tepeo

tepeo ZEB®: A Quick Start Guide

V5.0
ZEB-40R_03

Contents

Welcome to tepeo

Congratulations on the installation of your brand new Zero Emission Boiler (ZEB®) and thank you for leading the charge towards emission-free heating

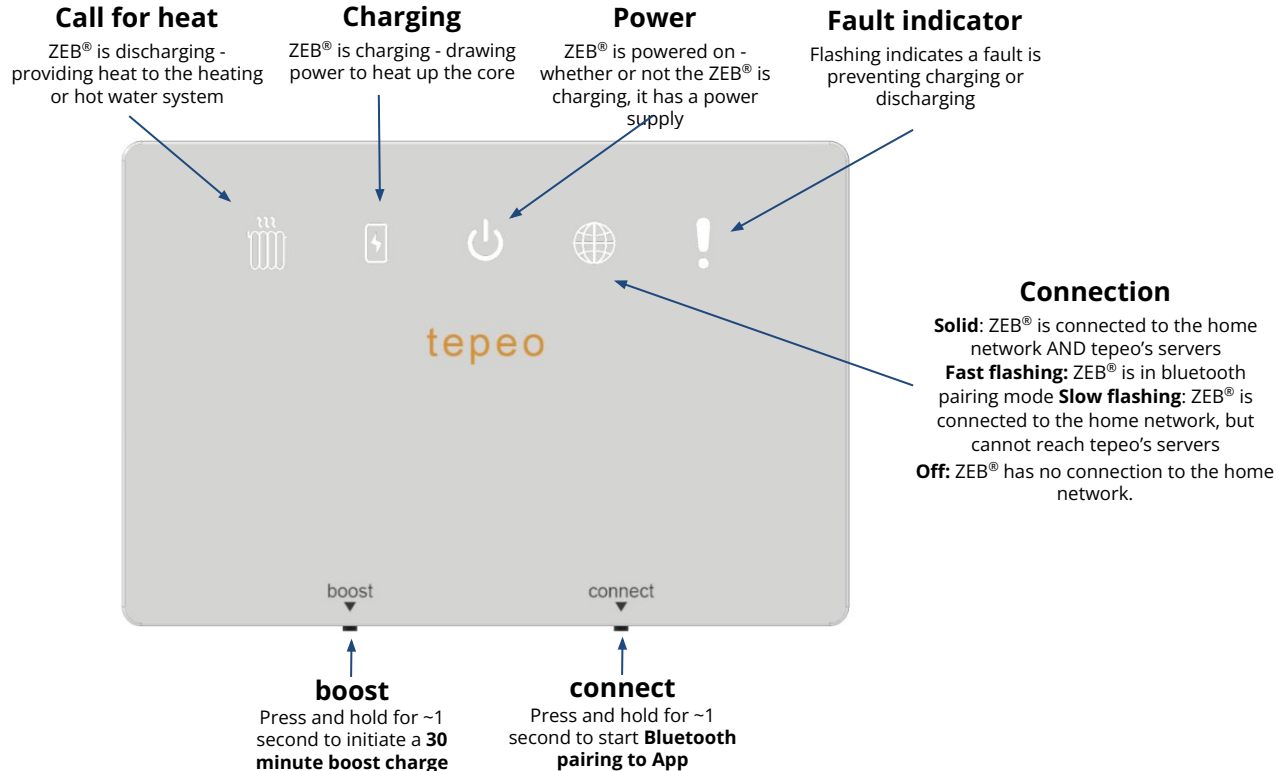This guide is designed to help get you started and answer any simple questions you might have about your ZEB®

If you want to get in touch, you can email us at
customer.service@tepeo.com

How the ZEB® works

Your Zero Emission Boiler operates much like a normal boiler - turning on when you need heat and sending hot water off to your radiators, underfloor heating or to heat-up your hot water tank. The crucial difference is that it is powered by electricity and uses thermal storage to utilise cheap, off-peak electricity to provide its heat. Here's how it works in a nutshell...

1 Electric heating elements heat a high density and highly insulated thermal storage core - storing up to 40kWh of energy

2 When your thermostat asks for heat, air is circulated around the thermal storage core. This air picks up heat and transfers it to a heat exchanger in the base of the ZEB®.

3 From here, a pump external to your ZEB® moves water through the heat exchanger and the heat is passed to your heating / hot water system.

4 The ZEB® constantly monitors its heat output, the energy in the core and external factors like weather, grid carbon intensity, and your tariff to determine when & how much to charge. Meeting the heat demand in your home may require some daytime top up charges at peak rate. This is normal and to be expected in cold weather.

5 This process repeats each day, and throughout the day in real time.

The ZEB® user interface

Call for heat
ZEB® is discharging - providing heat to the heating or hot water system

Charging
ZEB® is charging - drawing power to heat up the core

Power
ZEB® is powered on - whether or not the ZEB® is charging, it has a power supply

Fault indicator
Flashing indicates a fault is preventing charging or discharging

tepeo

Connection
Solid: ZEB® is connected to the home network AND tepeo's servers
Fast flashing: ZEB® is in bluetooth pairing mode **Slow flashing**: ZEB® is connected to the home network, but cannot reach tepeo's servers
Off: ZEB® has no connection to the home network.

boost

connect

boost
Press and hold for ~1 second to initiate a **30 minute boost charge**

connect
Press and hold for ~1 second to start **Bluetooth pairing to App**

5

tepeo App

Download the tepeo App from the App Store or Google Play store, and create a tepeo Account. There is a demo mode if you haven't got your ZEB® yet.

Search 'tepeo' and download the tepeo App, or scan the QR code below.

Create an account - you can do this using an existing service like a Google or Apple account, or directly using your email address.

The App will enable you to monitor the performance of your ZEB®, and to change key settings such as the WiFi network, tariff and cost/carbon preference.
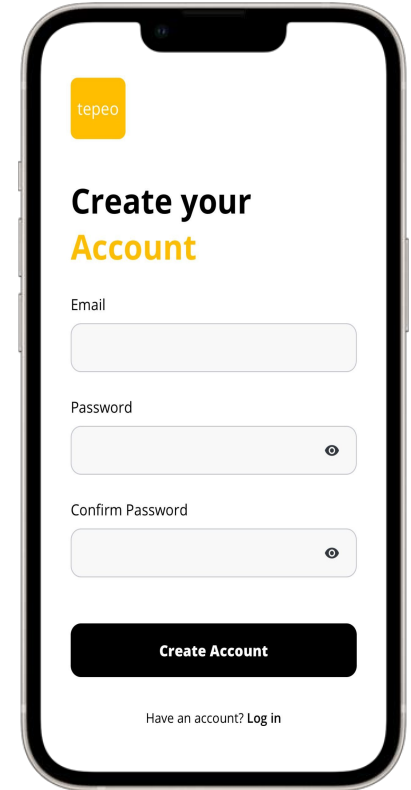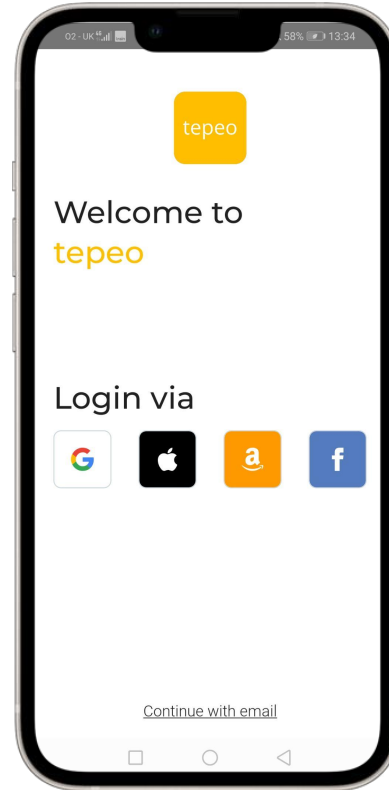
How to register your ZEB® (1/3)

- Log in to the App

- Choose 'Connect device'

- Follow the steps in the App

- At Step 2 press the **CONNECT** button on the ZEB® User Interface for ~1 second.

- This will put the ZEB® into **Bluetooth** pairing mode, and the connection LED will start to flash…

Please note your ZEB® should be registered during installation by your installer, but this process will let you add extra users / devices too.
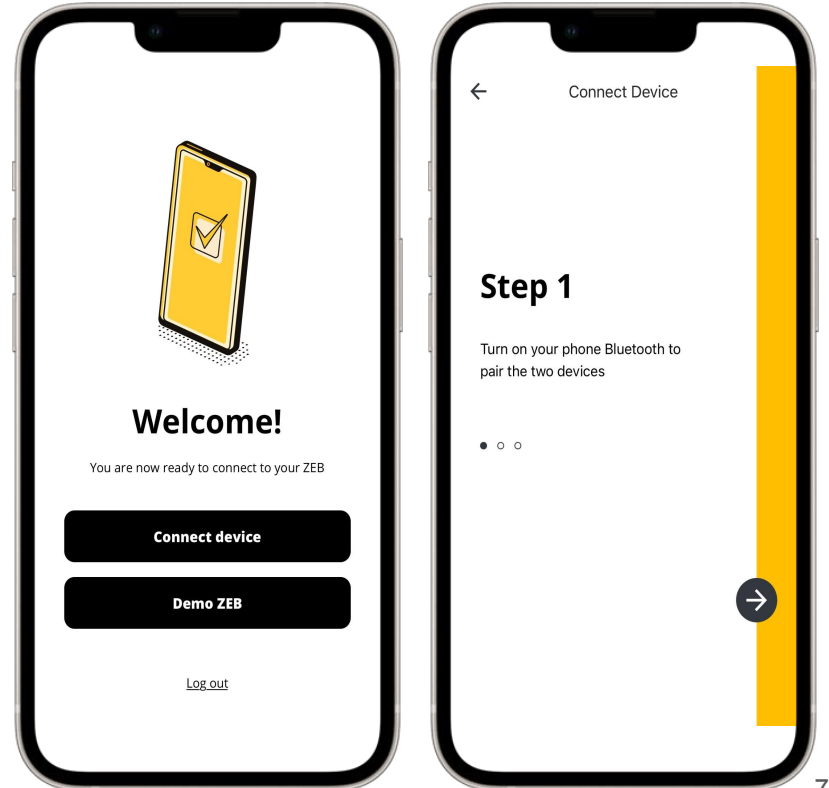
Register your ZEB® (2/3)

- Search for a ZEB®

- Choose your ZEB® from the list provided
  - in a scenario where multiple ZEB®s are being installed, they must be put into pairing mode individually to avoid pairing to the wrong ZEB®

- Press Connect in the app

*Please note - you need to have **Bluetooth** turned on on your device to search for the ZEB®. If you cannot find the ZEB®, reset the ZEB® by turning the main supply off, waiting 10 seconds, then turning it back on. It might be necessary to reset your device too to ensure Bluetooth is working correctly.*
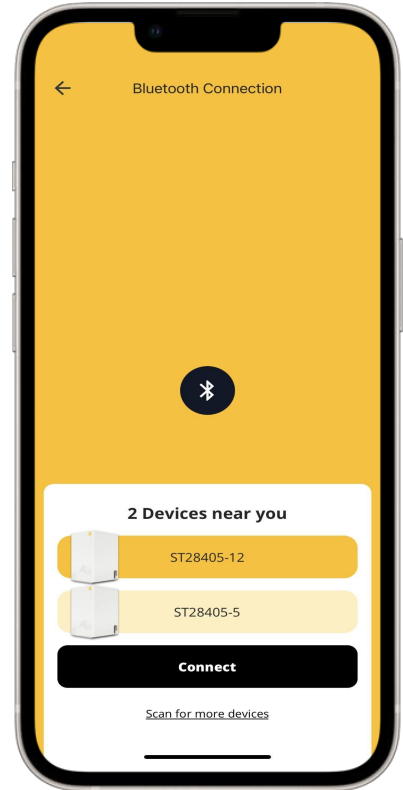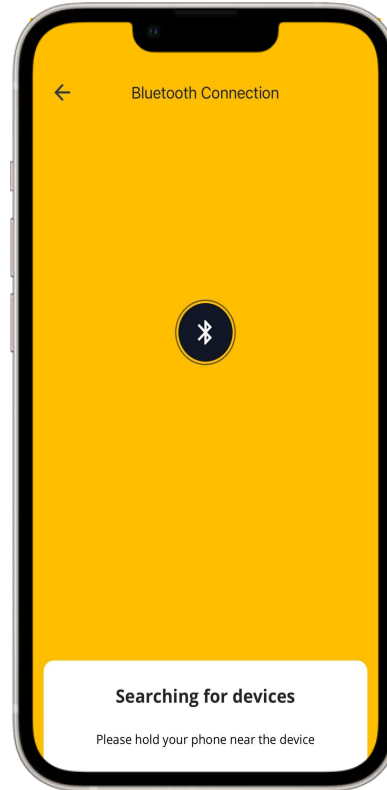
Register your ZEB® (3/3)

- If pairing is unsuccessful please repeat the sequence in step 1

  *Please note **Bluetooth** versions vary across devices, if connecting to the ZEB® is repeatedly unsuccessful it is best to try with another device.*

- Once connected, you will be asked to enter your home Wi-Fi Network name (SSID) and password

- Alternatively you may connect your ZEB® using an ethernet cable - this simply plugs in to the lower edge of the user interface
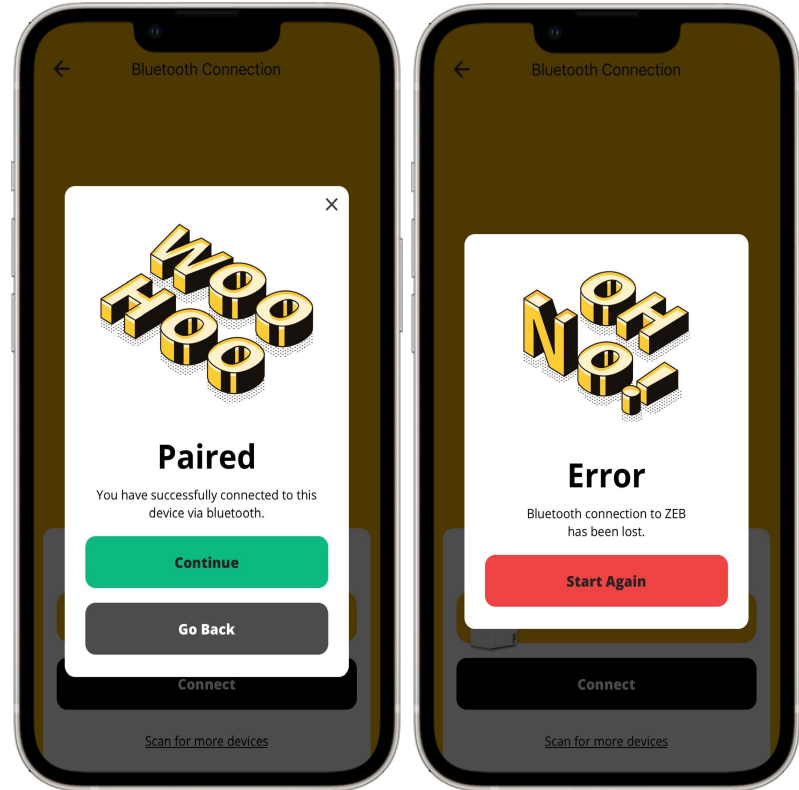
Tariff and setup

After setup is complete the primary user can review and make changes.

The primary user is the account which originally set up the ZEB®.

Secondary users can be added by following steps 1 to 3.

Tariff - it is important to correctly enter your tariff as the ZEB® uses the tariff information (price & timing) to inform the charging schedule.

Charging Style - this allows you to choose a charging priority to suit how you want the ZEB® to charge relative to cost/carbon.

Smart Charging - this allows you to turn on/off smart charging. With Smart Charging OFF, you can set a custom charging schedule.
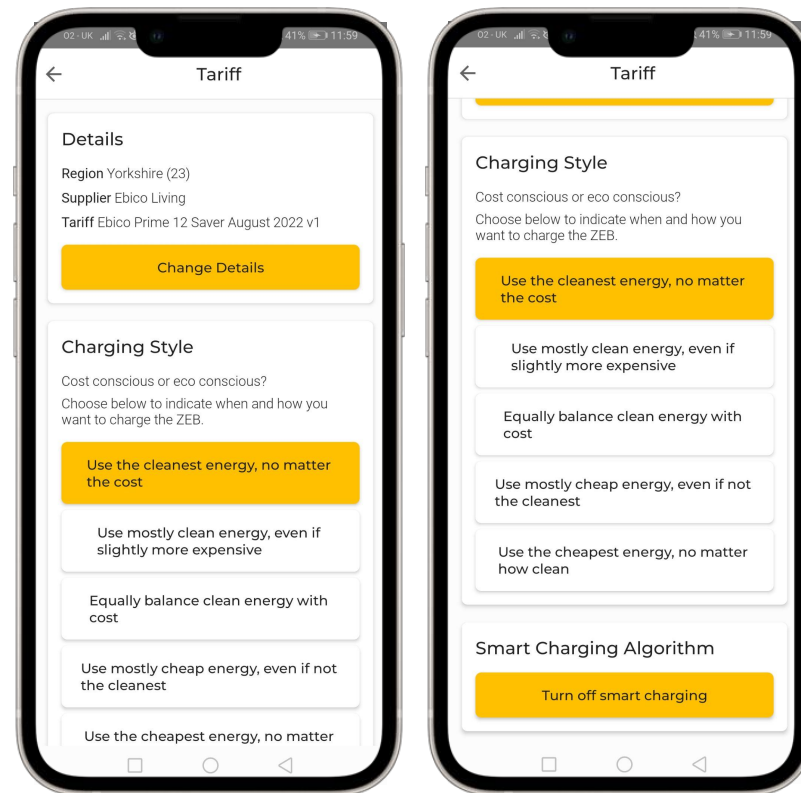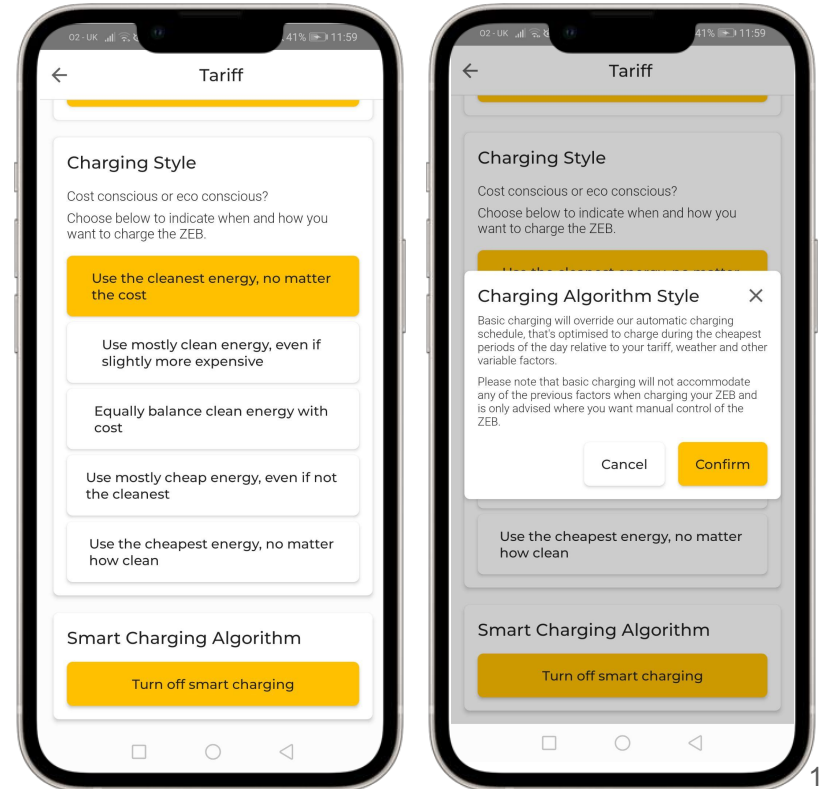
Charging your ZEB®

Smart Charging - your ZEB® will automatically calculate when and how much to charge based on your tariff, local weather forecast, grid carbon intensity and a prediction of your heat demand based on past use. You can choose whether your ZEB® is more cost or carbon conscious to nudge the ZEB® to optimise accordingly.

e.g. the ZEB® predicts 25kWh of heat demand: some in the morning, some in the afternoon. It calculates a charging schedule and charges 23kWh overnight with 2kWh top-up in the afternoon given a low carbon intensity period at 3pm.

Basic Charging - your ZEB® will charge for the full duration of your off-peak period, then top up if needed through the day. If the weather forecast is >16ºC it will only charge to 50% off-peak.

e.g. the ZEB® predicts 25kWh of heat demand as above, with the weather forecast of 10ºC. It charges for 4 hours overnight to 36kWh and does not need to charge again during the day.

Charging your ZEB®

Custom Charging - your ZEB® will charge to the target levels you set throughout the day. Smart / Basic charging are disabled and the ZEB® will do as instructed - not varying with the weather, grid carbon intensity or changes in heat demand over time.

This could mean your ZEB® will charge more than is needed (e.g. in mild weather) OR that your ZEB® does not charge enough to meet your heat demand (e.g. in cold weather).

Please ensure that you have considered the timing & pricing of your tariff when setting these times and targets. The ZEB® will simply charge when it is told to, not automatically based on your tariff.

e.g. the ZEB® predicts 25kWh of heat demand as above, with the weather forecast of 10ºC. It charges for 4 hours overnight to 36kWh and does not need to charge again during the day.
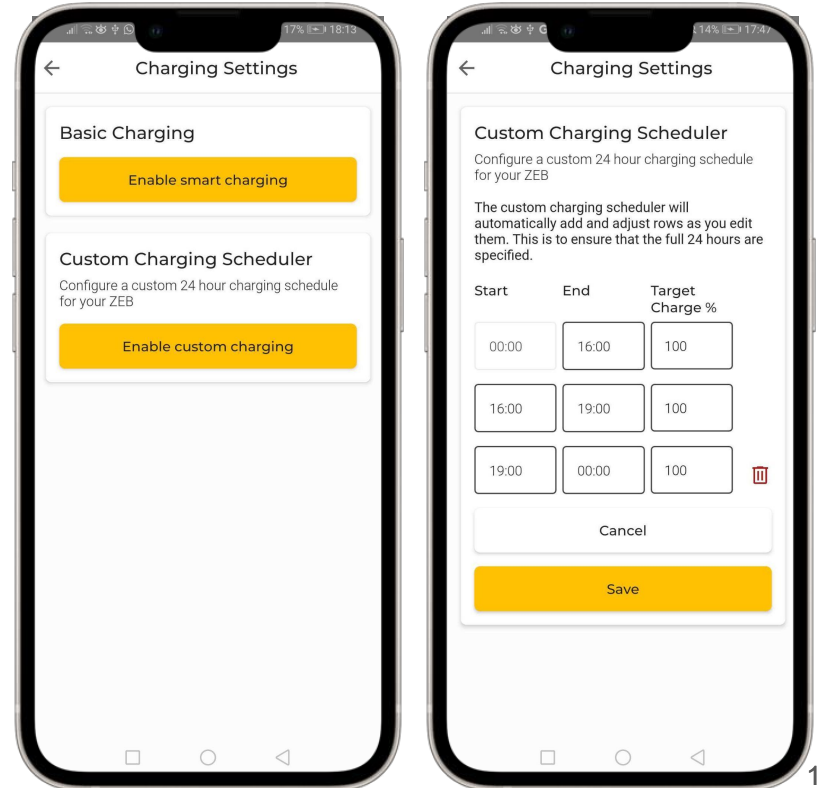
ZEB® Settings

After the setup is complete for your tariff, changing style and smart charging preference, the Primary User can adjust the Flow Temperature under ZEB® Settings:

Details - change primary user, change Wi-Fi, unlink ZEB®...

Flow Temperature - this will have been set in consultation with your installer to suit your system, take care lowering this - particularly if you have a stored hot water cylinder.
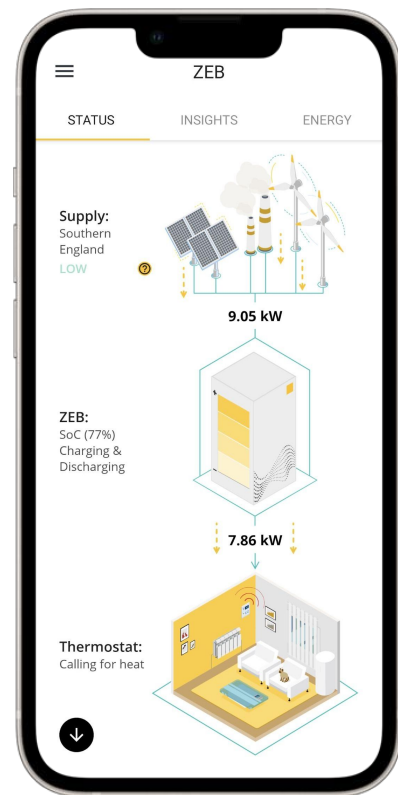

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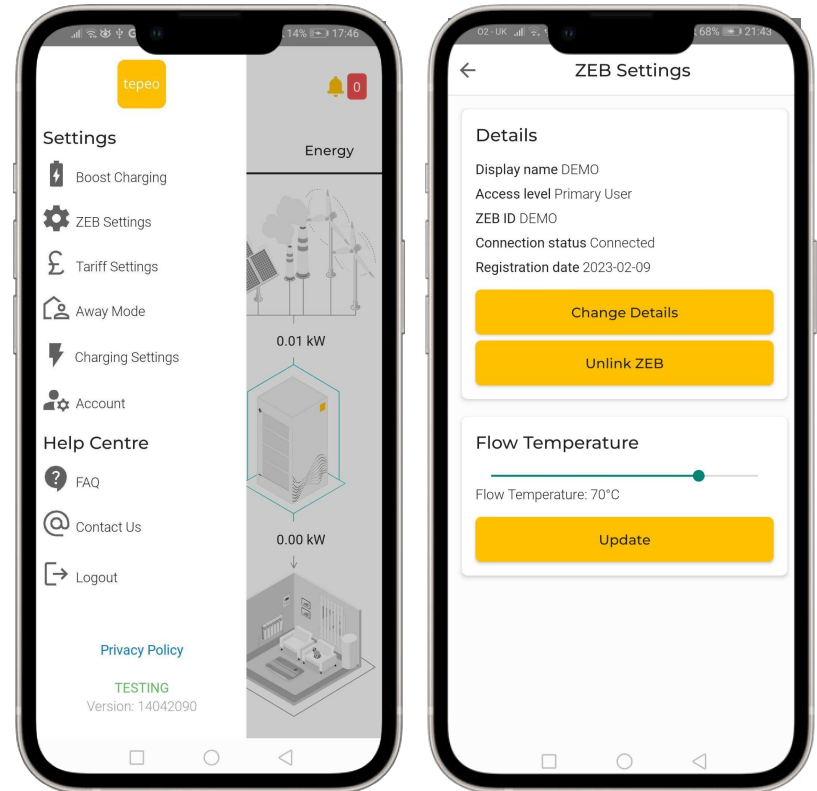
Using the App - STATUS page

After the setup is complete, the App can be used to see the current status of your ZEB®, and gain insights into its energy consumption and running cost.

Supply - with real-time carbon intensity of the local network that is providing power to your ZEB® (carbon intensity = HIGH / MEDIUM / LOW).

ZEB® - current State of Charge (%) and whether the ZEB® is charging (drawing power), discharging (providing heating / hot water), or idle.

Thermostat - whether your thermostat or programmer is calling for heat / hot water or not.

ZEB

STATUS   INSIGHTS   ENERGY

Supply:
Southern
England
LOW

9.05 kW

ZEB:
SoC (77%)
Charging &
Discharging

7.86 kW

Thermostat:
Calling for heat

Using the App - INSIGHTS page

The **INSIGHTS** page shows a summary of:

COST - shows the cost of charging your ZEB® given the tariff set in the app.

CARBON EMISSIONS - Carbon Emissions is the cumulative CO_2 (and other greenhouse gas equivalents) produced when charging your ZEB® given the mix of power generators in your region from the National Grid.

These fields can be further expanded to show the breakdown per day, week, month or year.
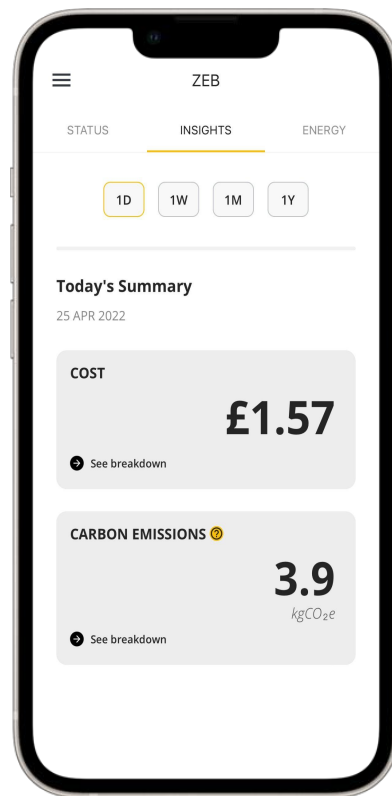
Using the App - ENERGY page

The **ENERGY** page shows what the ZEB® has been doing over time:

State of Charge (kWh) - as the ZEB® charges and discharges, the amount of energy in the core increases and decreases. The State of Charge graph shows how these energy levels change over time.

Electricity in (kWh) - shows when and how much electricity the ZEB® is drawing to provide heating to your home. The time and quantity of electricity going into the ZEB® is determined by your tariff, the local weather, grid carbon intensity and how much heating your home uses.

Heat out (kWh) - shows when and how much heat is being delivered to your home (heating and hot water system). This should match what your thermostat, programmer and hot water store are requesting from the ZEB®.

These graphs can be viewed for specific days by changing the date at the top of the page.
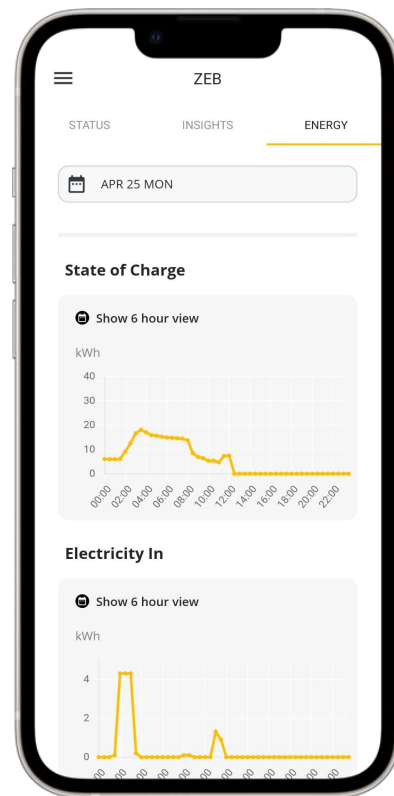
Away Mode

From the **Settings** menu choose **Settings** and **Away Mode.**

Activating **Away Mode** will pause re-charging while you are away, this saves you energy.

Set the **return date** for the day you get back, the ZEB® will charge ready for your return - using your tariff to help determine when is best to charge in advance.

Only the **primary user** can make changes to Away Mode

Please note: the ZEB® will still maintain a minimum state-of-charge in away mode. This is to ensure a small reserve of heat is available in case your thermostat calls for heat e.g. if it is in frost-protect mode.

Remember to set your thermostat to holiday/away mode too!
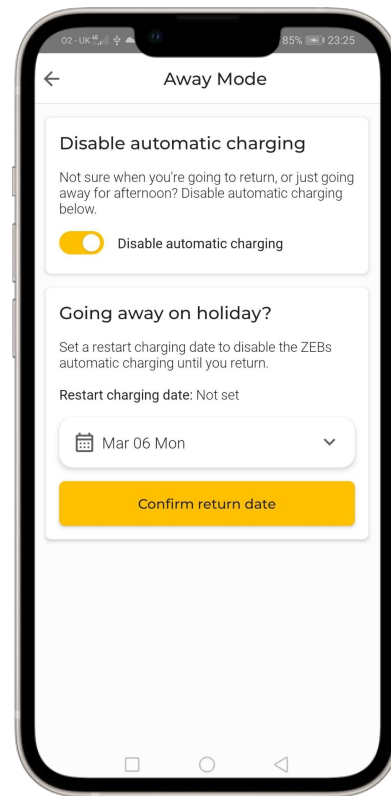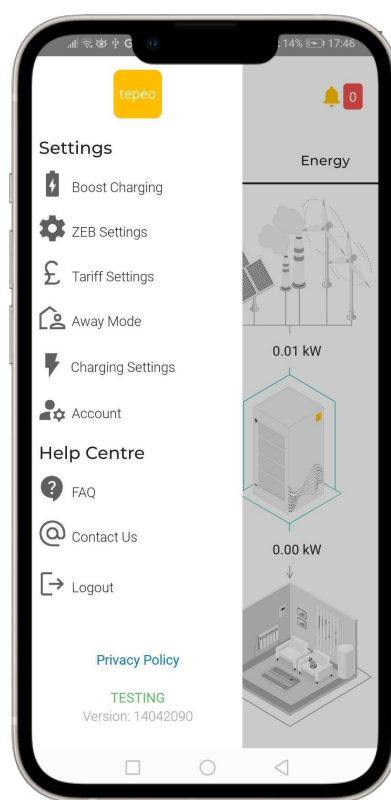
Boost Charging

Boost Charging: starts 30 minutes of charging.
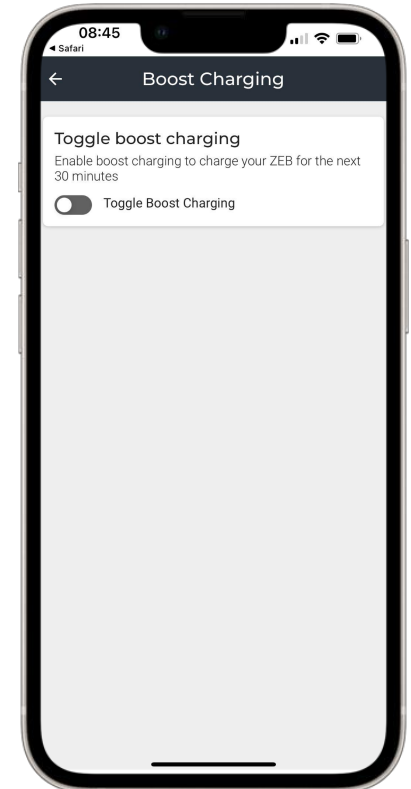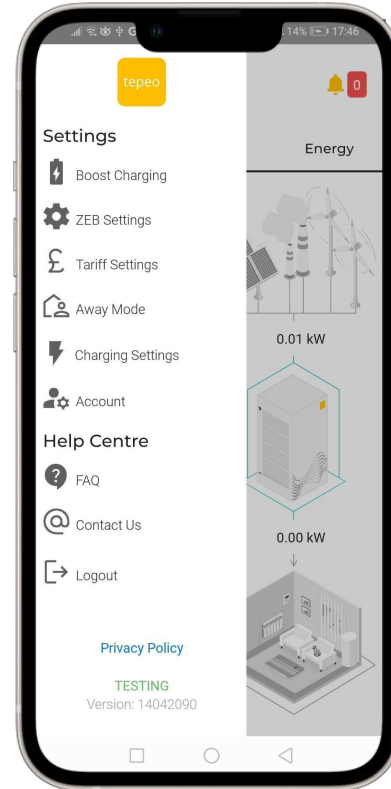
Use this when you want to **top-up the state of charge of your ZEB® manually.**

This has the same effect as pressing the **BOOST** button on the User Interface for 1 seconds.

This will not change your normal charge settings, **and will not repeat.**

Note: If your ZEB® is already fully charged, or at a high state of charge AND discharging - **boost may not be possible**.

Delete your account

If you no longer wish to have the tepeo App you can delete your account - this is found in 'Account Settings'.

Note that this will mean you no longer have any ability to control your ZEB® or change tariff information.
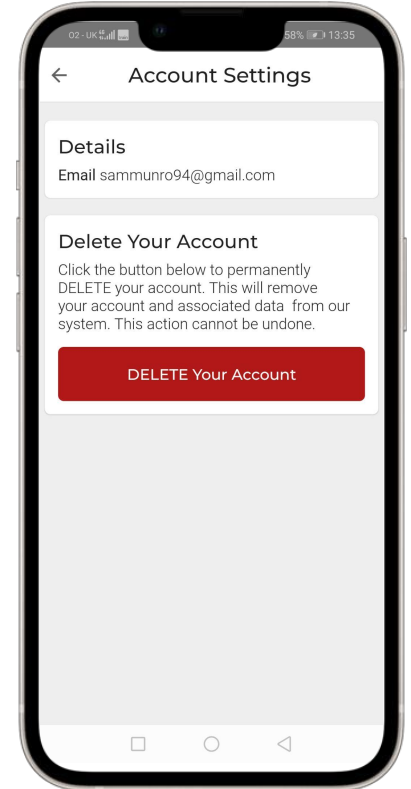
Solar PV integration

The ZEB® will soon be able to charge on excess solar electricity generated by a home's solar PV array.

This functionality is currently in beta so if you're interested in being part of our beta programme please get in touch at:
customer.service@tepeo.com

Troubleshooting, maintenance and support

Troubleshooting:

Your ZEB® will self-diagnose and correct most connectivity issues or intermittent operational faults. For example, the ZEB® will automatically reconnect to your wifi if the connection is lost.
If the ZEB® detects a fault which isn't automatically corrected, the fault indicator on the user interface with flash "!"

Power cycling the ZEB® may re-set the issue (turning the ZEB® off at the isolator switch, waiting 10 seconds, then turning the system back on). If this fails to fix the issue, please contact customer.service@tepeo.com

Maintenance & support:

Like with all boilers and heat pumps, some maintenance is required to keep your ZEB® working at its best.

As a minimum, you can arrange an annual ZEB® Health Check to maintain your 10 year guarantee.

Alternatively, our tepeo Care plan can offer peace of mind, helping to maintain your 10-year guarantee by providing the ZEB® Health Check, remote monitoring, alerts and additional member benefits (such as discounted heating system repairs).

You can find out more about our guarantee, tepeo Care plan and ZEB® Health Check at www.tepeo.com

FAQs

We're regularly updating our FAQs so please visit www.tepeo.com/faqs for hints & tips.

Q. How long does it take to charge?
A. 4.5 hours from empty. It can deliver heating after half an hour (from cold)

Q. What happens if I demand heat at a faster rate than it can be replaced in the ZEB®?
A. The ZEB® discharges in the range 0-15kW but charges at 9kW - the ZEB® state of charge will deplete faster than it can be replaced if the discharge rate exceeds 9kW.

**Q. Will the ZEB® use peak-rate electricity to charge, or just off-peak?**
A. Depending on the heat demand of your home, the ZEB® may be able to provide heating & hot water solely from off-peak charging. If the heat demand is higher, the ZEB® will top-up charge using peak electricity. This top up charging occurs when the ZEB® reaches its 'minimum state of charge' which we set to ensure a reserve of heat is available either for unexpected demand, for frost protection. On days with high heat demand we might also schedule additional charging during the day.

Q. What happens in a power cut?
A. Just as with a conventional boiler, the circulation pump will not work if there is no power supply, so heat will not be able to be provided. The stored heat will remain in the core for several days but will slowly be lost.

Q. Can my ZEB® draw electricity at the same time as a my EV charger?
A. Yes, a typical charger will draw 30A, the ZEB® 40A, so together 70A - less than the typical 100A household limit.
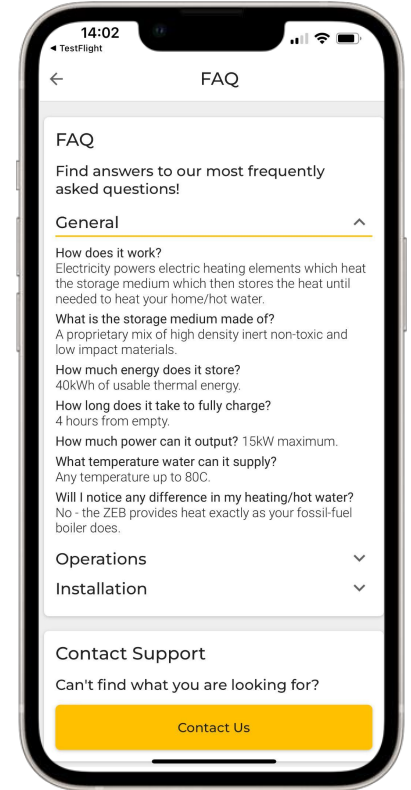
FAQs

Q. What flow temperature will the ZEB® deliver?
A. The ZEB® has a peak power output of 15kW and a continuous output of up to 9kW. However, the ZEB® will vary the power output to achieve the target flow temperature set during installation. This can range from 35°C to 80°C for a typical home, however, the peak flow temperatures / power output are only achieved at a high state-of-charge.

**Q. What happens if I change tariff or supplier?**
A. You can update your tariff in the app to reflect any changes to your tariff or supplier. It is important that you do this to ensure that the ZEB® charges when your electricity is cheapest. If for any reason your supplier or tariff isn't listed, please contact customer.service@tepeo.com

Q. How much energy does the ZEB® lose if fully charged and left without discharging?
A. If fully charged and then left without a call for heat - a very unusual circumstance as the ZEB® should only charge up in anticipation of a heating requirement in your home - the ZEB® loses ~15-20% of charge over a 24 hour period. The heat loss is higher at a high state of charge so having the ZEB® partially charged during the day for an evening call-for-heat is an expected use pattern.

Q. How much noise does the ZEB® make?
A. The ZEB® makes roughly the same noise as a boiler when discharging. If there are any unusual noises (rattle, gurgling, clicking etc) coming from your ZEB® please contact customer.service@tepeo.com
Air or debris in the heating system / heat exchanger can cause noise and this is could indicate that a service is needed, or be indicative of a fault.
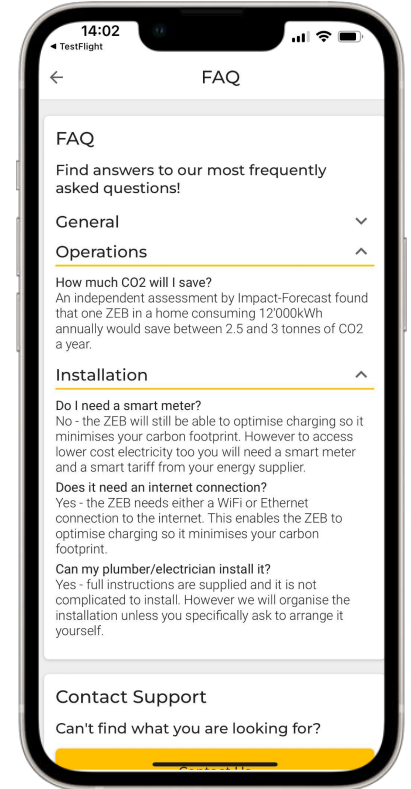
Glossary of tepeo terminology

kW - this is the unit of **power.** *The ZEB® charges at up to 9 kW, and is rated at 15 kW peak output / 9 kW continuous output.*

kWh - this is the unit of stored or consumed **energy** and is 1 kW of power sustained for 1 hour. *The ZEB® stores 40 kWh of thermal energy.*

Flow Temperature - this is the set (or real time) temperature of water flowing from your ZEB® to suit your radiators or hot water cylinder in °C. *The Flow Temperature Setpoint can be adjusted to suit your heating system.*

Charging Style - this allows you to choose the most suitable charging profile based on your priority between low carbon & low cost energy

Carbon Emissions - carbon dioxide equivalent in $kgCO_2e$. Carbon Emissions is the cumulative quantity of CO_2 (and equivalents) emitted by power generation in your region of the National Grid to supply the ZEB® with electricity.

State of Charge (kWh) - the energy stored inside the ZEB®'s core given the charging received. *The minimum state of charge can be adjusted by tepeo to suit your needs.*

Electricity in (kWh) - the total electrical energy input to your ZEB®.

Heat out (kWh) - the total heating energy output by your ZEB®.

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heat your home, not the planet

tepeo