements Review First Login

Address

Address Search

Selected:

1 Barangaroo Ave, Barangaroo, NSW 2000
151.20120, -33.86256

Save Cancel

Combined Energy *onWatch* Portal

Customer Onboarding



Step 3: Enter Customer Details

Customers

Edit Customer

Name

Email

Mobile

Primary Contact

Customers

1. John Doe

- Email: email@test.com
- Mobile: 02 3451 2422

Add additional users if multiple logins required

Address	Customers	Details	Agreements	Review	First Login	Support
---------	-----------	----------------	------------	--------	-------------	---------

Details

Phase

Single phase (1)
 Two phase (2)
 Three phase (3)

NMI


Export limit

Enabled

Notes

Save **Cancel**

Step 4: Enter Phase Info and NMI if available

Barangaroo,2000 Doe [Close](#)

Address	Customers	Details	Agreements	Review	First Login	Support
---------	-----------	---------	------------	--------	-------------	---------

Review

Address

1 Barangaroo Ave
Barangaroo
NSW 2000

Customers

1. John Doe

- Email: email@test.com
- Mobile: 02 3451 2422
- Welcome sent: not sent

[Send](#)

Details

Phase: Single phase (1)


NMI: Not entered

Export limit: Export limit not enabled

Notes:

Agreements

Service agreements that the customer needs to accept are listed here. These agreement will be presented to the customer the first time they log in and will be marked with a tick here once accepted.

-  CET - Combined Energy

Support

Full name: 2951 - Barangaroo,2000 Doe

GW ID:

Review Status: NEW

Tags:

Local Time: 12:15 AM (AEST)

Notes:


Next step:
When you are ready to send the welcome email and SMS to the customer, please click the button below:

[Send customer welcome\(s\)](#)

Step 5: Send customer welcome and ask customer to login on their own device




Step 6: Assist customer with first login and accepting service agreements

Log Out

Service Agreements

Name Mobile Email

For site at 1 Alan St, Rydalmere, NSW 2116



Data Services Agreement

This agreement is between you and Combined Energy Technologies Pty Ltd ("CET", "we", "us"), ABN 15 616 324 36, (trading as "Combined Energy"), Solahart's technology partner and provider of home energy monitoring and management services.

To provide an effective energy monitoring and management service, we collect energy consumption data for your site and use this information together with energy prices from your retailer, weather forecast data, and other metrics to coordinate your Home Energy Management system ("the system").

Service Levels

- Basic Monitoring:** Provides you with an easy to understand real-time visual display of your home's energy consumption and generation 24/7 so you can identify your costs and take action. If your site has a PowerStore water heater, excess solar generation will be automatically redirected to the tank under this service. The PowerStore water heater controller ensures that a minimum volume of hot water is always available to your household and implements mandatory legionella control requirements. The Basic Monitoring service is free for all Solahart customers and includes the SA Smarter Home Relevant Agent service.
- Home Energy Management:** An autonomous home energy optimisation service that reduces your total cost of electricity by coordinating appliances and energy storage devices in your home to make the best use of available solar power. If you are on a time-of-use tariff, this service will prioritise the use of off-peak electricity by estimating the total energy requirements of your appliances based on weather forecast information and usage patterns. This service is provided free of charge to all Solahart customers for a minimum of 12 months from the date of installation, after which you may elect to opt-in to a monthly subscription.

Terms and Conditions

Personal Information

We collect data from your site for the following purposes:

- monitoring and reporting the performance of the system, and devices or appliances connected to the system;
- remote troubleshooting of the system and/or associated devices and appliances;
- marketing of new appliances, devices, functionality or energy services related to the system;
- research and product development purposes.

We will take steps we believe to be reasonable and in alignment with industry and regulatory standards to protect and securely store your information. We will

Please read the agreement before accepting (scroll down)

Step 7: Assist customer with Energy Pricing page / tariff entry

Click for instructions on how to enter Energy Pricing information



The screenshot shows the 'Energy Pricing' page in the onWatch portal. The left sidebar contains navigation options: Home, Live View, Energy Pricing (highlighted with a red arrow), Combiner, Solar, Battery, Water Heater, Aircon, Others, Grid Meter, System, and Help. The main content area is titled 'Energy Pricing' with a help icon. Below the title are dropdown menus for 'Distributor' (TasNetworks) and 'Retailer' (Aurora Energy). There are radio buttons for 'Type' (Flat rate, Time of use) and a dropdown for 'Structure' (TOU 1 2021-01). A note states: 'Estimated prices are inclusive of GST. Daily connection fees are not included in price estimates.' A table displays pricing details:

P1 / Off-peak	P2 / Shoulder	Feed-in	Daily Fee	
15.17c	32.59c	9.35c	107.23c	<button>Customise</button>

Below the table is an 'Accept/Save' button. Three time-of-use charts are shown: 'Weekdays, Apr - Sep', 'Weekends, Jan - Dec', and 'Weekdays, Jan - Mar & Oct - Dec'. Each chart shows price segments (15.2c, 32.6c) across a 24-hour period. At the bottom, it says 'CET Plan Id 22882 As At 01/APR/2022 10:44 AM Updated 07/JAN/2021 4:24 PM'.

atHome website
Home page

Click the '?' to access help for the current page

Click to change date range of analysis data
The middle grey label shows the currently selected range ('1 month' in this example)



The screenshot shows the atHome website interface. On the left is a blue sidebar with navigation options: Home, Live View, Energy Pricing, Combiner, Solar, Water Heater, Others, Grid Meter, System, and Help. The main content area displays energy metrics and two pie charts. At the top right, there are date range selectors for 3 Months, 1 Month (selected), and 1 Week, along with a Log Out button.

Metric	Value	Description
Total Savings	\$84.3	FROM SOLAR
Value of Solar Energy	\$53.0	USED BY YOUR HOME APPLIANCES
Revenue from Export	\$31.3	FROM SOLAR
Cost of Grid Energy	\$43.3	TO YOUR HOME APPLIANCES
Consumed Energy from Solar	54%	46% CAME FROM THE GRID
Hot Water Energy from Solar	92%	FROM YOUR SOLAHART POWERSTORE TANK
Solar Self Consumption	63%	37% EXPORTED TO THE GRID
Total energy consumed	536 kWh	IN YOUR HOME
Supplied by Solar	291 kWh	TO YOUR HOME APPLIANCES
Supplied by Grid	245 kWh	TO YOUR HOME APPLIANCES

All help pages, including the initial Welcome message, can be accessed through the Help page

Log Out

Home
Home ?
Week

Total Savings is the estimated amount of money saved by supplying the home with solar and battery energy (+ export revenue)

\$84.3

Total Savings
FROM SOLAR

\$43.3

Cost of Grid Energy
TO YOUR HOME APPLIANCES

Money saved from solar self-consumption

\$53.0

Value of Solar Energy
USED BY YOUR HOME APPLIANCES

\$31.3

Revenue from Export
FROM SOLAR

54% **Consumed Energy from Solar**
46% CAME FROM THE GRID

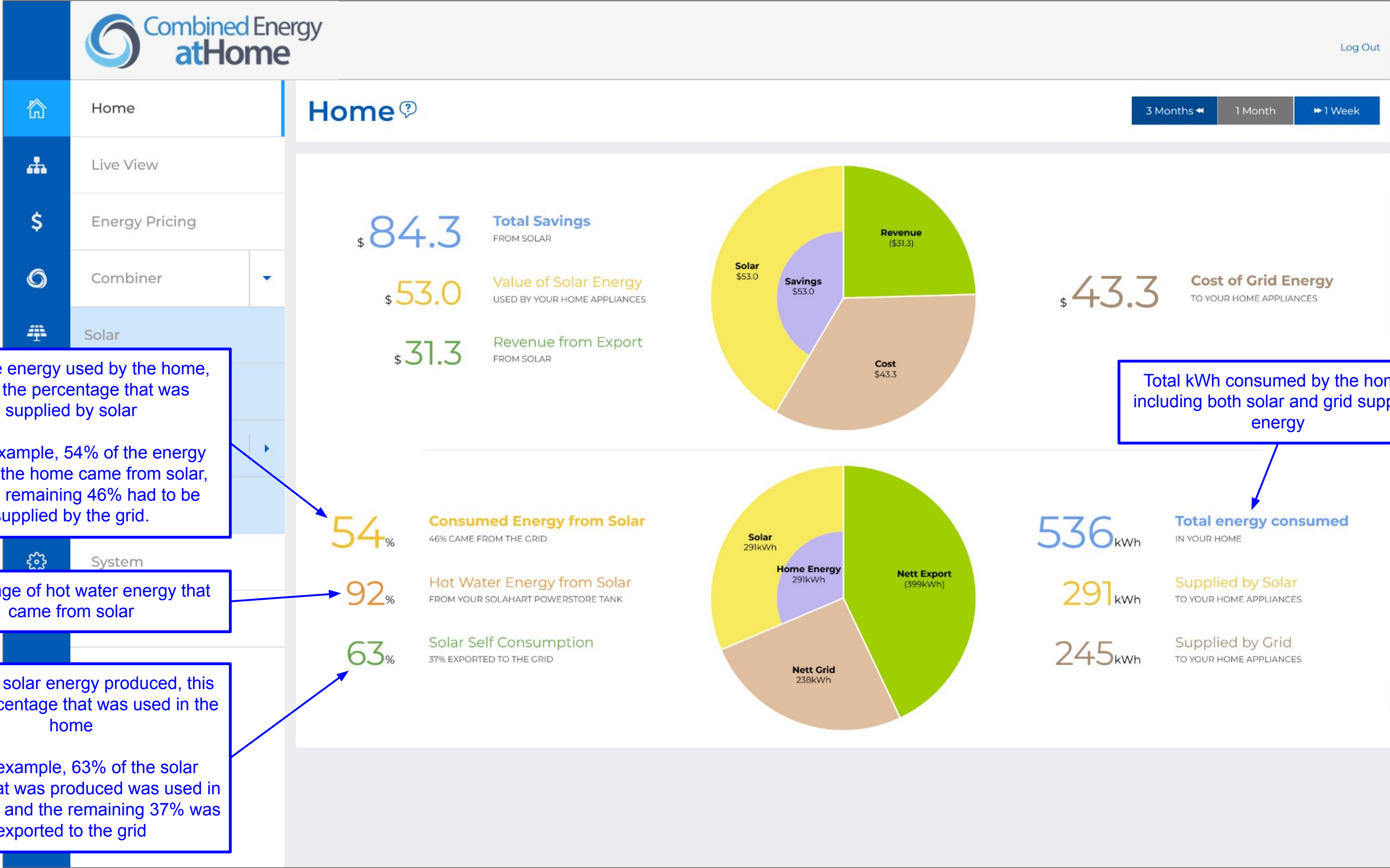
92% **Hot Water Energy from Solar**
FROM YOUR SOLAHART POWERSTORE TANK

63% **Solar Self Consumption**
37% EXPORTED TO THE GRID

536 kWh **Total energy consumed**
IN YOUR HOME

291 kWh **Supplied by Solar**
TO YOUR HOME APPLIANCES

245 kWh **Supplied by Grid**
TO YOUR HOME APPLIANCES



Of all the energy used by the home, this is the percentage that was supplied by solar

In this example, 54% of the energy used by the home came from solar, and the remaining 46% had to be supplied by the grid.

Percentage of hot water energy that came from solar

Of all the solar energy produced, this is the percentage that was used in the home

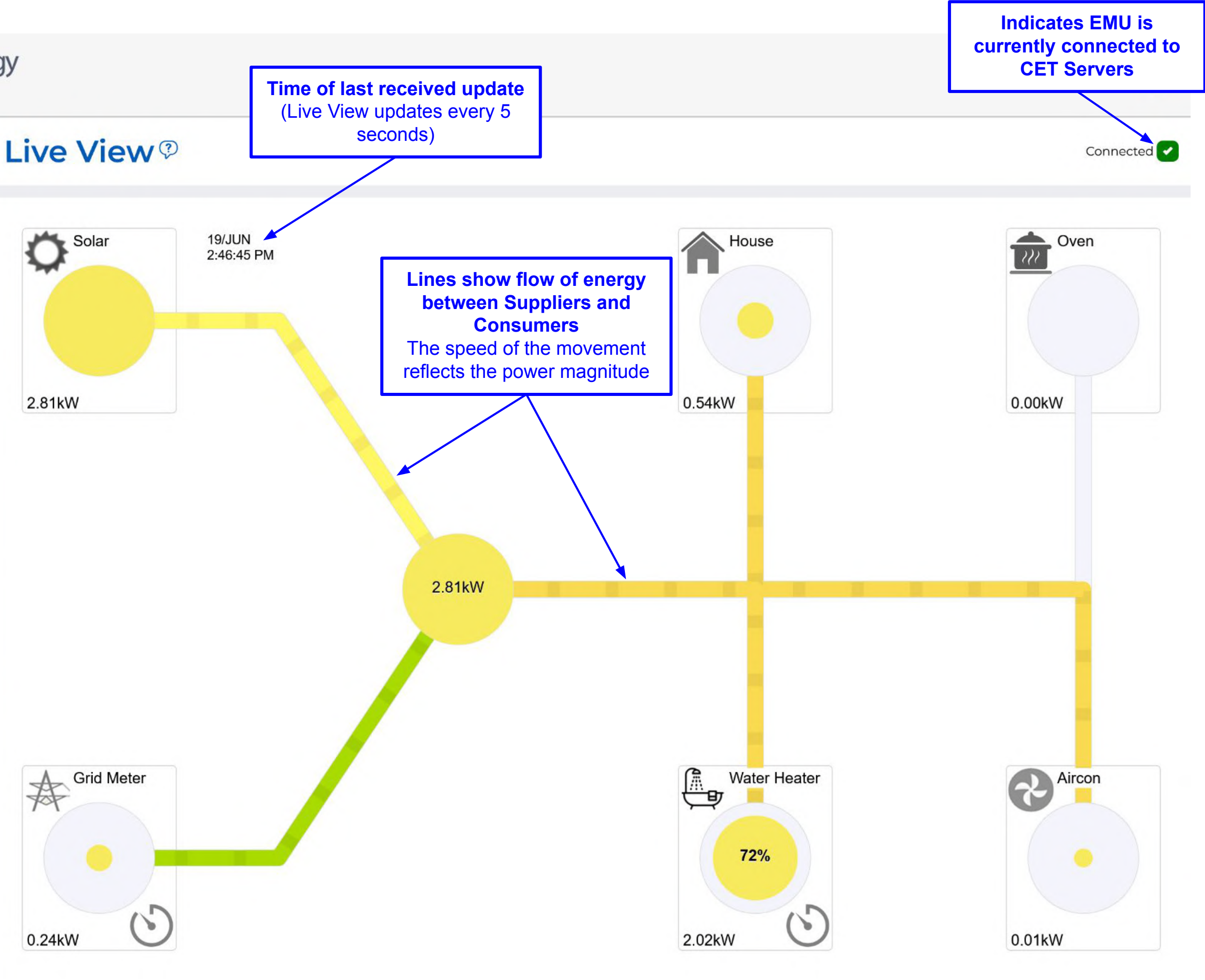
In this example, 63% of the solar energy that was produced was used in the home, and the remaining 37% was exported to the grid

Total kWh consumed by the home, including both solar and grid supplied energy

atHome website Live View

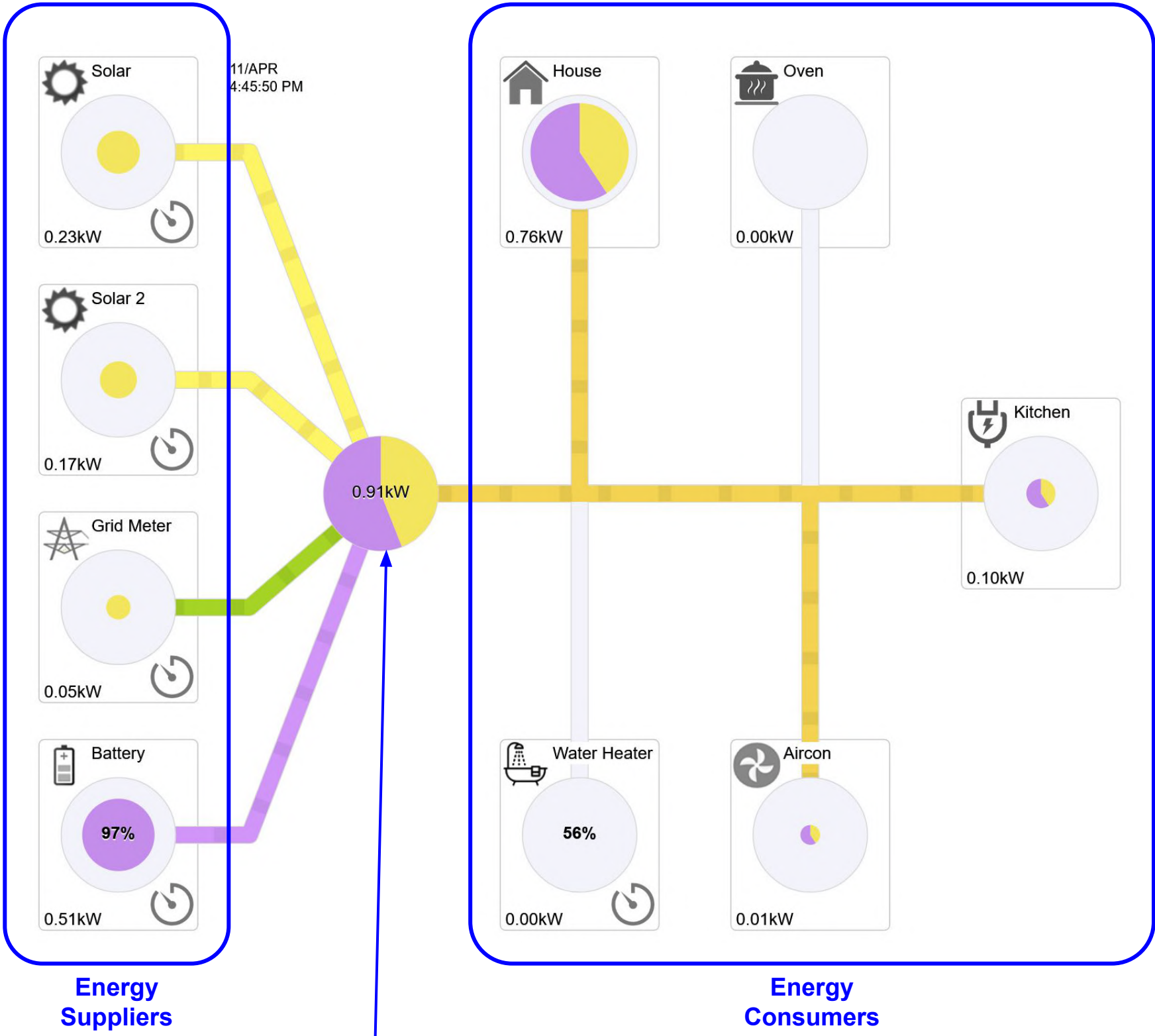
Combined Energy
atHome

- Home
- Live View**
- Energy Pricing
- Combiner
- Solar
- Water Heater
- Aircon
- Others
- Grid Meter
- System

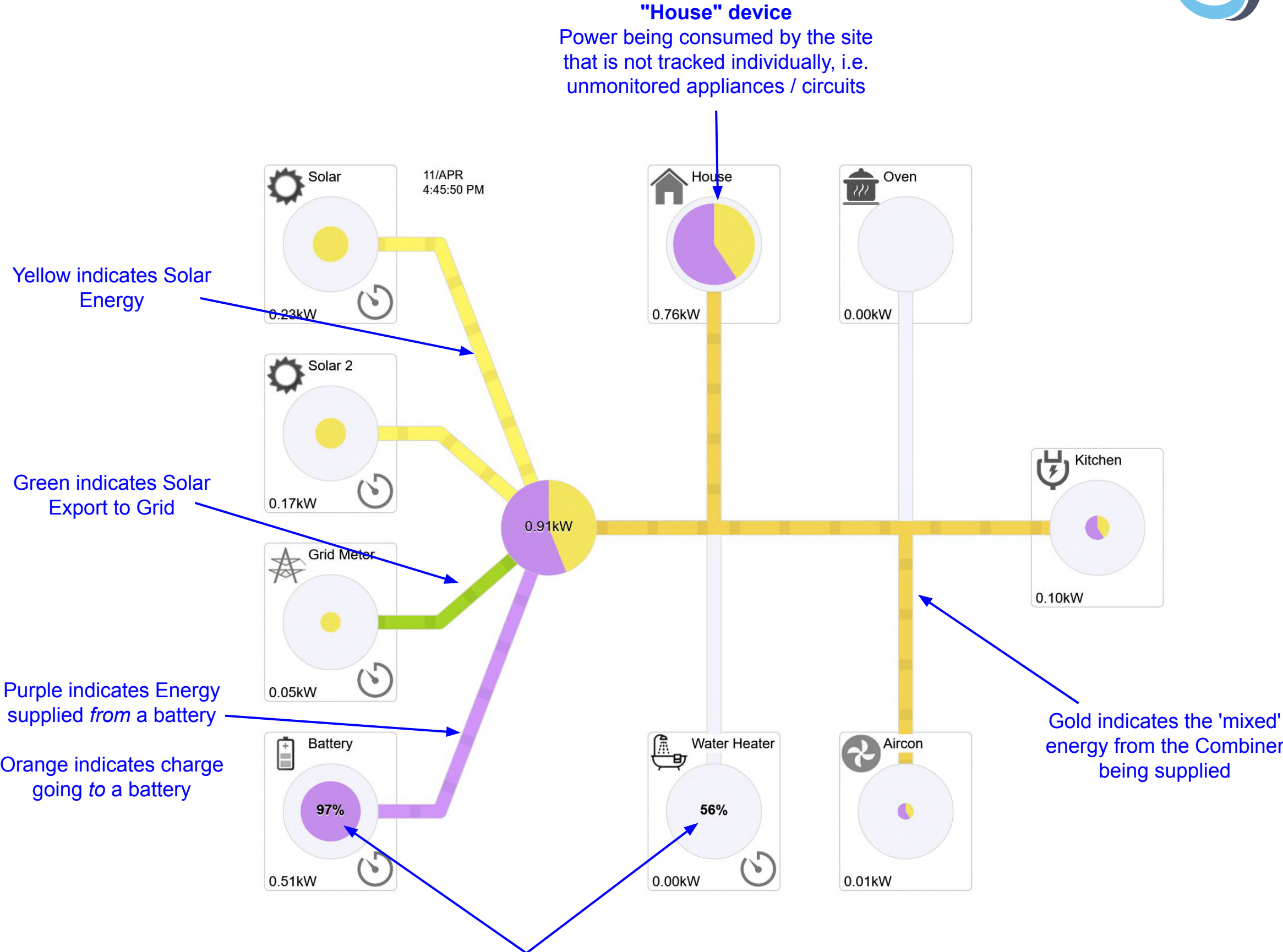


The Live View shows all the Devices in the home and how energy moves between them

All Devices at the Site are listed in the Combiner group in the menu



"Combiner"
Shows total power being
consumed / produced by the site



"House" device
Power being consumed by the site that is not tracked individually, i.e. unmonitored appliances / circuits

Yellow indicates Solar Energy

Green indicates Solar Export to Grid

Purple indicates Energy supplied from a battery

Orange indicates charge going to a battery

Gold indicates the 'mixed' energy from the Combiner being supplied

Charge State Percentage for energy storage devices

In this example the battery has 97% charge, so it is supplying energy to the home to offset grid usage.

The water heater in this example is at 56% charge, meaning it has 56% of its maximum amount of usable hot water

atHome website

Device Analysis for Solar

Combined Energy atHome

Log Out Analysis History Settings

Tariff 3 Months 1 Month 1 Week

Solar

Cost Analysis

	31 days	Daily avg
Savings	\$55.8	\$1.80
- Grid P1	\$0.00	\$0.00
- Grid P2	\$31.2	\$1.01
- Grid P3	\$24.6	\$0.79
Revenue	\$7.30	\$0.24

Energy (kWh)

	31 days	Daily avg	%
Supplied	166	5.36	66.6%
- to Other	166	5.36	66.6%
Exported	83.3	2.69	33.4%
Total	249	8.05	

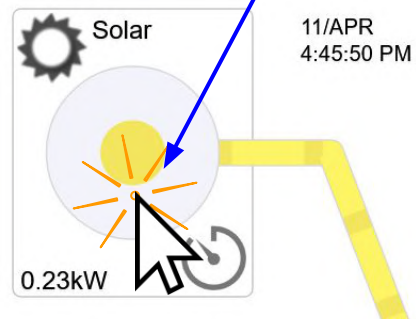
Energy

- Exported
- Supplied
- To Other

11/APR 4:45:50 PM

0.23kW

Clicking on a device in the Live View will open the analysis page for that device. Device Pages can also be accessed from the side menu.



Click to change date range of analysis data

The middle grey label shows the currently selected range ('1 month' in this example)

The **Cost Analysis** section shows the total savings and revenue for the Device during the selected time interval, as well as a daily averages.

If the 'Tariff' option is enabled, the Savings at each tariff price bracket (as defined on the Energy Pricing page) are also shown.

In this example, the Solar offset \$55.8 of grid consumption and earned \$7.30 in export revenue in the last 31 days.

The **Energy** section shows the total supplied / consumed energy for the Device during the selected time interval.

In the case of a Solar device, energy is split into 'Supplied' (i.e. consumed by the home) and 'Exported' (to the grid).

In this example, 249kWh of solar energy were produced in total, with 166kWh (66.6%) self-consumed in the home in the last 31 days.

The chart at the bottom shows a daily summary for the device during the selected period.

atHome website

Device Analysis for Grid



Grid Meter

Cost Analysis

	31 days	Daily avg
Cost	\$73.5	\$2.37
- P1	\$21.1	\$0.68
- P2	\$28.1	\$0.91
- P3	\$24.3	\$0.78
Revenue	\$12.5	\$0.40

Nett Energy (kWh)

	31 days	Daily avg	%
Supplied	278	8.97	
- P1	96.6	3.12	34.8%
- P2	108	3.48	38.7%
- P3	73.7	2.38	26.5%
Export	143	4.61	

Energy

- Exported Nett
- Supplied Nett
- P1@21.8c
- P2@27.7c
- P3@34.0c

The **Cost Analysis** section shows the total cost of grid energy supplied to the home during the selected time interval, as well as a daily averages.

If the 'Tariff' option is enabled, the cost at each tariff price bracket (as defined on the Energy Pricing page) is also shown.

In this example, \$73.5 of grid energy was purchased in the previous 31 days, and \$12.5 was earned by exporting solar

The **Energy** section shows the nett total energy that was imported and exported from/to the grid during the selected time interval.

In this example, 278kWh of grid energy was supplied to the home, and 143kWh of solar was exported to the grid in the last 31 days.

atHome website

Device Analysis for Batteries



Battery 3 Months ◀ 1 Month ▶ 1 Week

Energy (kWh)

	28 days	Daily avg	%
Discharge	264	9.41	
Charge	295	10.5	
- Solar	291	10.4	98.6%
- Grid	4.12	0.15	1.40%
Total	295	10.5	

Energy

- Discharge
- Charge
- Grid
- Solar

The **Energy** section shows the total energy that was used to charge and discharge the battery during the selected time interval.

In this example, 295kWh of energy was used to charge the battery, and 264kWh was discharged from the battery back into the home in the last 28 days. 98.6% of the energy used to charge the battery came from solar.

The difference between the total charge and discharge energy is due to the round trip efficiency of the charge/discharge cycle.

atHome website

Device Analysis for devices that consume energy



Water Heater [Tariff] [3 Months] [1 Month] [1 Week]

Cost Analysis

	31 days	Daily avg
Grid Cost	\$4.78	\$0.15
- P1	\$3.83	\$0.12
- P2	\$0.82	\$0.03
- P3	\$0.13	\$0.00
Home Energy Savings	\$27.3	\$0.88
- Solar	\$27.3	\$0.88

Energy (kWh)

	31 days	Daily avg	%
From Grid	28.6	0.92	20.7%
- P1	23.2	0.75	16.8%
- P2	5.01	0.16	3.63%
- P3	0.42	0.01	0.30%
From Solar	109	3.53	79.3%
Total	138	4.45	

Energy

- Grid
- P1@16.5c
- P2@22.9c
- P3@47.2c
- Solar

The **Cost Analysis** section shows the total cost of energy supplied to the device during the selected time interval, as well as the total savings due to self-consumption of solar energy

If the 'Tariff' option is enabled, the cost at each tariff price bracket (as defined on the Energy Pricing page) is also shown.

In this example, \$4.78 of grid energy was used to charge the water heater in the previous 31 days, and the equivalent of \$27.3 was saved through solar self-consumption.

The **Energy** section shows the total energy that was consumed by the device in the previous 31 days.

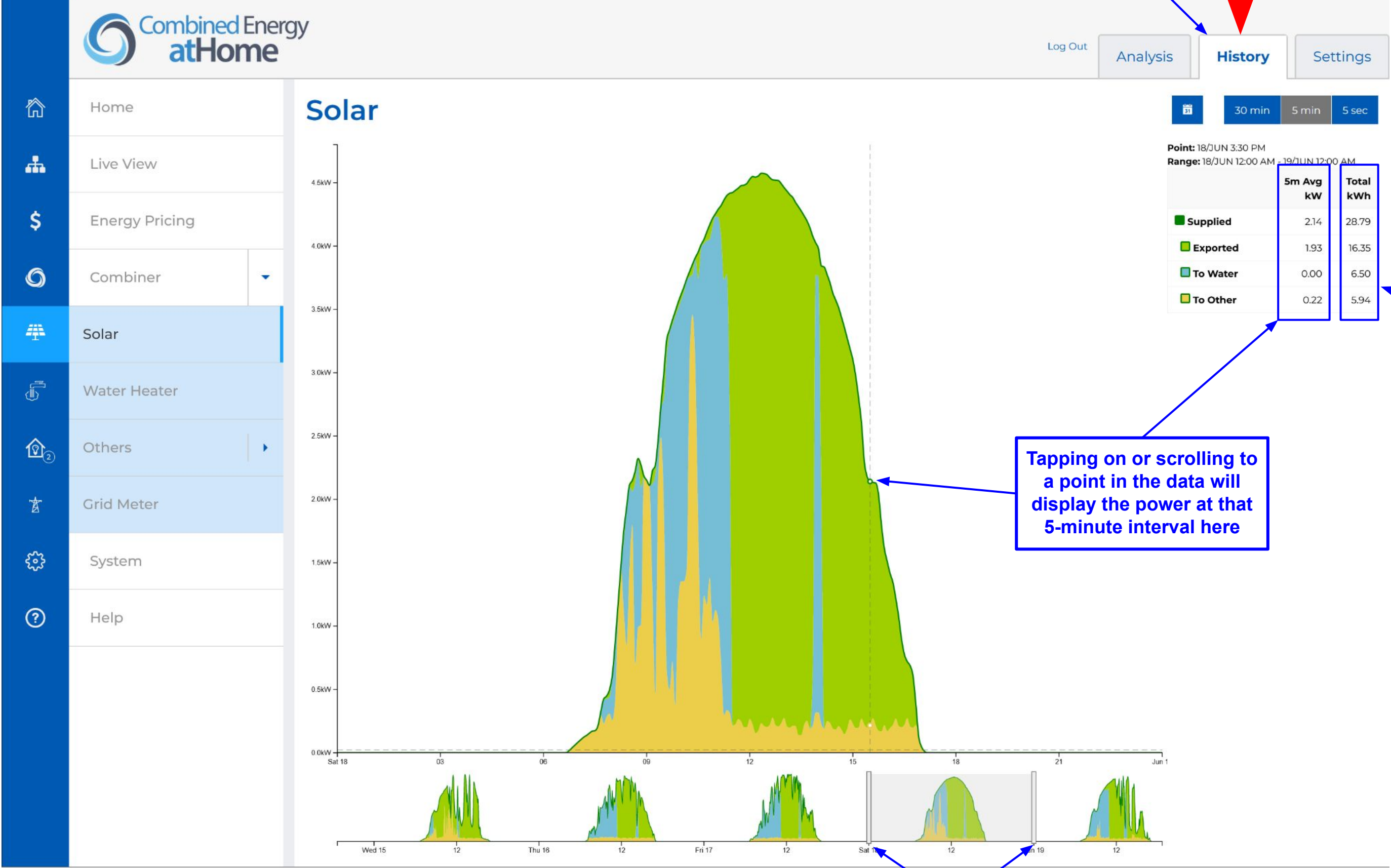
In this example, 28.6kWh of grid energy was supplied to the device, and 109kWh came from solar.

atHome website

Device History for Solar



Click the 'History' tab to view detailed historical data for the Device



Energy totals for the displayed date range are shown in this table

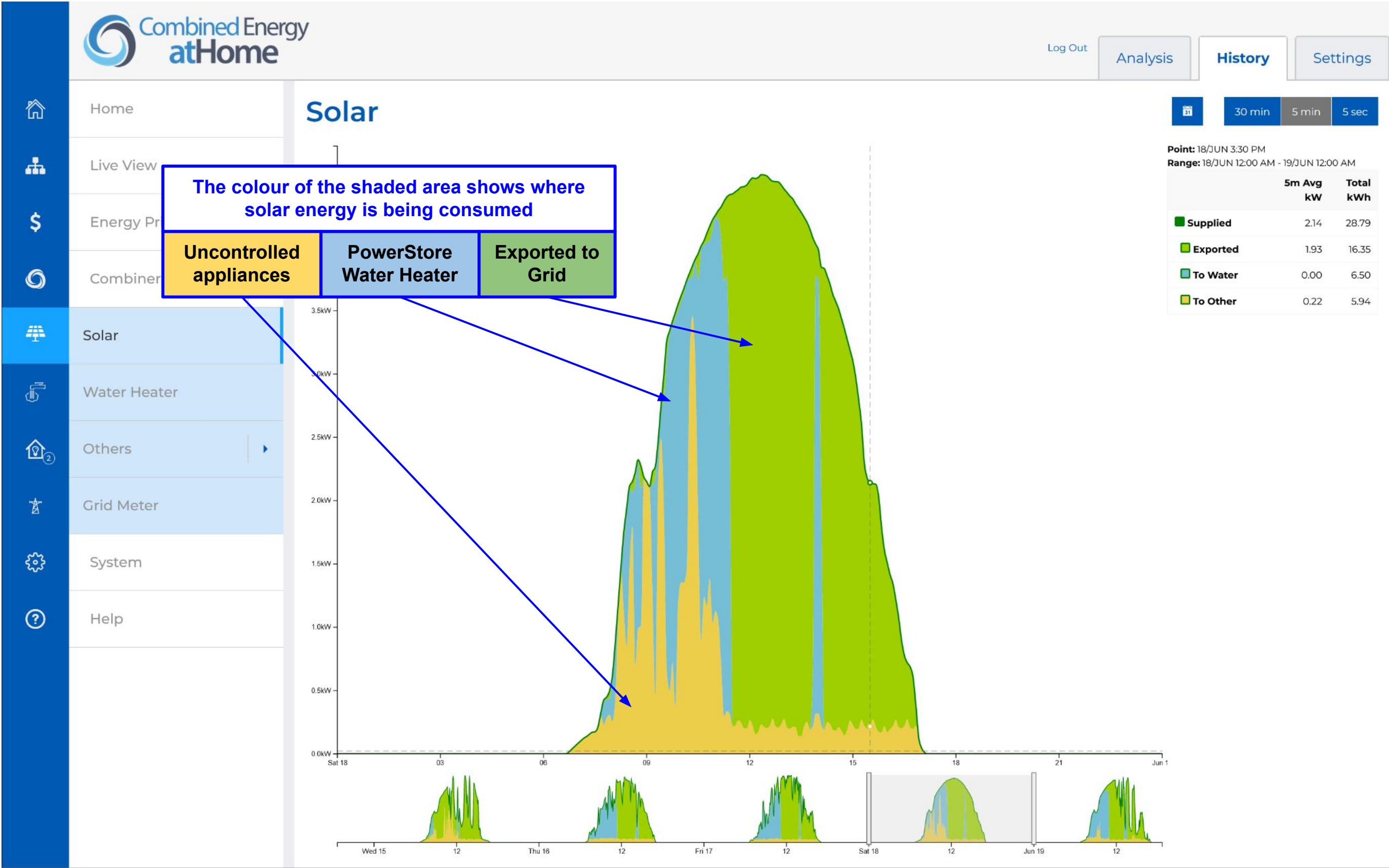
In this example, the total solar produced in the selected date range was 28.79kWh, with 16.35kWh exported to the grid, 6.5kWh used to charge the water heater, and 5.94kWh consumed by the rest of the home.

Tapping on or scrolling to a point in the data will display the power at that 5-minute interval here

Move these bars in the charting summary to view a specific interval in detail

atHome website

Device History for Solar



Log Out
Analysis
History
Settings

- Home
- Live View
- Energy Pricing
- Combiner
- Solar
- Water Heater
- Others
- Grid Meter
- System
- Help

Grid Meter

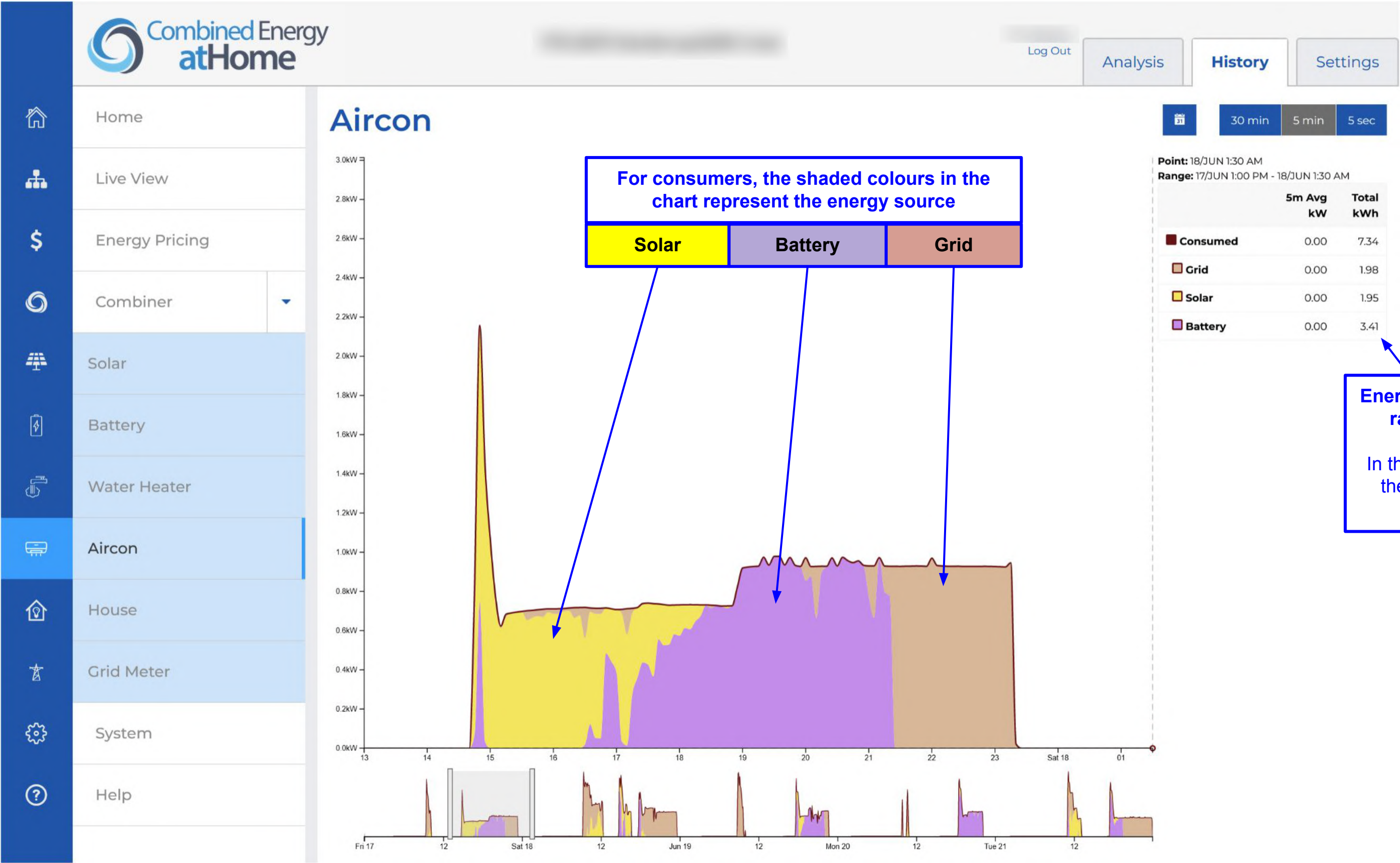
30 min
5 min
5 sec

Point: 23/JUN 12:40 PM
Range: 23/JUN 12:00 AM - 24/JUN 12:00 AM

	5m Avg kW	Total kWh
Exported	0.77	4.51
Solar	0.77	4.51
Supplied	0.28	12.69

Energy totals for the displayed date range are shown in this table

In this example, 12.69kWh of grid energy was supplied to the site, and 4.51kW of excess solar was exported to the grid.



Energy totals for the displayed date range are shown in this table

In this example, 1.98kWh came from the grid, 1.95kWh from solar, and 3.41kWh from the battery.

Combined Energy Apps and Services Questionnaire



Question 1: Connect the app that is used by each type of User

1. *atHome* web app <-> Customers
2. *onSite* web app <-> Installers
3. *onWatch* Portal <-> Dealers and Channel Partners

Question 2: Where can Dealers and Channel Partners access the latest documentation for CET products and services?

1. Via the Resources page through the *onWatch* Portal
2. Google search

Correct answer: 1

Question 3: How do I activate the customer's access to the *atHome* web app

1. Using the *onSite* Installer app
2. By adding a New Installation for the customer through the *onWatch* Portal and clicking the 'Send Customer Welcome(s)' button

Correct answer: 2

Question 4: What must the customer do to ensure that their energy costs are being correctly calculated in the *atHome* web app?

1. Do nothing
2. They must enter their energy retailer plan details using the Energy Pricing page

Correct answer: 2

Question 5: Where can Customers find help resources in the *atHome* web app? Check all that apply.

1. By clicking on the '?' icon next to the page title
2. Through the 'Help' page accessible via the side menu

Correct answers: 1, 2

There are some important prerequisites for Installations that should be considered before installation.

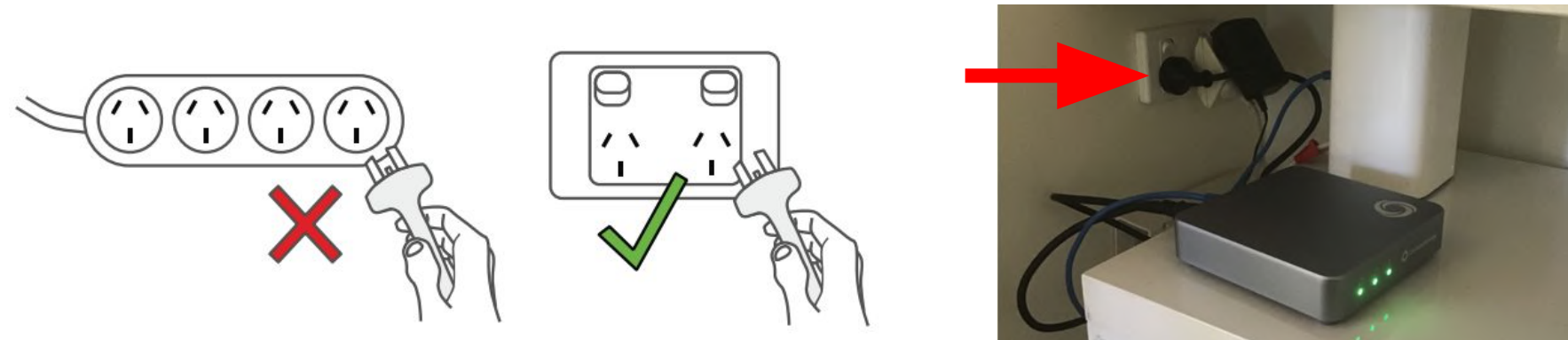
Make sure all of these requirements can be met before proceeding with an installation:

- 1. The site must have a permanent internet service**
- 2. The grid supply at the site must be monitored (using a Power Meter and CT clamps)**
- 3. All solar PV at the site must be monitored (either via data connection or using CT clamps)**
- 4. All batteries at the site must be monitored (with a data connection if supported by vendor)**
- 5. Batteries, Hybrid Inverters, and export-limiting Solar Inverters must have a data connection if possible**
- 6. Third-party energy control systems at the site (Amber, SolarEdge meter, Reposit, Solar Analytics meters with relays, etc) must be reported**

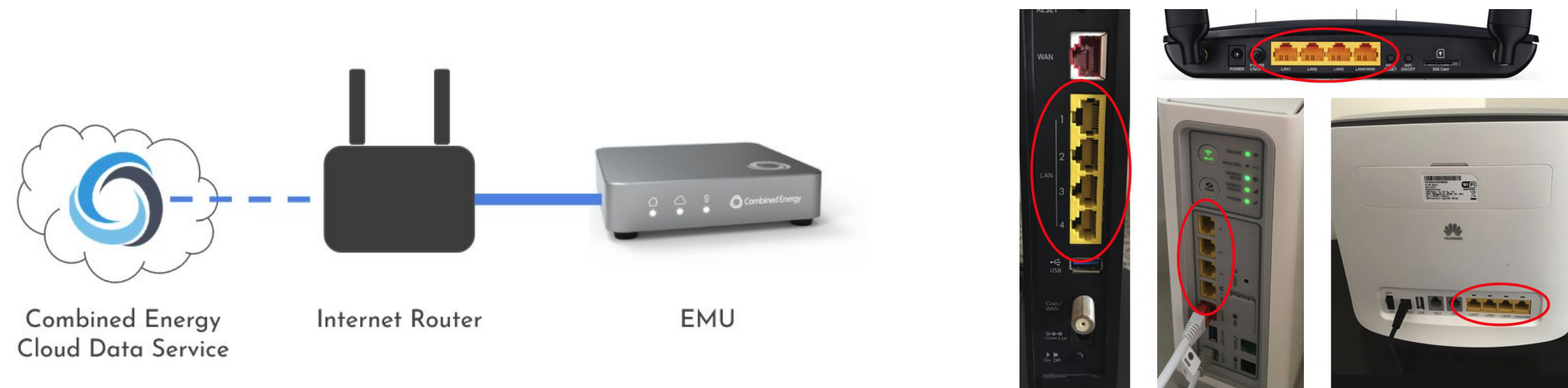
Installations

EMU Installation

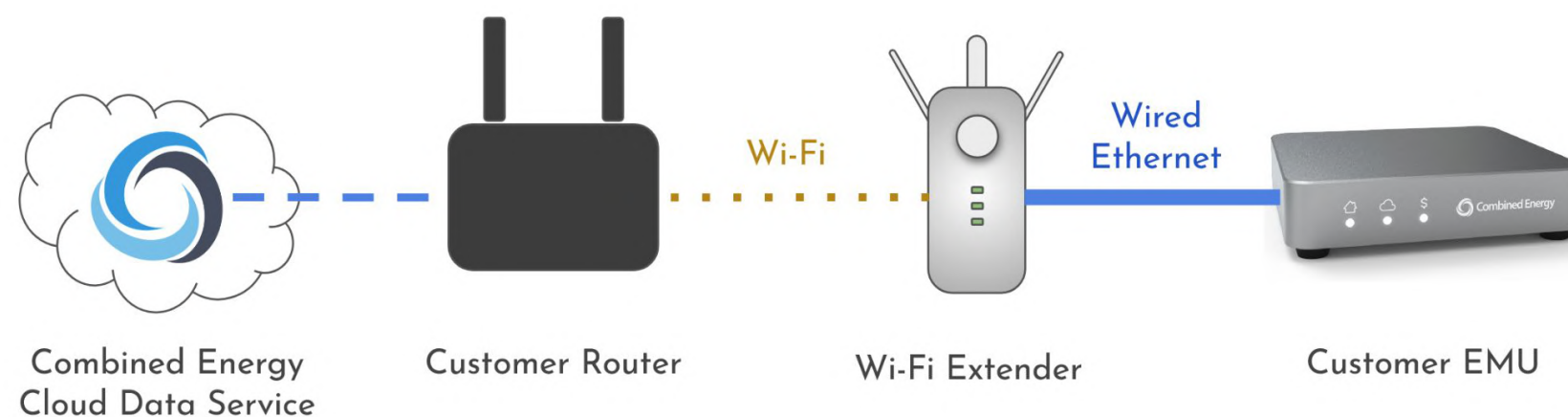
The EMU must be plugged directly into a wall outlet (**not** into a powerboard):



A spare Ethernet port (yellow "LAN" port) is required on the router to connect the EMU:



If the customer has a Wi-Fi hotspot only (i.e. no Ethernet port), a Wi-Fi extender with an Ethernet port can be added to the system:

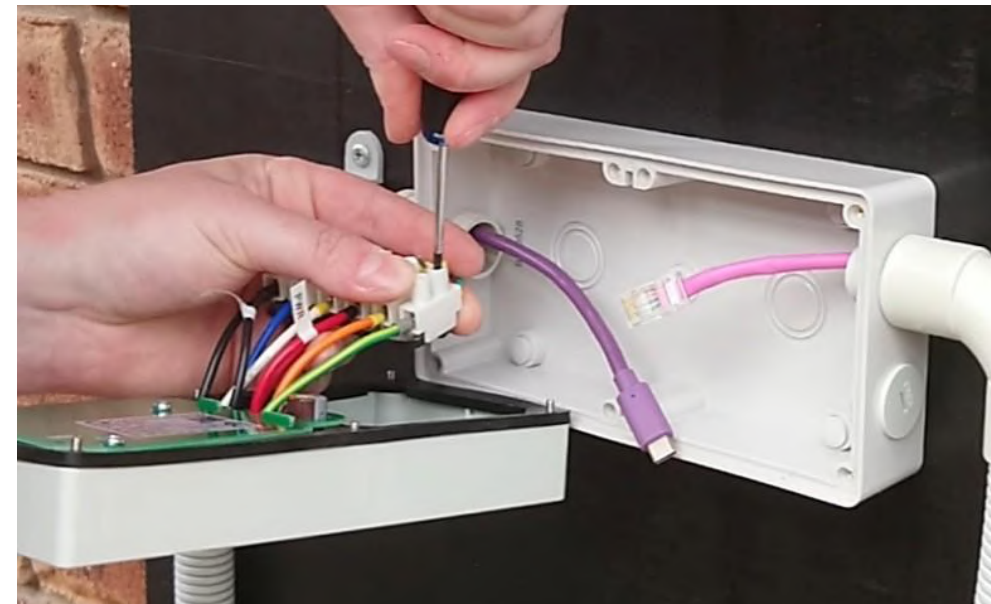


Installations

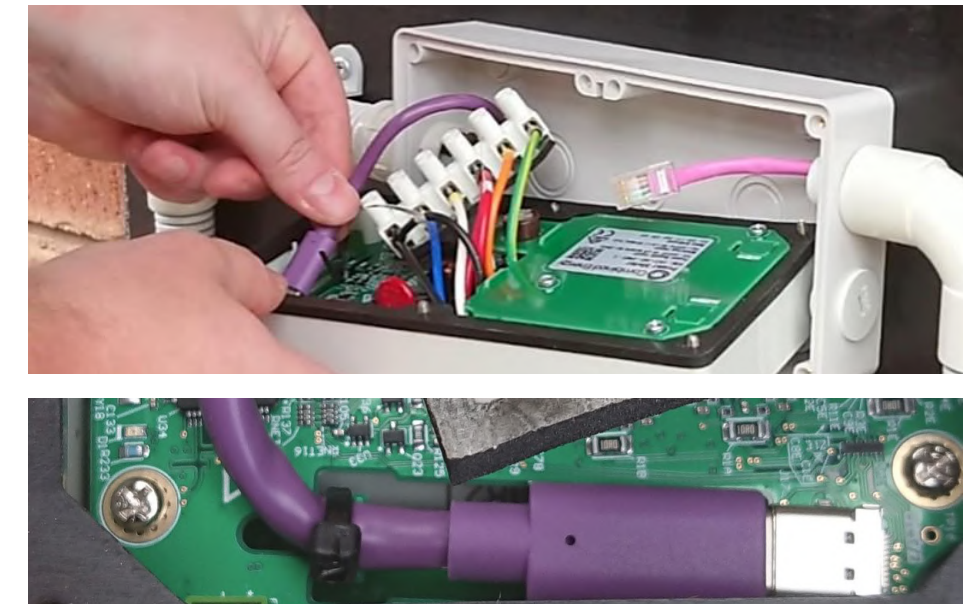
Power Meter Installation



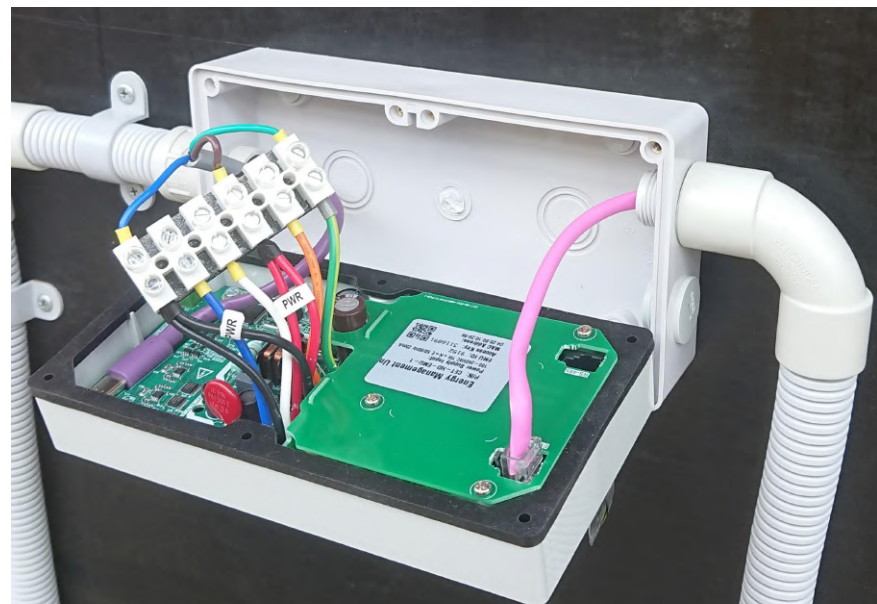
1 - Mount Enclosure Base to Wall



2 - Connect LV Supply Cables



3 - Connect CT Harness



4 - Connect Inverter Data Cable



5 - Close Lid and Seal



6 - Fit screw caps

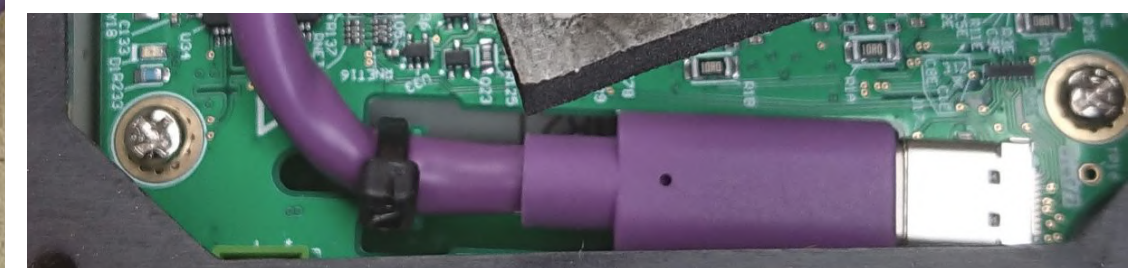
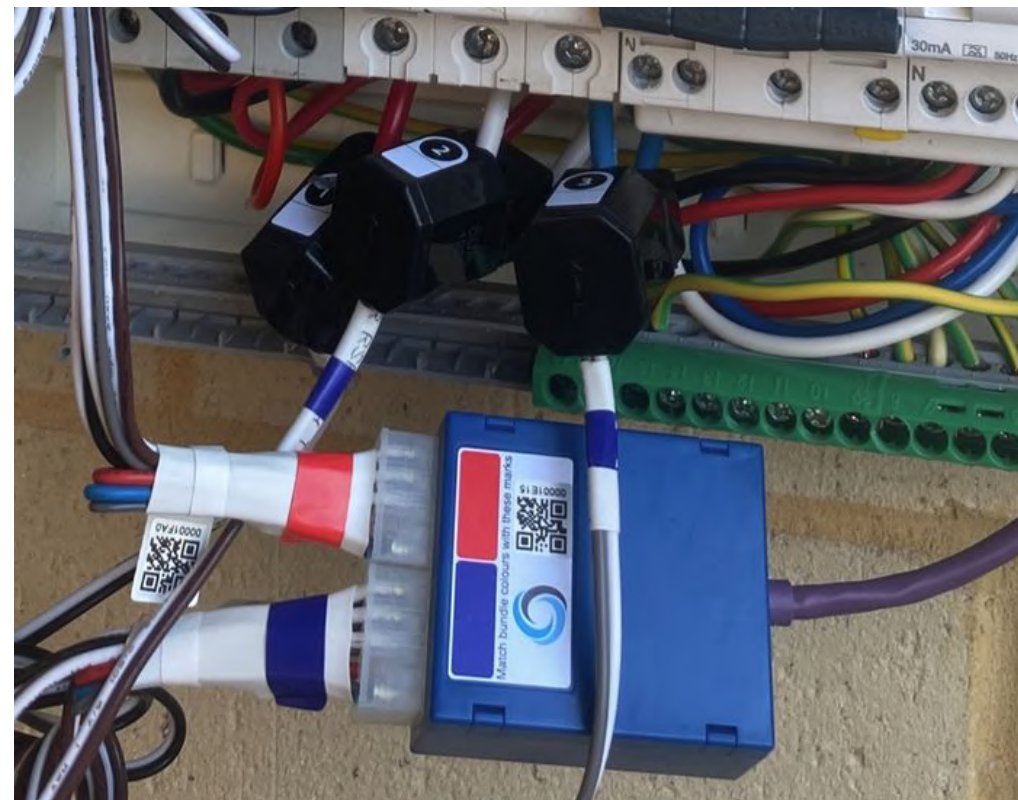
Installations

Power Meter CT Harness Installation

The Combined Energy **CT Harness** system enables easy connection of up to 6 Current Transformers (CTs) to Combined Energy metering products:



The CT Harness accepts up to two **CT Bundles**, each with three CTs:



Installations

Example single-phase site with PowerStore Grid Interactive (v2.0)

System description

- PowerStore Grid Interactive water heater being installed
- ABB Solar being installed (Inverter has Ethernet interface)
- Single-phase home
- Customer would like air-conditioning and cooking circuits monitored

Required Materials

- 1 x CET-HD-EMU-1 Energy Management Unit
- 1 x CET-HD-PM2-1 Power Meter
- 1 x CET-AS-CT1-30-1 CT Harness
- 1 x CET-CT1-B060606-1 60A CT Bundle
- 1 x 315E5X36 PowerStore Grid Interactive
- 3m double-insulated Ethernet cable



Installation Sequence

1. EMU plugged directly into wall outlet and connected to customer router:

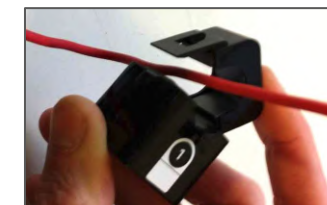


2. Power Meter installed on wall behind Main Switchboard adjacent to Inverter:










3. The Power Meter is connected to the Inverter with an Ethernet cable for comms.

4. CTs Installed in switchboard:
 - a. Red 1 clipped on to Grid supply
 - b. Red 2 on Air-conditioning circuit
 - c. Red 3 on Cooking circuit



5. Installer uses *onSite* web app to contact CET to test power meter, inverter connection, and check PowerStore is working correctly

Part Name	Part Number	Notes	Image
Energy Management Unit	CET-HD-EMU-1	<ul style="list-style-type: none"> Required at all Sites Supplied with power and Ethernet cable User Manual 	
Power Meter	CET-HD-PM2-1	<ul style="list-style-type: none"> Required at all Sites Supplied with mounting accessories CT Bundles and CT Harnesses ordered separately User Manual 	
CT Harness	CET-AS-CT1-05-1 (0.5m) CET-AS-CT1-30-1 (3m)	<ul style="list-style-type: none"> Each Power Meter requires one CT Harness to connect the CT Bundles Available in two lengths (3m / 0.5m) See PM2 User Manual for installation details 	
CT Bundle	CET-CT1-B060606-1 (60A) CET-CT1-B121212-1 (120A) CET-CT1-B202020-1 (200A)	<ul style="list-style-type: none"> CT Bundles have 3 CTs each Each Power Meter can support up to two CT Bundles CT Bundles plug into CT Harness Available in 60A / 120A / 200A options <ul style="list-style-type: none"> Higher current ratings available on request See PM2 User Manual for installation details 	

Part Name	Part Number	Notes	Image
<p>PowerStore Grid Interactive (v2.0)</p>	<p>315E5X36 (315L) 250E5X36 (250L)</p>	<ul style="list-style-type: none"> • PowerStore Grid Interactive water heater • Tempering valve built-in • Connects natively to EMU / Power Meter • User Manual 	
<p>Double-Insulated Ethernet Cables [5 packs]</p>	<p>CET-IT1-ETH15PK-1 (1.5m length) CET-IT1-ETH30PK-1 (3m length) CET-IT1-ETH50PK-1 (5m length)</p>	<ul style="list-style-type: none"> • Used for data connections between CET Power Meters / Comms Adapters and Solar/Battery Inverters 	
<p>USB-Ethernet Adapter for Goodwe Hybrid Inverters "LAN KIT USB"</p>	<p>GA10081-51-00P</p>	<ul style="list-style-type: none"> • Strongly recommended for use instead of RS485 for Goodwe hybrid inverters • Provides Internet access to Inverter for software updates 	

Question 1: Which of the following prerequisites must be met before Installation? Check all that apply

1. The home must have a permanent internet service
2. The grid supply at the site must be monitored
3. All solar PV at the site must be monitored
4. Batteries, Hybrid Inverters, and export-limiting Solar Inverters must have a data connection if possible
5. Third-party energy control systems at the site must be reported

Answer: 1, 2, 3, 4, 5

Question 2: How should the EMU be connected to power?

1. In a powerboard
2. Into an existing pass-through adapter
3. Directly into a wall outlet

Correct answer: 3








Question 3: How do you know if an Installation has been successfully completed?

1. Dealers and Channel Partners mark the installation as complete via the *onWatch* Portal
2. Installer contacts CET via the *onSite* app while at the site

Correct answer: 2

Products and Part Numbers

Installer Kit and replacement parts

Part Name	Part Number	Notes	Image
EMU System Installer Kit	299327	<ul style="list-style-type: none"> • 1 per Installer team strongly recommended • Collection of useful accessories and parts that are occasionally required during installation • Replacement parts listed below can be ordered separately 	
Split-core ferrite FAIR-RITE 0431164181 [22 pack]	299328	<ul style="list-style-type: none"> • Tray of 22 clip-on ferrites for improving PLT performance 	
Wi-Fi Extender TP-LINK RE200	056100	<ul style="list-style-type: none"> • Wi-Fi Range Extender for routers with no spare Ethernet ports, or for relocating EMU 	
5-port Ethernet Switch NETGEAR GS105	056101	<ul style="list-style-type: none"> • 5-port switch for routers with no spare Ethernet ports 	
CET RS485 Filter [5 pack]	CET-IT2-485FILPK-1	<ul style="list-style-type: none"> • Used with CET Power Meter when connecting to Goodwe DNS series inverters 	 x5
Ethernet cable 1.2m	052316	<ul style="list-style-type: none"> • Spare cable for use with 5-port switch if required 	
PowerStore Grid Interactive Controller bypass adaptor plug	050087	<ul style="list-style-type: none"> • Used to bypass PowerStore Grid Interactive Controller in event of a fault to ensure customer has hot water 	

Support

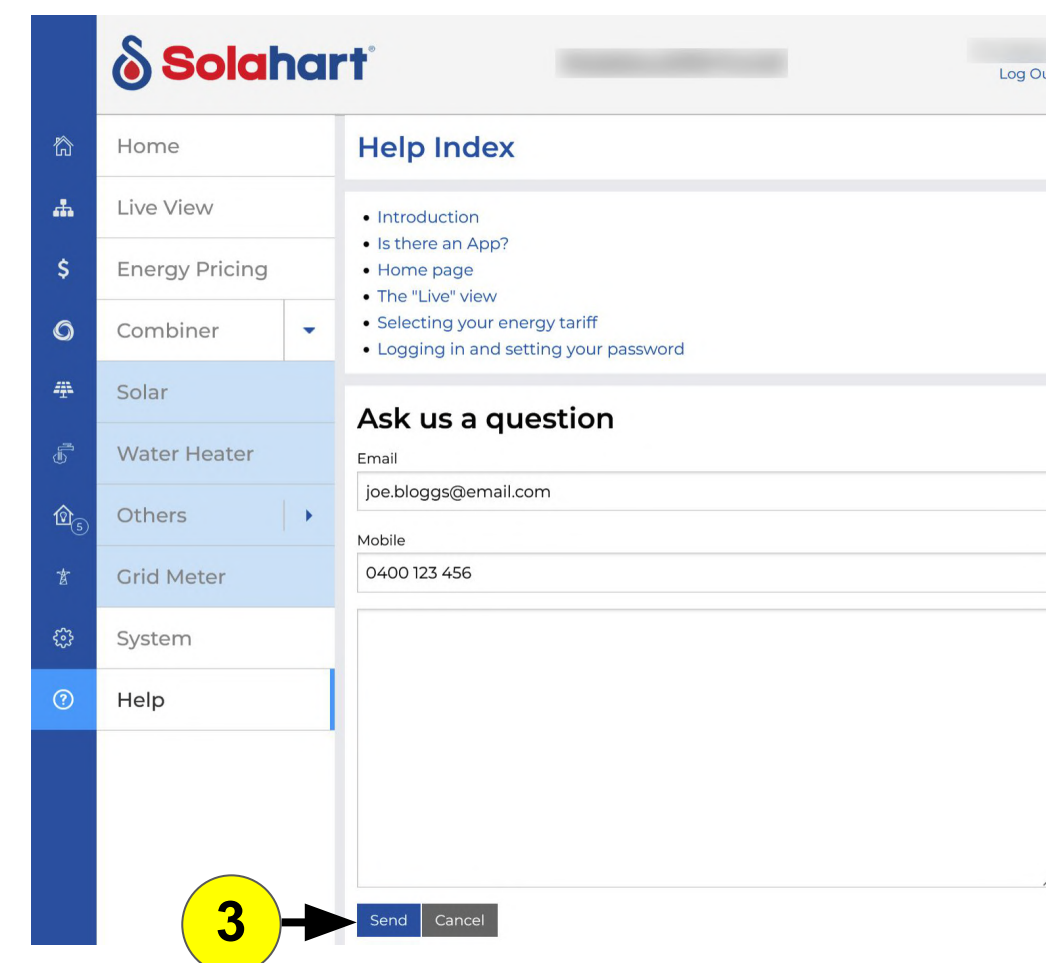
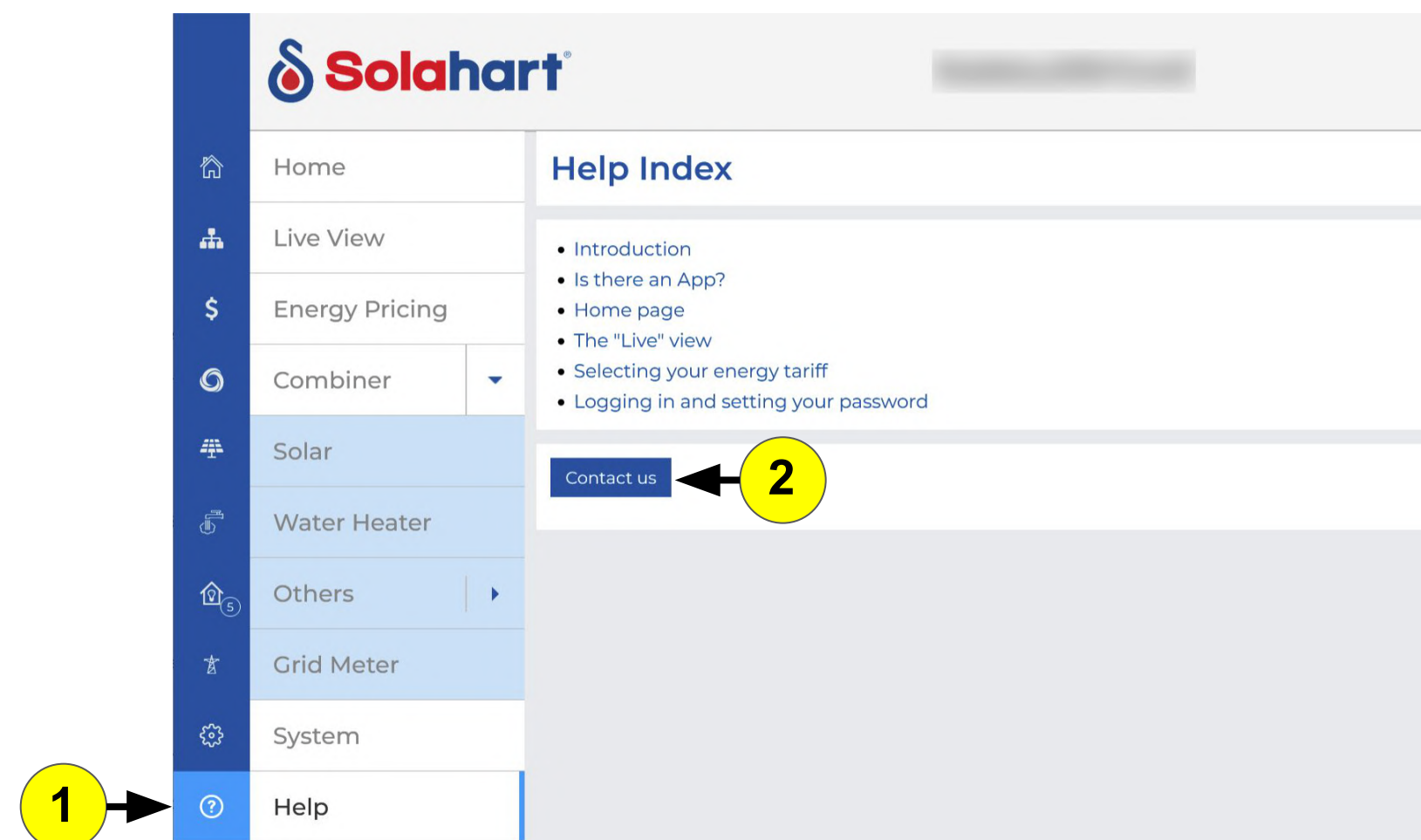
onWatch and *atHome* queries

For questions relating to:

- The *onWatch* Portal
- The *atHome* website
- CET Products
- System design and unusual installation requirements

Please email CET Support at: support@combined.energy

Customers and Dealers can also contact CET via the **Contact us** form on the Help page of the *atHome* website:



Support

When to contact CET Support



CET Support can help with:

- Issues relating to CET Apps and Services (e.g. *onWatch*, *atHome*, *onSite*)
- Issues relating to the Home Energy Management system at a specific site, such as:
 - Communication issues (EMU or devices offline)
 - Configuration issues (devices not appearing in Live View, invalid data)
- Setting or changing export limit rules at a site

For issues relating to Rheem products (e.g. PowerStore), CET Support can help with initial diagnosis and can refer product issues to Rheem Support if required.

Please contact CET Support if any part of a system is replaced or upgraded, for example:

- Replacement / repair of PowerStore water heaters
- Replacement / repair of Solar Inverters and Batteries
- Addition of any new major appliances, or any major electrical works

CET can confirm that the Home Energy Management System is properly configured and working before the Installer / service technician leaves the site.

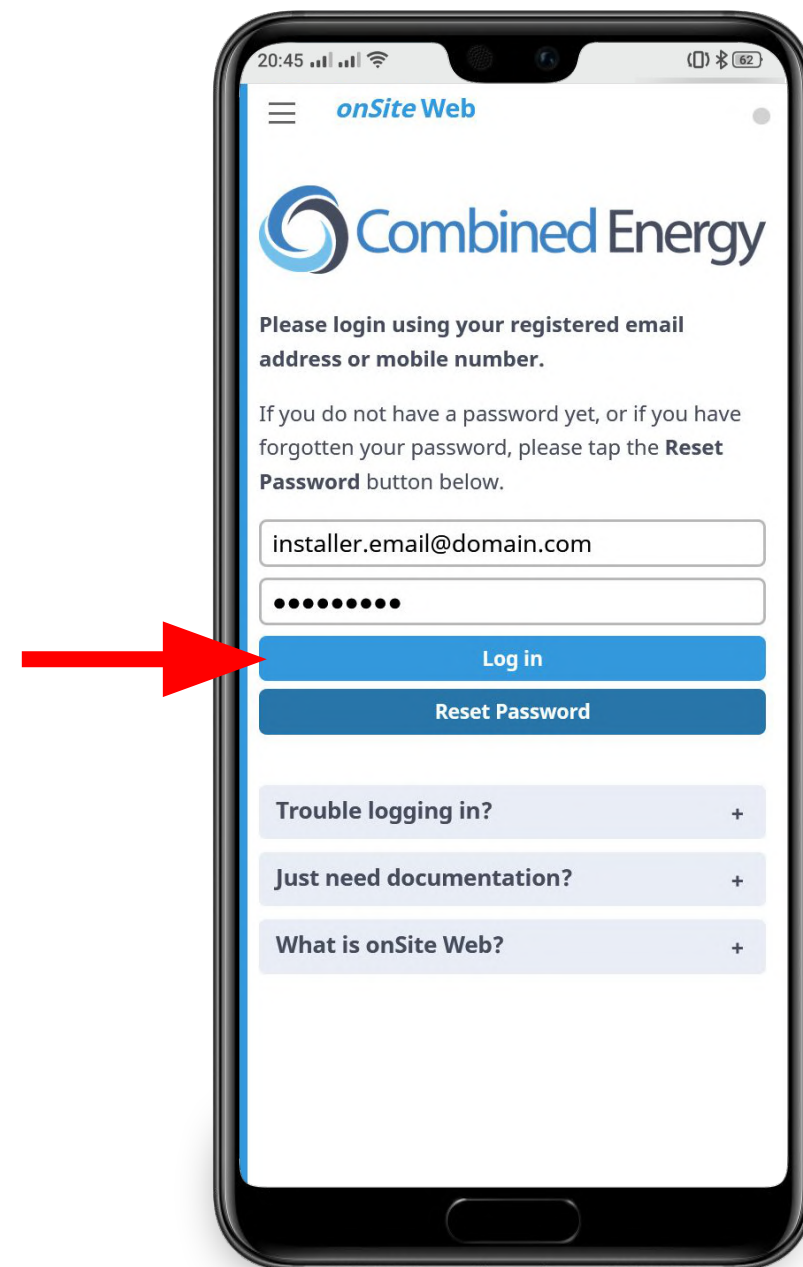
Support

Installer support through *onSite*

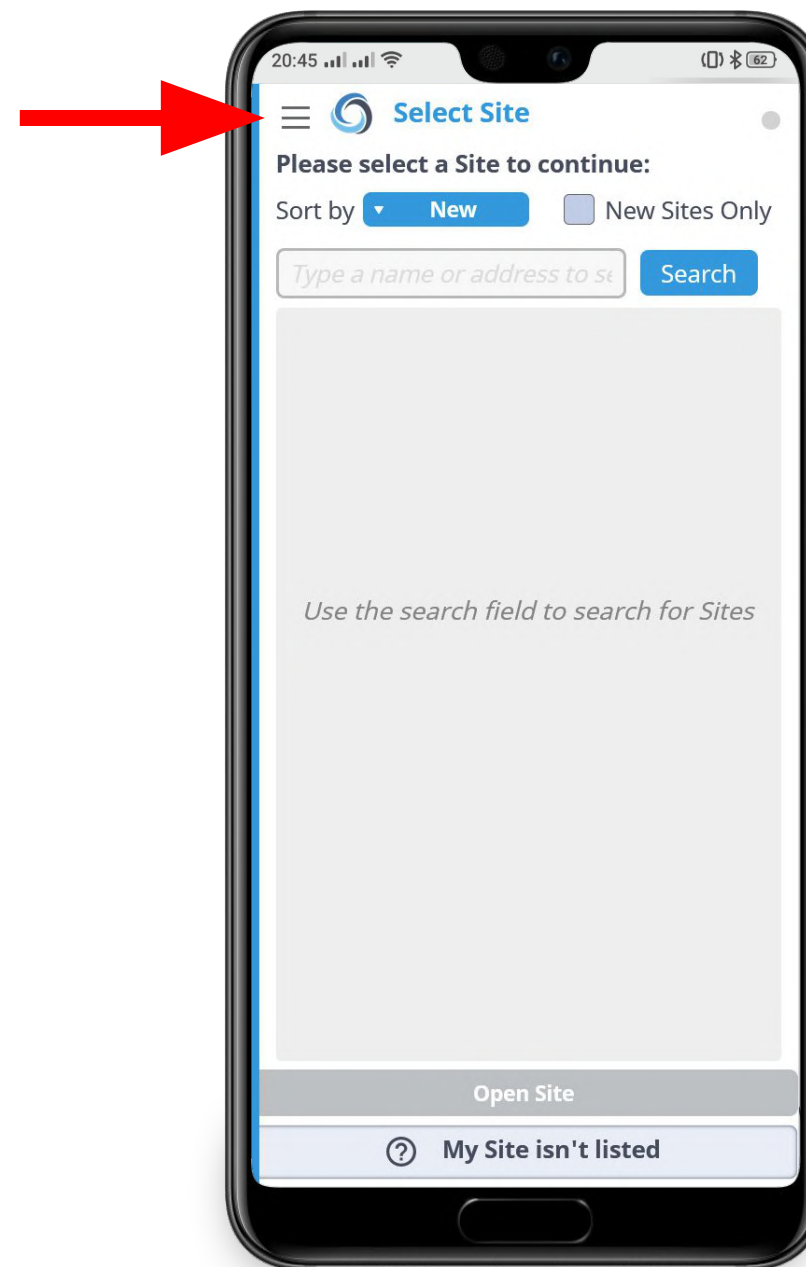


For Installers to receive support while at a site they **must be registered** by the Organisation that manages the customer.

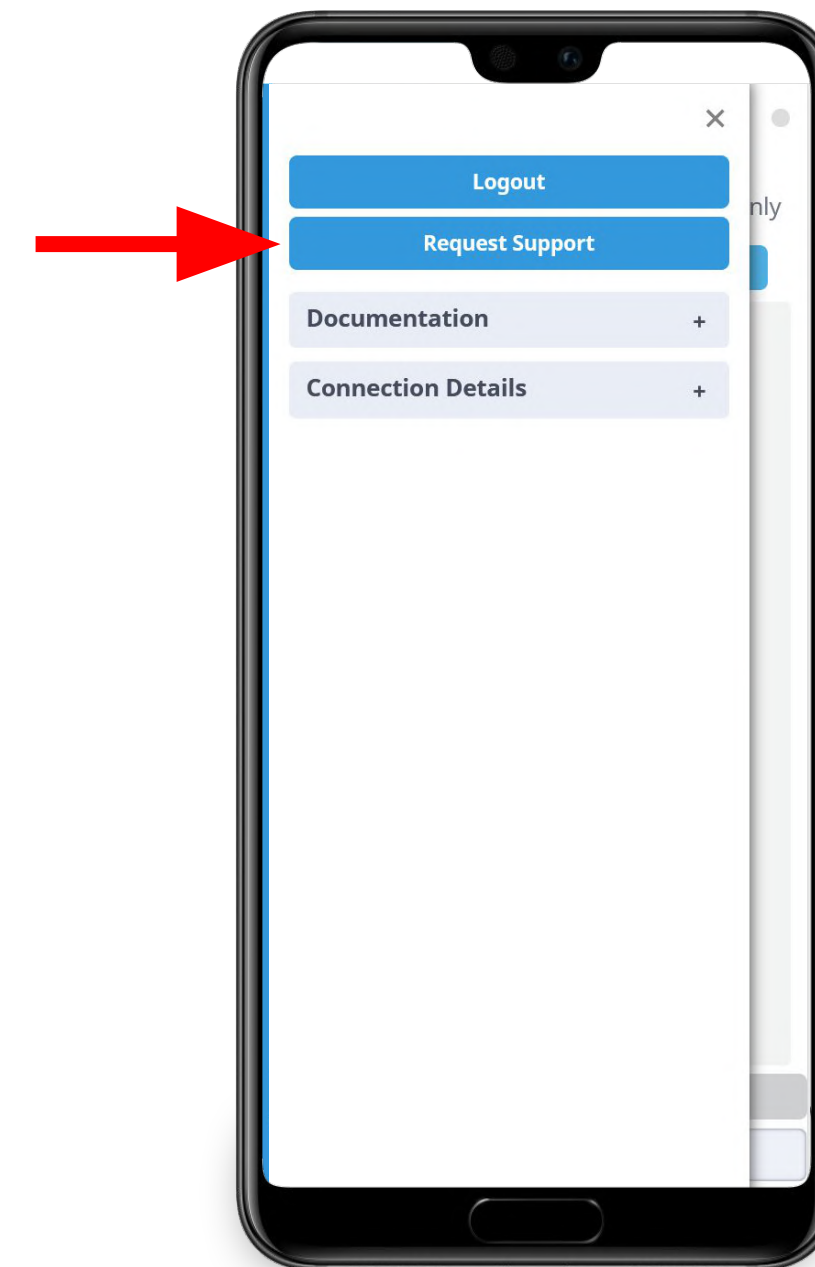
The *onSite* web app can be accessed at <https://onsite.combined.energy/>



Log In



Open Menu



Request Support

Question 1: How can Installers contact CET Support while on site?

1. By calling the CET phone support hotline
2. By logging in to the *onSite* web app and requesting support through the menu

Correct answer: 2

Question 2: How can Dealers and Channel Partners contact CET support? Tick all that apply

1. By emailing support@combined.energy
2. By submitting a help request via the 'Contact us' form on the *atHome* page for a specific site
3. By calling the CET phone support hotline

Correct answers: 1, 2

Question 3: What is required for an Installer to be able to use the *onSite* web app and complete an installation?

1. They must create an account for themselves on the Combined Energy website
2. They must be registered in the *onWatch* Portal as a member of the Organisation that manages the customer
3. They must call CET Support to request access

Correct answers: 2

Question 1: Which of the following does the Combined Energy System do to minimise the total cost of energy for the customer

1. Maximise solar self-consumption
2. Control the dimming level of lights in the home
3. Use the cheapest grid energy possible
4. Help homeowners understand the energy usage patterns in the home
5. Managing solar export limits intelligently

Correct answers are 1, 3, 4, 5

Question 2: How does a Home Energy Management System intelligently add value to PowerStore for the customer?

1. By reducing the flow rate of water from the PowerStore
2. By pre-charging the water heater with cheaper grid energy if the next day's weather will be bad and there will not be enough excess solar
3. By sending the customer an alert to tell them not to have a shower

Correct answer is 2

Question 3: Which of the following does the EMU do to manage energy at a home? Tick all that apply.

1. Analyse home energy data to detect usage patterns
2. Receive weather forecast and energy price information from the cloud
3. Coordinate major appliances to make best use of Solar, and to use the cheapest grid energy possible

Correct answers are 1, 2, 3

Question 4: True or false: A Power Meter is required at every site

Answer: True

Question 5: When would more than one Power Meter be required at a site? Tick all that apply.

1. If there are multiple switchboards at a site where CT monitoring is required
2. If the customer would like monitoring for more than 6 circuits at a switchboard

Correct answers are 1, 2

Question 6: What is the preferred method for integrating batteries into the Home Energy Management System?

1. Via a data connection to the Inverter (Ethernet or RS485)
2. By monitoring the battery with a CT

Answer: 1

Question 7: Where can Dealers and Channel Partners access the latest documentation for CET products and services?

1. Via the Resources page through the *onWatch* Portal
2. Google search

Correct answer: 1

Question 8: What must the customer do to ensure that their energy costs are being correctly calculated in the *atHome* web app?

1. Do nothing
2. They must enter their energy retailer plan details using the Energy Pricing page

Correct answer: 2

Question 9: Which of the following prerequisites must be met before Installation? Check all that apply

1. The home must have a permanent internet service
2. The grid supply at the site must be monitored
3. All solar PV at the site must be monitored
4. Batteries, Hybrid Inverters, and export-limiting Solar Inverters must have a data connection if possible
5. Third-party energy control systems at the site must be reported

Answer: 1, 2, 3, 4, 5

Question 10: How should the EMU be connected to power?

1. In a powerboard
2. Into an existing pass-through adapter
3. Directly into a wall outlet

Correct answer: 3

Question 11: How do you know if an Installation has been successfully completed?

1. Dealers and Channel Partners mark the installation as complete via the *onWatch* Portal
2. Installer contacts CET via the *onSite* app while at the site

Correct answer: 2

Question 12: How can Installers contact CET Support while on site?

1. By calling the CET phone support hotline
2. By logging in to the *onSite* web app and requesting support through the menu

Correct answer: 2

Question 13: How can Dealers and Channel Partners contact CET support? Tick all that apply

1. By emailing support@combined.energy
2. By submitting a help request via the 'Contact us' form on the *atHome* page for a specific site
3. By calling the CET phone support hotline

Correct answers: 1, 2

Question 14: What is required for an Installer to be able to use the *onSite* web app and complete an installation?

1. They must create an account for themselves on the Combined Energy website
2. They must be registered in the *onWatch* Portal as a member of the Organisation that manages the customer
3. They must call CET Support to request access

Correct answers: 2