

Manual: QA Energy Sharing Apartment Buildings

Local energy sharing from a production plant to consumption locations (apartments) in an apartment building without spot control — distribution of energy according to consumption, coefficients and the selected strategy, and allocation in the EDC.

Introduction

QA Energy Sharing Apartment Buildings controls local energy sharing from a production plant with photovoltaics (typically a shared PV plant on the roof of an apartment building) to consumption locations (CL) — individual apartments — without using spot control. The application continuously evaluates the consumption of the individual consumption locations in the current quarter-hour and, based on the set coefficient, the selected energy budget strategy and the local energy surplus, controls the export power of the inverter and the amount of energy intended for sharing.

The shared energy is allocated to the consumption locations according to the registration in the Energy Data Centre (EDC). Thanks to the allocation of the energy exported from the production plant, the residents of the building save on purchasing electricity at their consumption locations. The consumption locations in an apartment building are local — sharing takes place without transmission system fees.

For sharing, the application uses only the predicted overproduction, so that the home battery is charged first for local consumption. It also enables targeted battery discharging to create a flow into the grid, which is then allocated to the consumption locations; targeted discharging is controlled by the application automatically and is not switched on or off separately. In combination with **QA Consumption Control**, it can give priority to local appliances (e.g. water heating) in case of high overproduction for maximum use of the produced energy.

For clear visualisation and access to measurement history and graphs, we recommend connecting to Mervis SCADA.

Warning: The application requires user registration in the EDC system (production plant and consumption locations) and a valid sharing licence (SSE) from Smart Home and Energy. The allocation of shared energy is performed by the EDC according to the registration; the application only controls and evaluates the sharing.

Upstream and downstream applications

Upstream applications

Mandatory:

- **Meter QA** at each consumption location (apartment) — typically **QA EASTRON SDM230 / SDM630 Sharing (ESG)** on an RS485 line served by the **QA Modbus Master** application, or QA Shelly 3EM.
 - Source of data on the consumption of the consumption locations in the quarter-hour.
 - It is a separate meter next to the distributor's billing meter.
- **QA Consumption Control** — energy management; the application takes over the production and load prediction from it and, with the **Power Control to QA EMS** option, passes the sharing requests to it.

Downstream applications

Mandatory:

- **Inverter QA** with the export power control function — the application controls the export power to the grid through this QA (the **Power Control to QA Inverter** option).

Optional:

- **QA Consumption Control** in the extended mode — with the **Enhanced Control QA Power Management** option, the application also controls the energy management modes so that the overproduction is used first by local appliances.

Installation and initial setup of the QA

Installation

Purchase the application in the Smart Home and Energy e-shop (<https://eshop.smarthomeenergy.cz>). After the purchase you receive an e-mail with a link to the activation form, in which you choose one of the two installation methods:

- **Installation via the SHE Installation Application (recommended)** — the application is installed into the unit automatically and enables future automatic updates. Requires the “superuser” credentials for the unit. See the separate “Installation Application” manual for details.
- **Standalone installation file (*.fqax)** — install the file manually into the unit according to the unit manufacturer's instructions (logged in as “superuser”). This option does not allow automatic updates.

The trial version (TRIAL) is available on request — contact Smart Home and Energy support.

After a successful installation, the following appear on the unit desktop in the **Energy Sharing** section:

- a set of application cards (tiles): **Energy Sharing** (main card), **Values overview**, **Energy overview**, **Consumption Locations**, **Sharing Settings**, **SSE Installation** and **Installation**,
- value tiles (**Setpoint Exp Local**, **Export Target Period**, **Export Period**, **Import Period**, **Period time**, **Battery SOC**, **Pred.Over Batt**, **Over Sharing**, **Aver Load**, **Over Load Sharing**, **Active CL**),
- a separate tile with its name for each consumption location (e.g. K13:1 to K13:8 and B10:1 to B10:8 for apartments in two entrances).

Operating prerequisites

- **Control unit:** Fibaro HC3 or HC3L (or Yubii Home / Home Pro).
- On the production plant side, an inverter QA with export power control and **QA Consumption Control** (energy management with production and load prediction).
- In each apartment (consumption location), a meter with a meter QA (e.g. Eastron ESG via **QA Modbus Master**) for metering the consumption and transferring it to the production plant.
- The production plant (typically the owners' association) and all consumption locations (apartments) are registered in the **EDC** and the installation has a valid **SSE licence** (energy sharing) from Smart Home and Energy.

Opening the application control card

To open the application card in a web browser, move the cursor over the application tile (e.g. **Energy Sharing**, **Sharing Settings**) and click the eye icon in its top-right corner. The application card opens.

Warning: Not all cards and tiles are displayed to all users. Each user selects which cards and tiles are displayed on the **Display Settings** card (sheViewControl application) — levels **SHORT**, **ADVANCED** and **ADMIN**. If you cannot see a described card, check the settings on this card.

User settings

Initial setup procedure

1. "SSE Installation" card

- Check the validity of the sharing licence (SSE).
- Select the consumption locations to which the energy is to be shared.
- Check the local settings of the production plant (name, **EAN**).
- Save with the **SAVE** button.

2. "Installation" card

- Check the parameters taken over from the inverter.
- In the **CONTROLS SELECT** field, tick the options determining where the application passes the power control requests (inverter QA, QA EMS, extended control of **QA Consumption Control**), according to the wiring of the installation and the technician's instructions.
- Several options can be selected at the same time (the information above the list, e.g. 3 Selected, shows their number).
- Save with the **SAVE** button.

3. Consumption location cards (tiles with apartment names)

- Set the sharing coefficient of each apartment so that the sum of the coefficients of all apartments is 100 % (16 apartments with an equal share = 6.25 % each; an apartment that does not take part in sharing has 0).
- Set the coefficients according to the shares approved for your building; the values in the screenshots belong to a sample installation.
- Save with the **SAVE** button.

4. **"Sharing Settings" card** — choose the mode (**AUTO**), the control methods for the automatic and manual mode, the reserves and the calculation parameters.

5. **"Energy Sharing" card** — monitor the current state of sharing. The **Values overview**, **Energy overview** and **Consumption Locations** cards are used to check the values.

6. After the setup, check:

- the licence validity and the selection of consumption locations on the **SSE Installation** card (a valid sharing licence (SSE) does not replace the registration of the production plant and the apartments in the **EDC**, verify it separately),
- the measurement update time and the communication state (OK) on the **Values overview** card and on the consumption location cards.
- Zero shared energy does not in itself indicate an error — energy is shared only in case of predicted overproduction or targeted battery discharging.
- If the update time stops changing or the state is not OK, check the meter QA and the connection of the respective consumption location.

"SSE Installation" card

The card is used to set the sharing licence and to select the consumption locations.

- **License SSE** — name of the installation, **License Validity**, **Valid until** and **SSE Number** (number of the sharing licence). Use the **Update** button to reload the licence state from the server. The licence is assigned by Smart Home and Energy support; if it is not valid, contact support.
- **SSE Configurations** — **SUPPLY LOCATIONS**: tick the apartments to which the energy is shared (several locations can be selected at the same time; the information above the list, e.g. 16 Selected, shows their number). A separate tile is created on the desktop for each selected consumption location.
- **Local settings** — data of this installation: **Type** (Production), **Name** (e.g. the name of the owners' association), **EAN** (EAN of the production plant registered in the **EDC**), **Priority** and **HC** (serial number of the control unit).

The **Run status** line shows the running state of the application. Save the settings with the **SAVE** button.

“Installation” card

- **Inverter settings** — **Battery capacity**, **Inverter Power Max Phase** and **Inverter Power Max Total** of the inverter; the application takes the values over from the inverter QA.
- **CONTROLS SELECT** — where the application passes the power requests:
 - **Power Control to QA Inverter** (control of the inverter export),
 - **Power Control to QA EMS** (passing the requests to energy management),
 - **Enhanced Control QA Power Management** (control of the **QA Consumption Control** modes for maximum use of overproduction by local appliances).

The **Run status** line shows the running state of the application. Save the settings with the **SAVE** button. The application version is shown at the bottom of the card (e.g. sheEsgManagement 1.04.07).

Consumption location card

For each consumption location (apartment) selected on the **SSE Installation** card, the application has a separate card (a tile with the name of the consumption location, e.g. K13:1).

- **Meter values** — **Name**, **Period time** (elapsed time of the current quarter-hour, mm:ss), **Status** (OK) and **Update** (time of the last reading).
 - **Energy Recalculated / Uncalculated** for the period, today and in total.
 - **Uncalculated** is the actual consumption of the consumption location; recalculated is the consumption multiplied by the sharing coefficient.
- **Sharing Settings** — **Coefficient** (share of the apartment in the shared energy, e.g. 7.13 %).
 - Change the value with the **-0.01 / +0.01**, **-0.1 / +0.1**, **-1 / +1**, **-10 / +10** buttons.
 - The **0** and **100** buttons set the limit value (not an increment).
 - The sum of the coefficients of all apartments is shown on the **Consumption Locations** card; it should be 100 %.

The **Run status** line shows the running state of the application. Save the settings with the **SAVE** button.

“Sharing Settings” card

Setting of the sharing mode, the energy budget strategies and the reserves.

- **Control Mode** — current mode and state of sharing (e.g. **AUTO-OFF** = automatic mode, sharing is not taking place at the moment; this is not a fault). Buttons:
 - **AUTO** (automatic sharing according to the current consumption, prediction and battery state),
 - **MANUAL-ON** (sharing permanently switched on),
 - **MANUAL-OFF** (sharing switched off).
- **Remote Control Auto Maximal / Middle / Minimal** — for the automatic mode, three energy budget strategies according to the size of the surplus: **CONTROL METHOD AUTO MAXIMAL**, **CONTROL METHOD AUTO MIDDLE** and **CONTROL METHOD AUTO MINIMAL**.
 - Each determines how the energy to be shared is derived from the consumption of the consumption locations in the current quarter-hour: **Off**, **Minimum value**, **Median**, **Average value**, **Max Avg+Median** or **Maximum value**.
 - The corresponding consumption statistics are shown on the **Values overview** card (**Min**, **Median**, **Average**, **Max:Avg+Med**, **Max**).
- **Parametry Auto Režim** — **Reserve Battery Prediction**, **Reserve Mode Auto-Battery**, **Reserve mode Auto-PV** and **Reserve Mode Auto-Sharing** (kWh).
 - Energy reserves for the individual states of the automatic mode, which adjust the sharing conditions according to the predicted surplus and the needs of the production plant (battery charging, local consumption).
 - The values are set by the technician during commissioning; set the values with the **-- / - / + / ++** buttons.

- **Parameters for Control Method** — **Reserve for Control Mode Max** and **Reserve for Control Mode Middle** (kWh): reserves for the respective control method (Maximal or Middle); set the values with the -- / - / + / ++ buttons.
- **Manual Mode** — **CONTROL METHOD MANUAL MODE**: the same strategy options, valid for the **MANUAL-ON** mode.
- **Calculation parameters** — **Energy Change Max**: maximum change of the energy to be shared (kWh, e.g. 0.1 kWh); set the value with the -- / - / + / ++ buttons (- / + change the value in small steps); the **Nothing** button clears the value and -- is displayed.

Use the **AUTO** mode for automatic decision-making; after using the manual mode, switch back to **AUTO**.

“Energy Sharing” card

The main card — an overview of the current state of sharing and the prediction chart.

The card header shows the current state (e.g. AUT-OFF = automatic mode, sharing is not taking place at the moment). The meaning of each symbol on the card is displayed when you move the mouse cursor over the symbol (tooltip).

At the top there are the **Local** (production plant, left), **Auto Mode** (centre) and **Remote** (consumption locations, right) symbols; in the example with sharing switched off, there is a red power switch symbol below the automatic mode symbol.

- Below the symbols is the energy shared to the consumption locations in the current quarter-hour (Wh) on the production plant side and on the consumption locations side.
- Next is a row of four predicted values (kWh) with symbols: **Production over battery capacity**, **Energy for sharing**, **Production over load** and **Production over load and sharing** — the same values as in the **Prediction** section on the **Values overview** card.
 - These are predictions, not the energy actually assigned in the current period; monitor that in the **Assigned** column in the table below.
 - A negative **Energy for sharing** value is a prediction (production will not cover the load), not actually shared energy.
- Then the state of the home battery (% and kWh), the time in the period and the **Control** state (e.g. OFF).

The **Energy Forecast Chart** shows the course of the day hour by hour:

- **PV** (predicted production), **Load**, **Surplus**, **Surplus battery** and **Sharing** in kWh on the left axis,
- **Battery** (state of charge in %) on the right axis.

The vertical dashed line marks the current hour. Use the **Today** / **Tomorrow** buttons to switch the displayed day.

Below the chart there is:

- the number of **Active sharing** (apartments recorded by the application as active, e.g. 16; the value itself does not confirm that energy is currently flowing to them — that is shown by the **Assigned** column and the **Control** state),
- the **Energy Period [Wh]** table — for each apartment, the consumption in the period (**Period**), the consumption recalculated by the coefficient (**Recalculated**) and the energy assigned for sharing (**Assigned**); the **Total**, **Not assigned** and **Export Total** rows.

Use the **Update** button to reload the values and the **Detailed view** button to switch to the detailed display.

“Values overview” card

- **Period time** — elapsed time of the current quarter-hour (mm:ss; e.g. 10:00 = 10 minutes from the start of the quarter-hour).
- **Prediction**
 - **Battery Over Today** (predicted production beyond battery charging),
 - **Energy for sharing** (a negative value means that the predicted production will not cover the load and nothing is shared),
 - **Above the load, Over Load+Sharing**,
 - **PV Today the rest** (remaining predicted production today) and **The burden today** (kWh).

- **Local Values** — energy of the production plant **Import** and **Export** for the period (Wh), today and in total (kWh), communication **Status** and **Update** (time of the last reading).
- **Energy Remote Recalculated Import** — consumption of the consumption locations recalculated by the coefficients according to the individual strategies: **Min**, **Median**, **Average**, **Max:Avg+Med**, **Max** and **Selected** (value according to the selected control method) for the period, today and in total; **Status** and **Update**.

“Energy overview” card

Energy CL — overview of the recalculated consumption of the individual apartments (**Name**, **Period.Rec.**, **Today**, **Total.Rec.**) and the **Total** row.

“Consumption Locations” card

Configuration CL — overview of the apartments and their sharing coefficients (**Name**, **Coefficient**) and the sum **Total** (should be 100). Set the **Coefficient** of an individual apartment on its card.

Value tiles

The following tiles are displayed on the desktop:

- **Setpoint Exp Local** (set export power of the production plant, W),
- **Export Target Period** (target export energy in the period, Wh, and the selected control method),
- **Export Period** and **Import Period** (Wh),
- **Period time** (elapsed time of the current quarter-hour in seconds and in the mm:ss format),
- **Battery SOC** (% and kWh),
- **Pred.Over Batt**, **Over Sharing**, **Aver Load** and **Over Load Sharing** (predicted energies in kWh, see the **Values overview** card),
- **Active CL** (number of active consumption locations).

Notes

- Sharing takes place in quarter-hours: the application evaluates the consumption of the consumption locations in the current period and decides on the energy to be shared according to the selected strategy, the coefficients and the local surplus.
- Only the predicted overproduction is used for sharing, so that the home battery is charged first for local consumption.
- Local sharing in an apartment building takes place without transmission system fees.
- The user arranges the registration in the **EDC** (production plant and all consumption locations) themselves; the **SSE licence** is assigned by Smart Home and Energy before the application is put into operation.
- The application variables (the **Variables** tab in the device settings) contain only internal and statistical values — the user does not set anything in them. All settings are made on the application cards.
- For clear visualisation and access to measurement history and graphs, we recommend connecting to Mervis SCADA.