Manual BeeClear

Your2Power - BeeClear
 49.10_EN

Contents

1 Introduction

1.1 General

The BeeClear is designed to give realtime insight into the energy use of a household. In order to increase awareness of electricity usage, this will clearly be represented in the available graphs. The refresh rate of the graphs is 10 seconds for optimal use of the data provided. It wil help greatly in identifying between different power consuming sources in the household. Privacy is another one of our concers. That is why user data is stored locally and can only be accessed by the user. The device can be completely disconnected from the Internet without affecting usability. The data of the smart meter in such case will be accessible via the BeeClear in "access point mode".

1.2 Money saving

The BeeClear is meant to help save money. Ther is no subscription service. One time purchase is all it takes to take control of your energy consumption. Whether it be for comparing energy suppliers or gas consumption.

1.3 Data stored locally

User energy data is stored on a Secure Digital (SD) card. Data is not stored anywhere else such as the 'cloud' or any other central location besides the SD-card. This is to help guarantee that the user is always in control. This does mean on the other hand however, that the owner also has the responsibility to protect his own data. Back up and recovery of data is an added BeeClear function to help the user protect his data. It is also possible to export the accumlated data to other programs such as spread sheet programs (Microsoft Excel) for easy overview of the data and to support other purposes. The choice of extablishing an internet connection is up to you [1], however, the internet connection be use to acquire updates for the BeeClear without having to download them manually from the website. Future updates could contain secondary tools such as weather forecast and solar energy production prediction.

WARNING *Only use the parts provided with the BeeClear, the parts are listed on the next page. Frequently backup your data and keep a tab on updates for improved functionality.*

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[1]An internet connection is required for "smart meters" built before the year 2014, as to provide accurate registration of time and data. The so-called Network Time Protocol (NTP) is used. **"smart meters" produced after 2014 don't need an Internet connection.**

Figure 1: BeeClear Energiemanager, P1-cable and USB-energy supply

Figure 2: RJ45 cable

2 List of items

The items below are supplied when purchasing a BeeClear set. All items need to be present or a successful installation.

2.1 Items:

- BeeClear Energiemanager (figure 1)
- P1-cable (figure 1)
- USB-energye supply (figure 1)
- UTP-kabel (figure 2)
- Micro SD-memory card (figure 3)

Figure 3: SD-card

2.2 Set-up requirements BeeClear

The following set-up requirements are mandatory:

- A "smart meter" with P1-connection (telephone cable connector RJ11);
- A socket in the vicinity of the "smart meter" (230 Volt);
- A computer, smartphone or tablet for visualisation of the data (includiing a monitor);
- An Internet connection in the vicinity of the "smart meter" (only concering "smart meters" before the year 2014);

3   Specifications

Listed below are the specifications for each provided item.

3.1   BeeClear V2

- CPU MIPS 500 MHz.
- RAM 64 MiB.
- Flash 8 MiB.
- Wifi 150Mbps, IEEE802.11 b/g/n, IEEE802.3/ 802.3u, WPA-PSK, WPA2-PSK.
- Network (WAN/LAN).
- USB 2.0.
- TF-memory port micro SD-Card.
- Micro-USB (power supply).

3.2   P1-Cable

- Pl2303 serial USB of FTDI.
- Lengte > 80 cm.
- RJ11 Connector.

3.3   Power Supply

- Input: 120-240Vac 0.45A 50/60 Hz.
- Output: 5.0V DC 1A.
- Micro USB cable, length > 80 cm.

3.4   Network Cable (RJ45)

- RJ45 naar RJ45-connector.
- Length > 80 cm.

3.5   MicroSD

- The Micro Secure Digital Card (SDC) is a Kingston brand with a storage capacity of 16 GB.

4 Quick-start guide

Steps to set-up the BeeClear as follows:

- *STEP1* Insert the Micro SD-memory card into the appropriate TF-slot.

- *STEP2* Connect the network cable (optional).

- *STEP3* Connect the BeeClear to your private network if you want to use a cable connection. Use the RJ45/UTP-cable included (also known as an ethernet cable).

- *STEP4* Connect the P1-cable. The RJ11 side (phone plug) must be inserted into the P1-socket of the "smart meter". The USB-plug (USB-B black, flat plug) can now be connected to the BeeClear.

- *STEP5* Connect the micro USB-power supply (white cable) to the BeeClear (micro USB) and the USB-B sidde to the USB-power supply. The USB-power supply can now be attached to the 220V grid.

- *STEP6* Check the LED-indicators. The blue LED's) should turn on. In sequence first a pink/red LED wil turn on indication boot and syncing with the "smart meter".

Figure 4: LED statussen

5 LED-status

The BeeClear has four internal Light Emitting Diodes (LED's). The LED's are to be found above the main button. (see figure 4).

The LED-indicators have the following functions (from left to right):

1. Wi-Fi radio status on (2.4 GHz dual channel, on = OK).

2. Link status cables OK (RJ45 connected, on = OK).

3. Systeem status OK/NOK (off = OK, red = NOK, pink = booting).

4. Power supply voltage OK (on = OK).

The BeeClear has to complete the start-up procedure before the multifunctional button can come online. The power supply-LED will light up once the BeeClear has been supplied with power. After which the LAN-LED will light up briefly, followed by the 'pink' status SYS_OK LED (booting). SYS_OK will turn 'red', it is now possible to use the other buttons.

The table below indicates how the different functions from the multi-functional button can be utilized.

Suppose you want to activate WPS. firmly press the BeeClear-button during 4-8 seconds and let go. You will see different LED-indicator feedbacks as you pass thru the different function phases during the 4-8 seconds. Different system settings/functions can be attained as illustrated by the table below.

Function	Action	LED Indicator (SYS_OK)
System reboot *and write files to SD-card. and let go*	*hold button for **0-2 seconds** and let go.*	LED will turn off (wait 1 minute).

Function	Action	LED Indicator (SYS_OK)
Abort choice (1st) Nothing will be changed resume normal operation.	*continue hold button **2-4 seconds** and let go.*	LED will turn on continously (blue).

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Function	Action	LED Indicator (SYS_OK)
Wireless Protected Setup (WPS)	*continue hold button* **4-8 seconds** *and let go.*	LED will blink slow (blue).(*)

Function	Action	LED Indicator (SYS_OK)
Abort choice (2nd) Nothing will be changed resume normal operation.	*continue hold button* **8-10 seconds** *and let go.*	LED will turn on continously (blue).

Function	Action	LED Indicator (SYS_OK)
Factory defaults Registered energy data will be preserved, only settings will be reset	*continue hold button* **10-14 seconds** *and let go.*	LED will blink fast (blue).(*)

Function	Action	LED Indicator (SYS_OK)
Abort choice Nothing will be changed. Resume normal operation.	*continue hold button* **14-18 seconds** *and let go.*	LED will turn on continously (blue).

* The LED will stop blinking as soon as the button is released.

** The system status LED SYS_OK (diagnose) kan also be red. This indicates that no smart meter data has been detected.

6 Differences in network settings

There are different options when incorporating the BeeClear into your home network. It depends on the situation and plugs in the circuit panel. The differences in network setup are listed below.

- Option1- No Internet, but "Access Point" mode (AP/standalone);
- Option2- wireless connection with your existing network;
- Option3- Cable, connected via UTP/Ethernet;

6.1 -Option1- Without Internet (standalone)

Figure 5: Option1

In case you do not make use of any internet provider, it is still posible to use the Beeclear. The option to use is the BeeClear in Access Point mode (AP). The BeeClear will be available via WI-Fi in AP mode.

6.2 Connecting with Wi-Fi Access Point (stand-alone)

The factory defaults of BeeClear are set to Wi-Fi access point this is also known as Access Point mode (AP). In this mode, a wireless connection can be established directly point to point with the BeeClear device.

Proceed as follows:

1. Find the access point with the SSID: "BeeClear".
2. The password is: "power2you".
3. WPA2 is the used encryption.

When Wi-Fi connection has been successfully established, it should be possible to use the http://192.168.111.1 address of the BeeClear private webserver. If everything works as expected a logon dialog should be visible (see figure 6).

Figure 6: Logon dialog

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You can continue by logging onto the BeeClear mini private webserver. See chapter

Be Aware! Older "smart meters" built before 2014 have a mandatory requirement. In such case BeeClear needs an Internet connection to attain an accurate time for registering meter data.

Explanation: The BeeClear needs an accurate and reliable time source as to register the energy date in a precise way. New smart meters (after 2014) report the time in a more reliable fasion (>DMSR4.x). Older smart meters do not (DMSR2.2, DSMR3). To solve this problem we use the Network Time Protocol (NTP) for older type smart meters. For this typical setup we offer users settings described in the next chapters and known as "Option3". It is possible to use Option3 and Option1 simultaneously but is not support by us.

6.3 -Option2- Wirelessly in your Wi-Fi network

Figure 7: No wired network available

In case there are no wired connection options available in your meter cupboard, you can use the wireless method to connect to your exiting private Wi-Fi network.

ATTENTION It is advisable to temporarely configure the BeeClear settings outside of the meter cupboard and connect the BeeClear with the existing wired network. Chapter: 11.3 Menu function "LAN" (Network) explains how to connect the BeeClear to your existing wired network.

Now you can continue to configure the BeeClear settings with the BeeClear connected to the wired network. To continue use chapter: 11.5 Wi-Fi Client Setup .*

6.4 -Option3- Wired

Figure 8: BeeClear Connected via wired Network

If an existing wired network infrastucture is available to you in the metering cupboard, you will be able to connect the BeeClear directly with the shipped RJ45 ehternet cable.

6.5 Disable Wi-Fi

If you do not want to use the Wi-Fi capability of the BeeClear you can turn Wi-Fi off. To turn off the Wi-Fi function, you will choose the GUI button "switch" named Wi-Fi and set it to "Uit" (Off). If you are certain you want this, u will then activate the button "Toepassen" (confirm). In the groupingsfield "Status" you are able to observe and evaluate the changes to the Wi-Fi radio settings.

Figure 9: Turn off Wi-Fi

If later on you decide to turn on Wi-Fi you can flip the switch to "Aan" (On), folowed by "Toepassen" (confirm).

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7 Finding the BeeClear private webportal server

If everything is correctly connected and network settings are correct, it now should be able to find your BeeClear in your existing private network. There are more than one methods available to find your BeeClear. Not all methods will always work.

The method that will best work for you is dependant on your netwerk configuration and infrastructure. Most elegant method u should use is the one mentiond as number one in the list.

The following list of methods are available so you can try to see what works best for finding your BeeClear in your private network. **ATTENTION** *the list of methods only apply to OPTION2 or OPTION3*

1. If you are using an Apple or Linux based operating system, you should be able to find the BeeClear via: http://beeclear.local. **ATTENTION** If you are using a Windows based operating system http://beeclear.local will only work if you:
   a. Do not use a Microsoft Windows base browser;
   b. And install Apple Bonjourservice see: https://support.apple.com/kb/DL999?viewlocale=en_US&locale=en_US.
2. Try: http://www.beeclear.nl/mijnmeter.
3. Try: http://beeclear.
4. If all above fails, you can download the Windows binary Beescan https://beeclear.nl/updates/windows/BeeScan.exe.
5. For experts, try to see what IP-address the BeeClear has been given by your router (DHCP). And use this in your webbrowser addressbar.

ATTENTION Finding the BeeClear in your private home network only applies for Option2 (Wi-Fi-client) and Option3 (Wired). If you are using Option1 (Wi-Fi-AP stand-alone) for example, you will be connecting to the private stand-alone BeeClear IP-address (http://192.168.111.1). The above mentioned methods will not be applicable because stand-alone mode (Wi-Fi-AP) wont have internet connectivity.

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[1]Every time you choose toepassen (confirm), the settings will be activated. In some situations the BeeClear might restart/boot. In the event of a reboot the momentary graphs (actueel) will show a gap.

7.1 Logon to the webserver (private appliance)

If you connect to the BeeClear, a logon dialog will appear in your webbrowser. For extra protection (security) logon to the BeeClear mini webserver is manadtory.

The default account username:"beeclear" with password:"energie" is set. This account is case sensitive. So be aware to use lower case for both account and password. It is advisable to change this private webportal password. To change the password go to: Instellingen –> Geavanceerd –> "Wachtwoord veranderen". (Settings –> Advanced –> "Change Password").
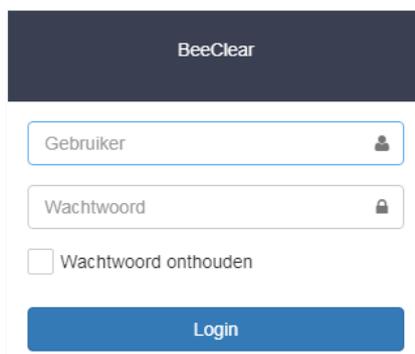
Figure 10: Logon dialog

ATTENTION: username and password are always lower case.(zie figure 10).

If everything went according to plan, you now should be able to see the accumulated "smart meter" data.

Als now you will be able to change settings of the Access Point (AP). To do this go to the left menu panel via "Instellingen–>Netwerk–>Wi-Fi" (Settings–>Network–>Wi-Fi).

7.2 Menu (Left and Right) ▤

You can control the left and right menu (depending on screen resolution).

Figure 11: Menu panel left

The menu selection consists of main functions with supportive sub functions (see figure 11).

Main functions can be found on the right side and top. This is dependant on resolution. On the left side panel supportive subfuncions are selectable.

Main functions are: **Home, Actueel, Elektriciteit , Gas en Instellingen**. On the left menu panel you can find the sub functions related to the chosen main functions.

Dependant on resolution of the display device, there will appear a right menu panel (or not). This is a feature to support mobile devices where display space is scarce.

8 BeeClear Main functions

Figure 12: Home presentation

8.1 The Home function

When you are logged on, you will enter the home screen (starting point). The home screen presents the current momentary meter readings. Observes changes in meter readings indicated by the yellow highlighting.

The home presentationi will display the following information:

- Meter reading measurement time. Time/date of the measurement (accuracy +/- 5 seconds).
- Tariff (Normal of High Tariff).
- Momentary usage in Watt.
- Momentary deliverance in Watt.
- Meter reading usage high tariff kWh.
- Meter reading usage low tariff kWh.
- Meter reading deliverance high tariff kWh.
- Meter reading deliverance low tariff kWh.
- Meter reading gas in cubic meters.

If auto-update is activated (check mark), meter reading values and momentary usage will be refresht every 10 seconds. The refresh moment is recoginzed by the yellow/orange highlights.
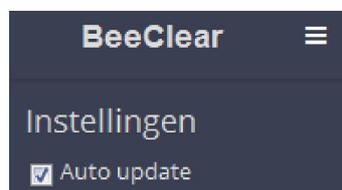
Figure 13: Automatisc refreshing of meter readings

8.2 De "Actueel" presentation function

The presentation function "Actueel" (Momentary values) will show a line graph with a refresh rate of 10 seconds. .

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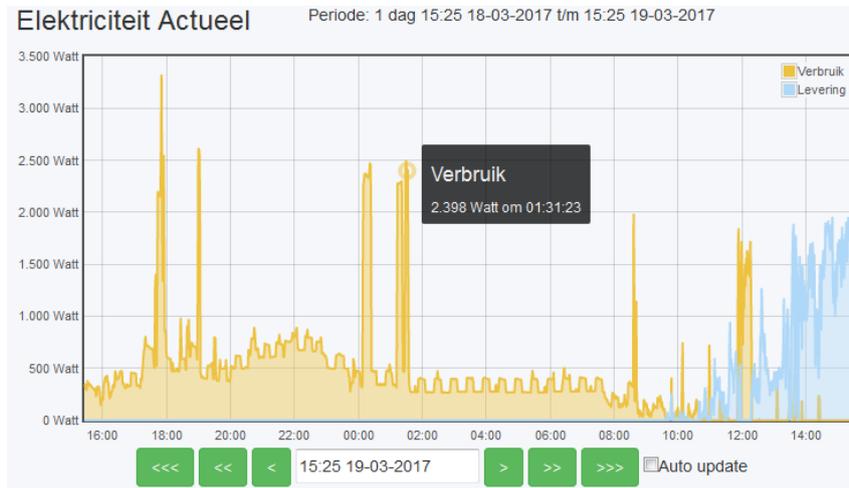
Figure 14: The Momentary value presentation (Actueel)

8.3 The Calendar function

Fast browsing through your stored historical energy data is supported by the calendar function.
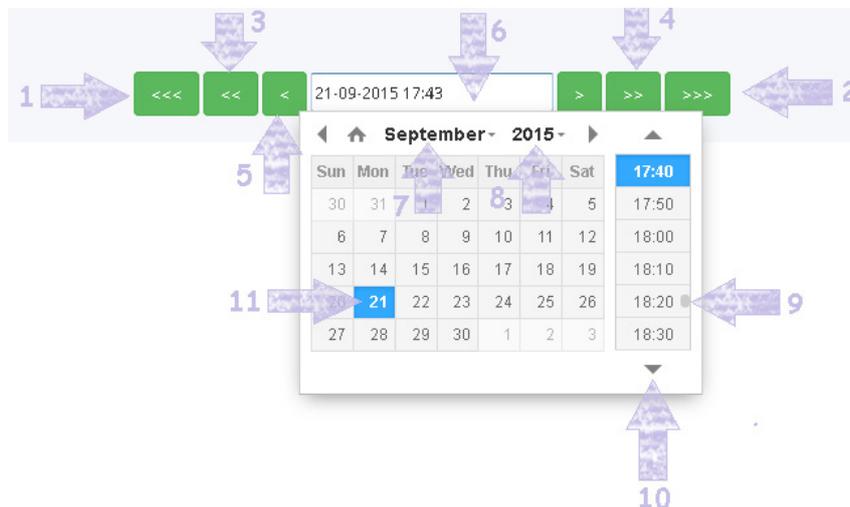
Figure 15: The Calendar function

- 1] en 2] Per presentation period x3 browse through the calendar time (*).
- 3] en 4] Per presentation period x2 browse through the calendar time.
- 5] Per presentation period browse through the calendar time.
- 6] Manual input and/or calendar activation.
- 7] Choose Month.
- 8] Choose Year.
- 9] en 10] Scrollbar, unit =10 min.

(*)The calendar function is available for both the historical data of elektricity and gas. Presentation period is dependant on chosen period in the left side panel.

8.4 The Elektrical presentation function (historical)

The presentation function: "Elektricity (Historical)" show graphical bar presentation per chosen: "presentation period".

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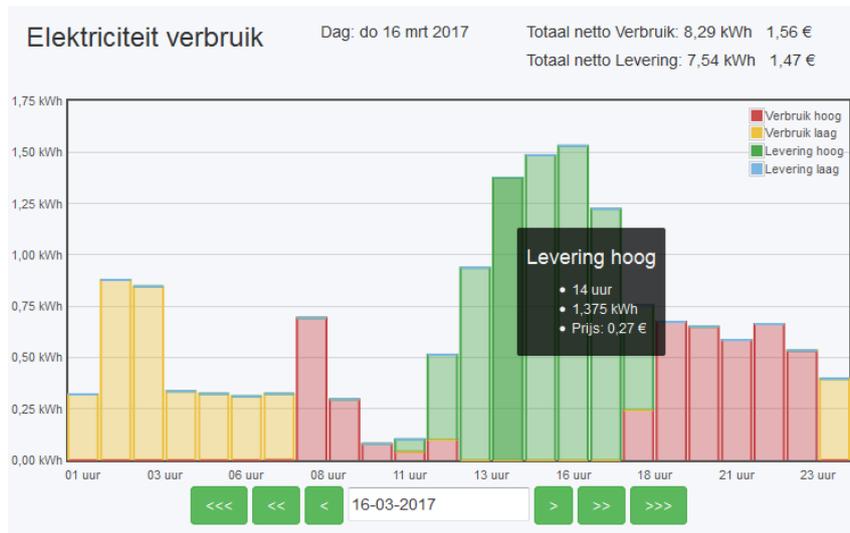
Figure 16: The presentatin function: Elektricity (Historical)

- On the left side of the menu you can select the presentation period.
- The bar graphs can be chosen per period and will present them.
- The different colours indicate the tariff: low, normal, delivering normal and delivering low.
- The hover functon will calculate usage and or deliverance as soon you hover the bar graph.

8.5 The meter readings table function

Figure 17: De meterstanden tabel

By activating the function option: "Tabel" (Table) a different presentation will be served. The Table presentation will show all recorded and stored historical meter readings in detail. An accumulated presentation is also presented above the table view. The views are related to the serial number of the smart meter.

8.6 The gas presentation function (Historical)

With the gas presentation function you are able to browse fast through historical stored gas meter readings. The gas meter readings will be persented in bar graphs per chosen presentation period. The hover function is also available and calculates gas costs. The tariff values are used, filled out in the "tarieven" pane (tariffs).
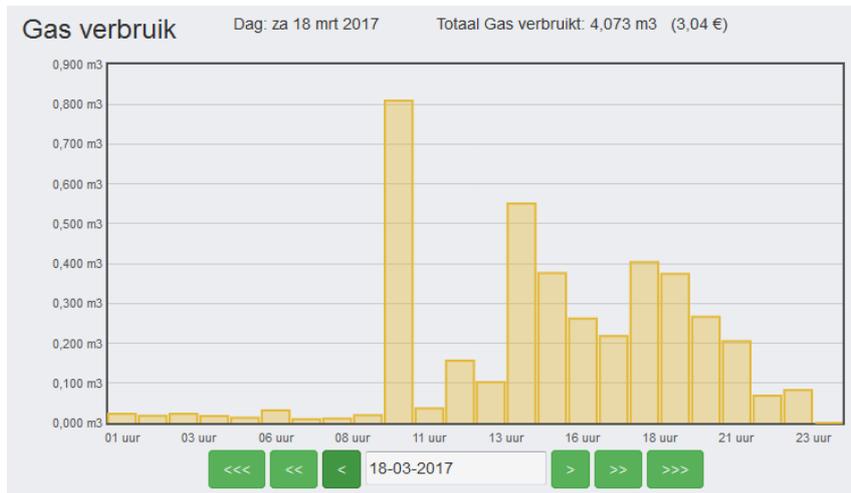
Figure 18: Gas usage (historical)

8.7 Table gas meter readings

On the menu on the left side, you can choose different presentation periods. The table view will show you gas usage in a period of 24 hours when you choose the 1 dag (1 day) view.

Figure 19: Gas Table (historical)

To browse through your historical gas meter readings, again the calendar function is available.

9 Function "Settings"

In the menu: "Instellingen" (Settings) you can set and choose different user options. For exampe changing tariff settings, configuring network settings, making backups, choosing & installing latest update, etc.

9.1 Info

The menu-item "Info" (Information) you will find information about different BeeClear properties. As an example you will find free space on SD-card information but also smart meter serial info and P1-data communication health.

9.2 Back-up

Figure 20: Back-up

To assure your "smart meter" data is not lost easily, you can use the back-up function. By selecting the button: "Back-up meterstanden" (back-up meter data), you will be able to back-up your smart meter data to SD-card and even download the data from SD-card to an alternate back-up location. Meterdata will be stored as an meter back up file (mbc) but also a CSV formatting can be chosen. The function "Backup actueel" (back-up momentary data) you will be able to store the data accumulated at 10 second intervals. Be reminded, if you have a long period of accumulated data, it will take a long time to write to SD-card as a backup file.

10 The function "Export" (Exporteren)

The export function extracts data from a back-up.

- After you have made a back-up, the system will generate a file. The formatting is as follows: %YearMonthDay%.mbc. The file is generated on to the SD-card. The back-up file is downloadable on to your PC for example (to mitigate single point of data).

- To restore a back-up you should choose the function "bestand terugzetten" (restore file) .

- The button "choose file.." will give you the opportunity to upload back-up files of type (.mbc).

- In the field to the right of the back-up, meter reading values gas and elektricity are available as downloadable links to Comma Separated Value's (CSV). The values are stored in a per hour layout.

- Both gas and electricity values are downloadable an usable in popular spreadsheet programs. For example Microsoft's Excel.

10.1 Tariffs

Hier you can set the tariff values for gas and elektricity. These values are used for calculating your energy costs.

Figure 21: De tariffs function

Do not forget to update the changed values with the button: "Update Energie Maatschappij" (Update Energy Company).

11   The "Network" settings option (settings)

The menu function "Network" will give you the option to connect the BeeClear wirelessly or wired to your private network. The wireless function can be used in situations when you want to bridge the distance wirelessly. In case there is no wired connection available.
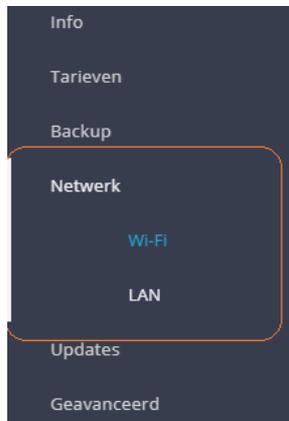
Figure 22: Wi-Fi options

You can choose two different modes to use the Wireless connection setup:

1. Wi-Fi Access Point mode (AP).
2. Wi-Fi Client mode.

11.1   Wi-Fi Access Point mode (Network –> Wi-Fi)

Wi-Fi Access Point Mode, AP-mode offers a self-reliant way of connecting wirelessly. AP-mode is intended to log-in to your BeeClear circumventing the internet altogether.

ATTENTION When using Wi-Fi AP mode without internet connection you should remeber that this will not work for older meter types (before 2014).

11.2   Wi-Fi-Client Mode (Network –> Wi-Fi)

Wi-Fi-Client mode offers a transparent and integrated way of wireless connection. Wi-Fi client is applicable when you want to use your existing Wi-Fi network.

11.3   Menu function "LAN" (Network)

The menu function "LAN" offers the possibility to obtain the BeeClear in your existing "wired" netwerk infrastructure. The properties you will see in the GUI exists of different groupings of settings. On top you will see the grouping: "Status". Here you will find the actual status of your connection (wireless / LAN). Beneath you will find the grouping: "Instellen" (Settings). Here you are able to configure the IP-settings for your wired IP network.

- Default BeeClear LAN interface settings are set to "Automatic".
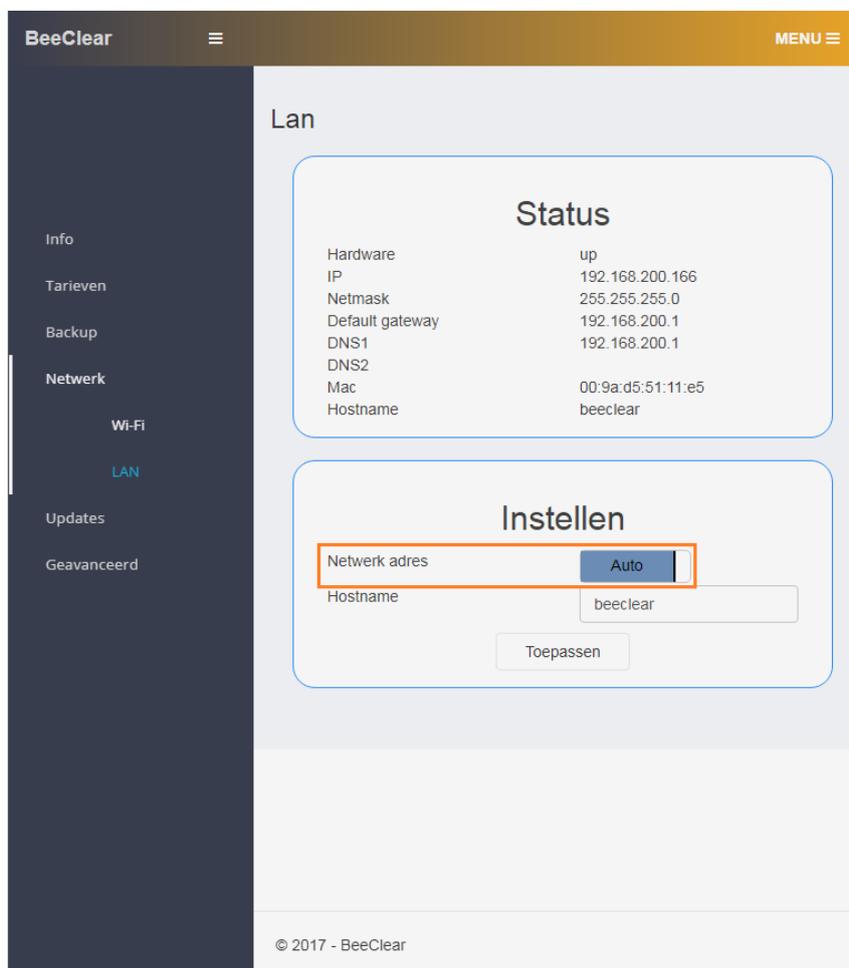
Figure 23: Network Settings (DHCP)

To manually set IP properties, you can use the software switch "Netwerkadres" (Network address) and set it to "Handmatig" (Manual).

Figure 24: Wired Settings (LAN)

The following screen wil appear (see figure 24).

- If you are experienced and familiar with IPv4-addressing and networking, it is advisable to set the GUI switch to manual.

11.4 Changing Hostname (LAN)

You can change the servername (hostname) of the BeeClear mini private webserver. Default "BeeClear" is set as hostname.

- You can change the GUI input field "Hostname" to change the name of the BeeClear webserver.

11.5 Wi-Fi Client Setup

To setup the BeeClear as a Wi-Fi client (client in your existing Wi-Fi network), you first enter via the menu: Instellingen –> Network –> Wi-Fi (Settings –> Network –> Wifi). The next screen will appear:
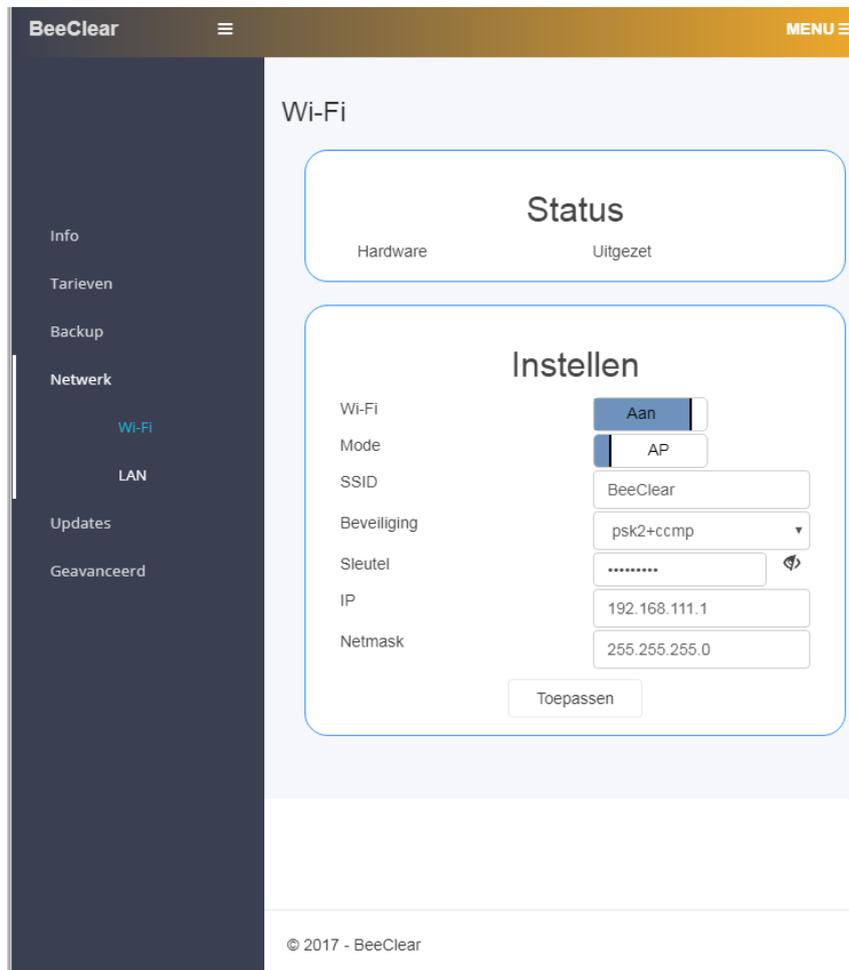
Figure 25: Wi-Fi first use

The BeeClear is shipped with default settings as a Wi-Fi Access Point (AP).

If you want to change the default settings to Client you will have to go through the following steps:

- Put the GUI switch "Mode" to "Client".
- Select "Scan Wi-Fi" button (use the "recycle" symbol).
- Choose the name of your private Wi-Fi network from the pull down menu.
- Set the correct password that goes with the field:"Sleutel" (key).
- With the "eye" symbol, you can verify if a correct password/key has been set.
- It is also possible to set the IPv4-addressing manually (expert mode).
- You then choose the button "Mode" and set it to "Handmatig" (manual).
- After changes have been made, you have to activate them by choosing "Toepassen" (confirm).
- Check the "Status" fields to see wheter the BeeClear received an IP-address.
- BeeClear also supports extra cryptographic security algorithms to choose from manually.
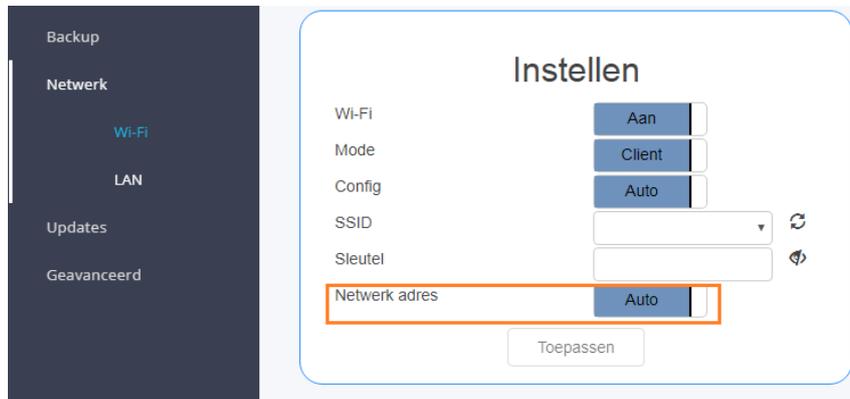
Figure 26: IP Network address

- In most situations the "Network address" button should be set to "Automatisch (Automatic). This is default to most situations (DHCP) mode.

If setting Wi-Fi client mode does not seem to work, it is advisable to restart all over again and follow the reset procedure. You can follow through the reset procedure by holding the BeeClear-button on top for about 8-10 seconds (see chapter:5 LED-status).

11.6   Encryption algorithms

You can manually choose between a couple of different Wi-Fi encryption algorithms. The BeeClear is compatible with the algorithms listed below (see figure: 27).

- psk2 = WPA2 (Pre Share Key version 2).
- psk = WPA (Pre Shared Key version 1).
- tkip = TKIP
- ccmp = AES
- mixed = switches between encryption algorithms
- wep = Wireless Equivalent Privacy
- open = no encryption
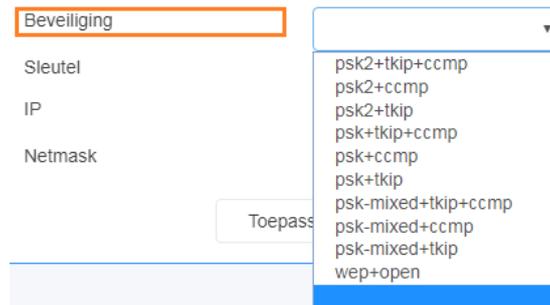
Figure 27: Setting Crypto Algorithms

11.7   Wireless Protected Setup (WPS)

To simplify Wi-Fi client configuration WPS is supported. It is required your Wi-Fi router supports WPS. You can activate WPS by following the instructions below:

1. Put your router in WPS mode by activating the WPS push button function. You now have two minutes to activate WPS on the BeeClear.
2. Now put BeeClear into WPS-mode (see chapter:5 LED-status) By pressing and holding the push button for 4-8 seconds. Wait for the LED to blink slowly and let the button go.
3. Resume with chapter: 7 Finding the BeeClear private webportal server .

If all succeeded, you are now able to connect the BeeClear with the shipped P1-cable with the smart meter. One last step. Almost there. Continue with chapter:7 Finding the BeeClear private webportal server .

11.8 The menu function "Updates" (Settings)
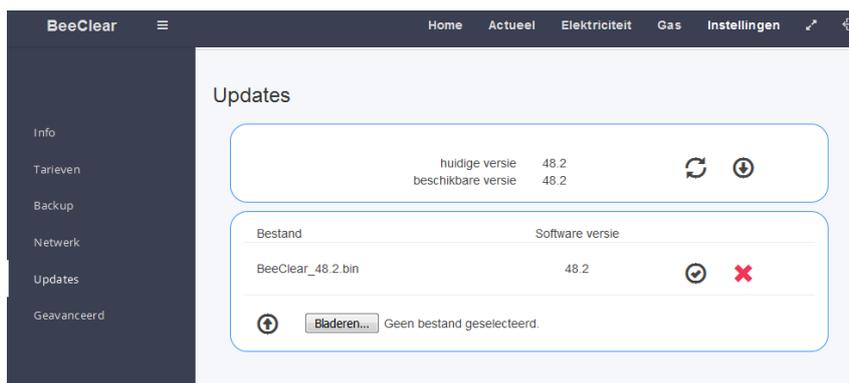
Figure 28: Updates GUI

The menu function: "Updates" will give you an oversight of the available firmware updates.

- Use the: "beschikbaarheid" (availability) function and check if the installed version is the same version as the available version.
- In case an new version is available, you can choose to install it.
- Initiate the download of the firmware file (to SD-card) with the button: "Download firmware bestand" (Download firmware file). This wil download the firmware to SD-card. If this is the first firmware file you downloaded, a new grouping field wil appear.
- The function "Installeer firmware" (Install firmware) will initiate the firmware installation.
- A progressindicator will appear. Wait 2-3 minutes. If all was successful, the logon screen of BeeClear will re-appear. If after 5 minutes nothings seems to happen, you should try to refresh the browser (F5). It might also be the case that the BeeClear has changed IP-address.

ATTENTION ALWAYS BACK-UP YOUR DATA BEFORE YOU INSTALL AN UPDATE!

11.9 The menu function "Geavanceerd" (Advanced)

Figure 29: Advanced menu options

The menu function "Geavanceerd" (Advanced), has several options to change the behaviour dependant on use.

- The function "Mijn meter" (my meter) is a redirection service and is meant to help find your BeeClear in your private network. The BeeClear service is available via: https://beeclear.nl/mijnmeter. If you do not trust or want to use this service, you can turn off the GUI switch "Mijn Meter".
- The function "DSMR 3 meter" is meant to support older smart meters. This function should only be used with smart meters built before 2014. Normally this switch is set to "Off".
- The function "Toon gas" (Show gas). Set this switch to "Uit" (Off) if you do not want to show gas presentations.
- Turn off the function "Dubbeltariefmeter" (two tariffs) if you only use single tariff.
- Turn off the function "Levering" (deliverance) if you do not feed in elektrictiry into the elektricity grid.
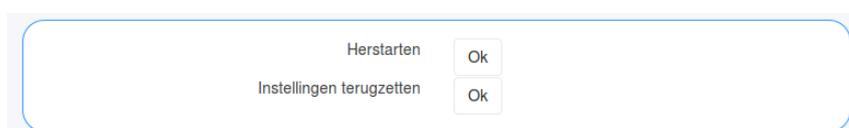
Figure 30: Reboot BeeClear

- The menu function: "Herstarten" (reboot) will reboot the BeeClear and

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flush files to SD-card.

- The menu function: "Fabrieksinstellingen terugzetten" (restore factory defaults) will set factory default settings. Stored energy data will never be touched by the BeeClear.

Figure 31: Change BeeClear Password

- The menu function: "Wachtwoord veranderen" (set password). Here you can change the default factory password "energie". If you lose/forget your password, you can always reset the password by using the reset procedure as described in chapter: 5 LED-status).
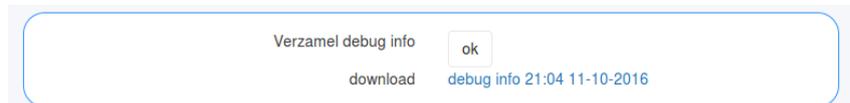
Figure 32: Collect debug information

- The menu function: "Verzamel debug info" (Collect debug information). To collect debugging information for analysis purposes. Information will be collected and stored in a file named "(debug_info.tgz)". To activate this function you select the button: "Ok". It can take up to 5 minutes collecting information. After a while a URL (download link) will appear. You can download this file. The downloaded file can be e-mailed to BeeClear info@beeclear.nl to asist in troubleshooting support.

11.10 SSL Easy

- By flipping the GUI switch Https to "Aan" (ON), TCP service port 443 (SSL) will activate. Default we ship a so called "Self signed certificate". After a reboot you can make use of this function by connecting via https:// (instead of http://). Both ports should be active now (443 and 80). HTTP traffic will be crypted between endpoints. Because a "self signed cert" is being used there is no need for a third trusted party. The only downside is that webbrowsers will report that the connection is not secure. This is due to the fact not the entire trust chain is verified (green lock).

- The indicator: "Https status" will show if the local SSL-client started correctly.

Take note that logging on initially can take up to 15 - 20 secondes. This has to do with the SSL-encryption. SSL-encryption drains a lot of CPU processing power from the BeeClear.

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11.11   SSL Expert

In theory using self-signed certificates should be sufficient for all situations. It could be that you rather see the complete certifictate trust chain function correctly. To configure SSL correctly involves a lot knowledge to set this up correctly.

- When turning on the GUI "Switch" just next to the function option "SSL-certificaten", you will have more control options to set. You are now able to set the complete "certificate chain". It will make the "green lock" visible in webbrowsers (trusted).

- The cert.pem field is meant to place the public certificate. The certificate contains the servername (FQDN of BeeClear hostname) as it is known and registered by the public DNS registrar (Internet). For example: beeclear01.mydomain.com

- The chain.pem must containt the intermediate CA-certificates (CA-bundle).

- The key.pem contains the private key (deliverd during ceriticate request by a certificate authority).

11.12   Example installing a Let's Encrypt certifcate (for free)

Without paying to much attention to details we will show you an example how you could obtain official certificates for free. As an example we will use FQDN: "demo5.beeclear.nl". An important requirement is this address must be resovable via public DNS. U should also have access to the public DNS-records at your registrar/hosting provider.

- Step1 generate a private key for the key.pem field:

    - openssl genrsa -out key.pem 2048

- Step2 generate a request (Certificate Signing Request).

    - openssl req -new -sha256 -key key.pem -out csr.csr
    - Fill in the requested questions (example beneath):
        * Country Name (2 letter code) [AU]:NL
        * State or Province Name (full name) [Some-State]:Zuid Holland
        * Locality Name (eg, city) []:Rotterdam
        * Organization Name (eg, company) [Internet Widgits Pty Ltd]:Your2Power
        * Organizational Unit Name (eg, section) []:BeeClear
        * Common Name (e.g. server FQDN or YOUR name) []:demo5.beeclear.nl
        * Email Address []:marcel@beeclear.nl
        * Please enter the following 'extra' attributes
        * to be sent with your certificate request
        * A challenge password []:
        * An optional company name []:
    - Use the generated "csr.csr" file as input in Step3

- Step3 Go to: https://www.sslforfree.com/create?domains=demo5.beeclear.nl

    - Choose: Manual verification (DNS)
    - Add TXT record toe bij uw DNS-provider
    - Example TXT: host _acme-challenge.demo5.beeclear.nl

- – Example of TXT record: upLU2shZTmi8Ljy52eYR1FV5dtWaRQ_bqaBbiA3J3i
  - – Check (mark): I have my own CSR
  - – Paste the file csr.csr text into the inputfield of the let's encrypt site

- Step4 Use the site's reply/answer from Step3:

  - – Certificate (with the "demo5.beeclear.nl" hostname built in). This text should be "pasted" into the BeeClear input field: "cert.pem".
  - – CA Bundle (CA chain root & Intermediate certs). This text should be "pasted" into the BeeClear input field: "chain.pem"

- Step5 Now activate the certificates with the "Ok" button next to the text "Zet nieuw cert" (set-up new cert).

- Step6 You now have to restart the BeeClear with the reboot function.

After the reboot and everything works as should (check the Https status), a complete validated trust chain and https connection is possible with your BeeClear. Let's encrypt certificates are only valid for three months. The downside is you will have to go through described above steps to update the certificates every three months.

12 Warnings

12.1 First time use

- If the smart meter has just been installed by the net adminstrator, the BeeClear will most probable not show any historical data. This is due to the fact that the net admin did not yet register and activate the smart meter. Under normal circumstances this (activating) can take up to 3 weeks.

- If the smart meter needs activation you will be able to recognise this (incorrect behaviour) by viewing the "Home" presentation. The "Home" presentation wil show incorrect dates like 1970 or 2001.

- When you boot up the BeeClear for the first time (with SD-card) it can take about 5-10 minutes before the mini private webserver can be reached. This only a one time behaviour and has to do with initialising and formatting database structures.

12.2 Power supply

- The BeeClear needs sufficient power to start. The supplied power supply must be used. Using other power supplies with lower power output will result in the BeeClear not functioning properly.

12.3 Factory settings/ Reset

- In the unlikely event of an unresponsive BeeClear, you will always have the possibility to reset the BeeClear (settings not data). We refer to chapter: 5 LED-status for detailed instructions.

- In some situations data corruption may occur. You will have the possibility to reformat the SD-card with the supplied SD-adapter. Also you will be able to read/transfer the data physically instead of downlod the data.

- Under some circumstances after updating the BeeClear with new firmware the browser will not display presentation properly. In such case a reload of the browser will resolve this issue (CTRL+SHIFT+R). Sometimes it is also necessary to remove the browser cache. Most specifically on mobile dovices this can be the case.

13 Frequently asked questions(FAQ)

Question: I am not able to logon. I am sure the password is correct.
Answer: Some malware scanners block functions of the BeeClear. Try to update the anti malware product. Be aware that logon username is case sensitive (lowercase for example).

Question: How many years of data storage do I have on the 16 GB SD-card?.
Answer: The supplied SD-card can store up to 40 years of meter reading data. 200 MB of metering data yearly will be stored. When taking momentary elektricity data into account (every 10 seconds data point) about 20 years of data can be stored.

Question: When I look at the "Home" presentation view, I see meter readings from the year 2000 instead of current year.
Answer: The network grid administrator will take about 3 weeks to activate the smart meter and to take the meter into commission. As long as the meter has not been taken into commission, invalid dates and times will be observed.

Question: The BeeClear does not serve its webcontent.
Answer: The SD-cards needs to inserted completely into the SD-slot. sometimes a long nail or tool can be helpful to inject the SD-card into the SD-slot. An internal fastening mechanism will hold the SD-card into place after injecting firmly. Another possibility could be the IP-addres of the mini private webserver has changed due to DHCP. To prevent this you can set a host reservation setting on the DHCP server.

Question: Can I use BeeClear for my own developed application ?
Answer: You can use the Application Programming Interface (API) for own application development. Be aware the API can still change per firmware release.

Question: BeeClear is designed to save energy, but how much energy does the BeeClear device consume it self ?
Answer: Beeclear's power consumption on average is 3 Watt.

Question: Can I use BeeClear when I am outside of the house?
Answer: Yes you can reach the BeeClear outside of your house. There are a lot of mechanisms to do this. For example you could configure port forwaring for your router. This implies that you know what your are doing. You are in fact opening a port to the outside public internet (security risc). To open a port and protocol for the BeeClear service (HTTP port 80 or HTTPS port 443). Het is aan te bevelen om alleen SSL port 443 te gebruiken voor extern publiekelijk verkeer. Dit is om "afluisteren" te voorkomen.

Question: The red LED is turned on. The BeeClear information screen (info) says: "geen dataframe" (no data frames).
Answer: The setting: "DSMR 3 meter" has been set wrongly for this smart meter. This setting should in most cases be switched to UIT (OFF). Older smart meter (build date before 2014) this switch should be turned on.

Question: Somehow it seems that old metering data has been recorded going back in time before I even ordered a BeeClear. What is going on?
Answer: The BeeClear needs a trustworthy time source. This is due to the fact BeeClear does not have a Real Time Clock (RTC). This is only applicable when reading older smart meters (build before 2014). If an Internet connection is not

stable for a while, the internal clock of BeeClear will vary. This is when data potentially can be written in the past or even in the future.

Question: The bar graph shows metering values with a large gap in time and extraordinaroy high value in a short period of time. How can this be possible?
Answer: The BeeClear was not shut down properly and has lost metering data, most probably more than once. If you unexpectedly cut the power often enough the BeeClear may lose metering data. The correct way to shut down the BeeClear is by pressing the button on top of BeeClear for one second. Then wait for a minute. All data will be sync flushed to SD-card. You can now safely remove the BeeClear from power. You can also choose to shutdown or reboot the BeeClear via the webinterface.

14 Technical support

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