

Control PV Plant with PLC

(Energy gateway for renewables)

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Product Components

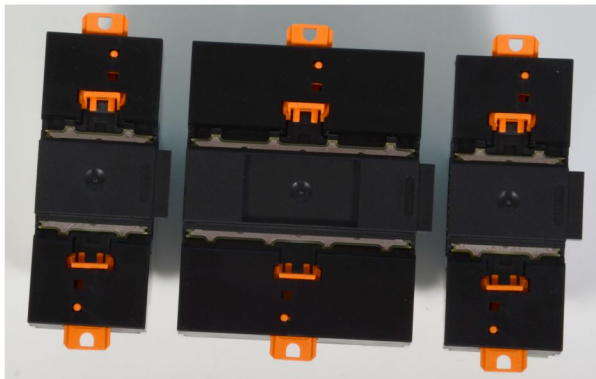
Modular solution

Cost effective sensors



Monitoring of

- Inverters
- String Boxes
- Electricity Meters (AC, DC)
- Sensors (Irradiation, Temperature, Wind)
- Safety Relays
- Door Contact (Theft Protection)
- Overvoltage (Lightning Protection)



Supported Devices

AEG
Power Solutions



Danfoss



DIEHL



KACO 
new energy.

KOSTAL



mavi solar



MNik
Omnik New Energy

OMRON

 **pairan**



POWER-TRAP®




Satcon™

Schneider
Electric

SIEMENS

siliken
innovation experience



solar edge



SOLU energy
TRONIC

teca
Elektronik



SUNGROW

Sunville

sunways
Photovoltaic Technology

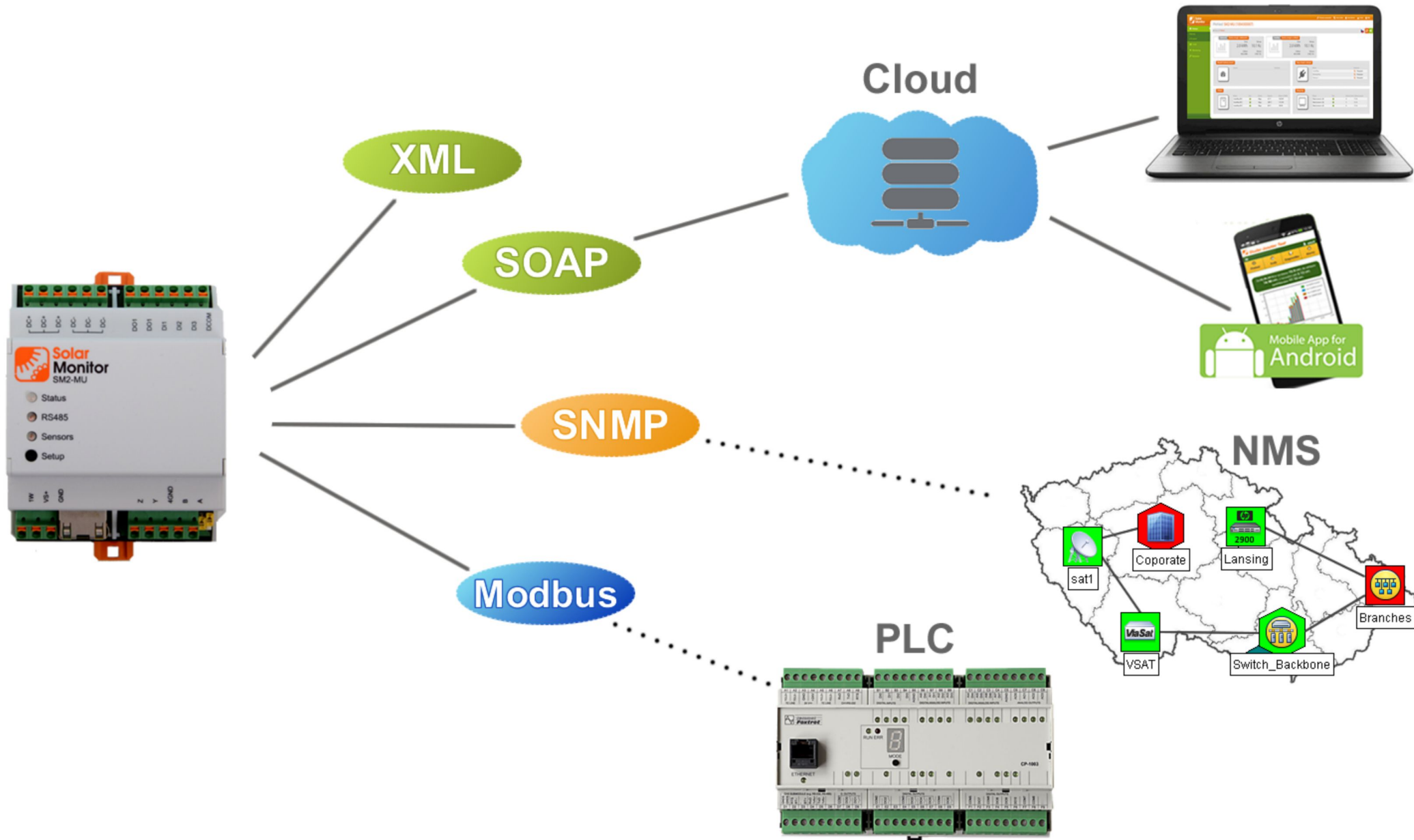
VACON®

xantrex

Solar Monitor – Solution Areas



Software Interface Overview



Webserver of the SM2-MU: Responsive Design



Overview SolarMonitor - Studer Test

Overview

Peaks

LCD Panel

Charts

Alerts

Home > Overview



Inverters (Hybrid)



Name	State	Mode	Temperature	Grid power (0.2kW)	Power (0.2kW)	Updated
XTH 8000-48V (L1)	✓	Charger	- °C	104.98 W	141.96 W	0s
XTH 8000-48V (L2)	✓	Charger	- °C	151 W	42.99 W	0s
XTH 8000-48V (L3)	✓	Charger	- °C	-20 W	42.99 W	0s

MPP Trackers



Name	State	Mode	Temperature	Arr Power (0kW)	Power (0.1kW)	Updated
VT 80-48V	✓	Night	22 °C	0 W	52 W	0s
VS 70-48V	✓	Night	22 °C	0 W	0 W	0s
VS 120-48V	✓	Night	22 °C	0 W	0 W	0s

SNMP – Castlerock SNMPc: Geographical Maps

The screenshot displays the SNMPc Management Console interface. The main window is titled "SNMPc Management Console" and features a menu bar (File, Edit, View, Insert, Manage, Tools, Config, Window, Help) and a toolbar with various icons. The interface is divided into several sections:

- Left Panel (Tree View):** Shows a hierarchical structure under "Root Subnet". It includes folders for "Discovered Objects", "Backbone", "Coporate", "Intl", "R&D", "Sales", and "Switch_Backbone". Under "Intl", there are nodes for "CRC_HQ", "Dallas", "Denver", "Lansing", "Miami", and "NY". Under "Switch_Backbone", there are nodes for "Cisco_2500", "cisco2800", "Detroit", "San_Jose", "Santa_Barbara", "sat1", and "VSAT".
- Map View:** A geographical map of the United States with several nodes placed on it: "CRC_HQ" (yellow icon), "Denver" (blue cloud icon), "Lansing" (green server icon), "Dallas" (orange server icon), and "Miami" (green server icon). A scale of 1:27,000,000 is shown.
- Network Topology:** A diagram showing a central "Company_WAN" node connected to various devices: "HP_8200", "WAP_1", "Cisco_7200", "VoIP_CM", "App_Server", "Servers_1", "DNS", "Exchange", "2008", "UNIX", "Backup", and "NDRETEL".
- Log View:** A table at the bottom showing system events.

Severity	Date	Time	Source	Message
Normal	09/10/2009	14:15:28	User-PC	Smtip Service Up
Normal	09/10/2009	14:41:16	DNA	Device Responding to Poll
Normal	09/10/2009	15:03:58	San_Jose	Trend Report Agent Connected to Server
Normal	09/10/2009	15:09:51	Florida	Device Responding to Poll
Normal	09/10/2009	15:10:38	Dallas	Device Responding to Poll

At the bottom of the console, there is a status bar with the text "For Help, press F1" and a user information section showing "localhost Administrator Supervisor".

PLC Example in IEC 61131-3 ST: Data Reading

```
PROGRAM prgMain
  VAR_INPUT
  END_VAR
  VAR_OUTPUT
  END_VAR
  VAR
    enable : BOOL := 1;
    ip : STRING := '192.168.1.221:502';
    chanCode : UINT := ETH1_uni0;
    tcp : BOOL := TRUE;
    sm : fb_Solarmonitor10;

  END_VAR
  VAR_TEMP
  END_VAR

  sm(enable := enable, ip := ip, chanCode := chanCode, tcp := tcp);

END_PROGRAM
```


PLC Example in IEC 61131-3 ST: Power Control

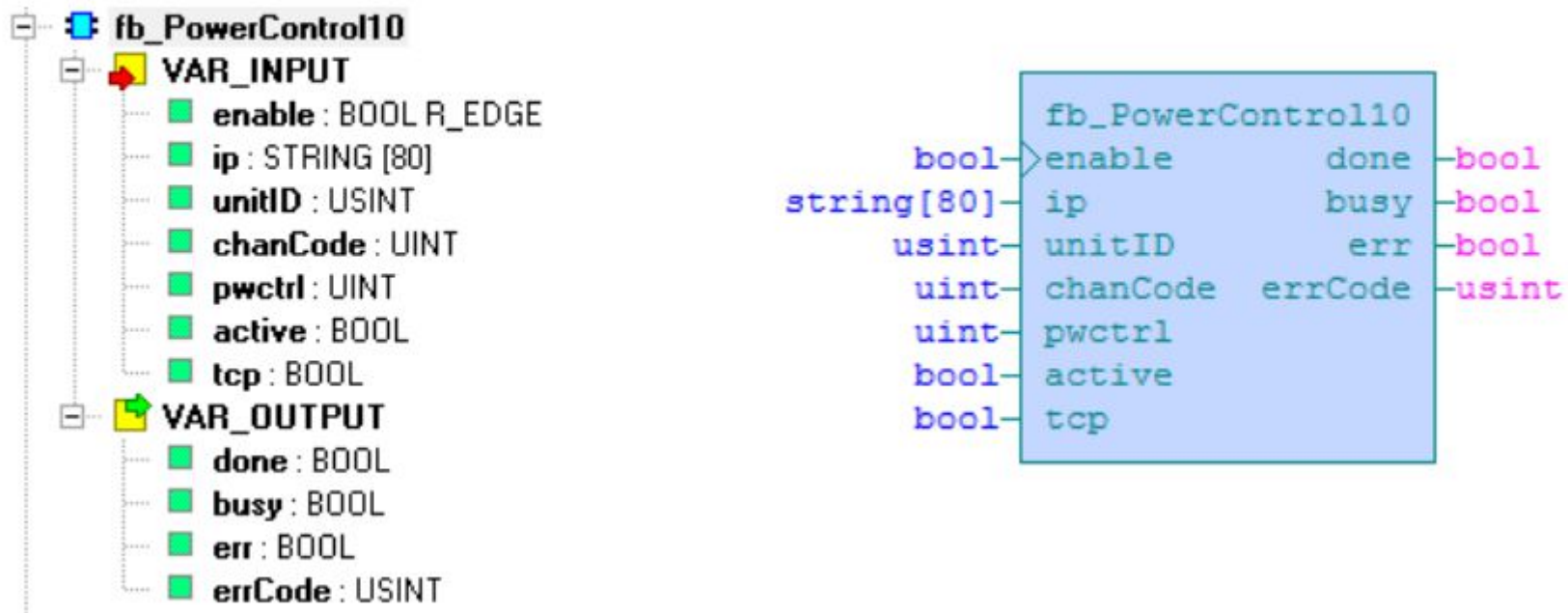
```
PROGRAM prgMain
  VAR_INPUT
  END_VAR
  VAR_OUTPUT
  END_VAR
  VAR
    enable : BOOL := 1;
    unitID : USINT := 5;
    sm_pc : fb_PowerControl30;
    ip : STRING := '192.168.1.221:502';
    chanCode : UINT := ETH1_uni0;
    tcp : BOOL := TRUE;
    val : UINT := 60;
    active : BOOL := TRUE;

  END_VAR
  VAR_TEMP
  END_VAR

  sm_pc(enable := enable, ip := ip, unitID := unitID, chanCode :=
chanCode, tcp := tcp, pwctrl := val, active := active);

END_PROGRAM
```

5.3 Funkční blok „fb_PowerControl10“



Graph Example: normal, no consumption during day



Od 04.07.2018

Do 04.07.2018

dnes

listopad

2018

Dashboard

Solar Production

Max: 2.94 [kW]
Energy: 23.69 [kWh]

Consumption

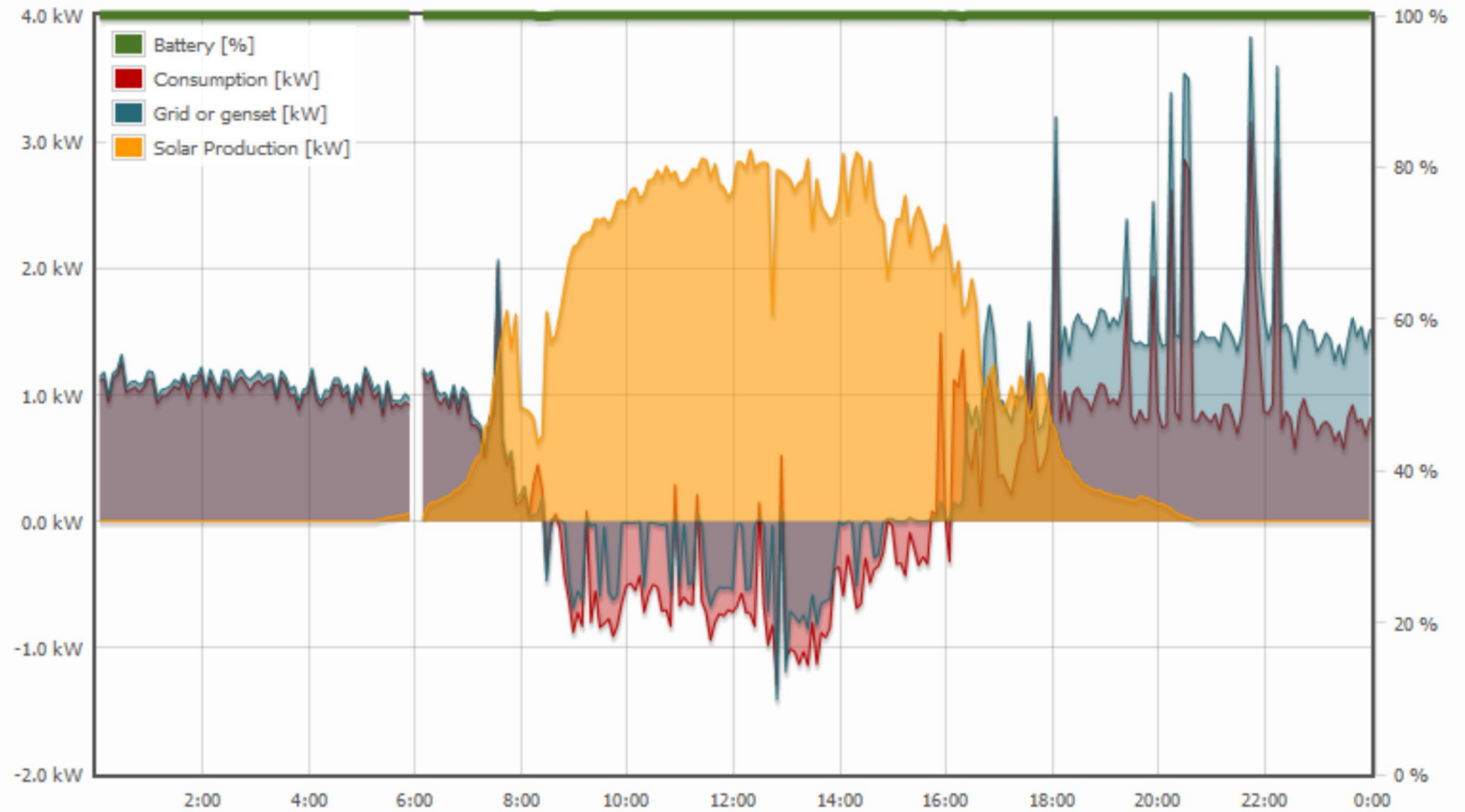
Max: 3.16 [kW]
Energy: 11.33 [kWh]

Grid or genset

Max: 3.83 [kW]
Energy: 18.13 [kWh]

Battery SOC

Max: 100.00 [%]
Min: 99.81 [%]



Graph Example: normal, consumption during day



Od 30.07.2018

Do 30.07.2018

dnes

listopad

2018

Dashboard

Solar Production

Max: 3.00 [kW]
Energy: 25.23 [kWh]

Consumption

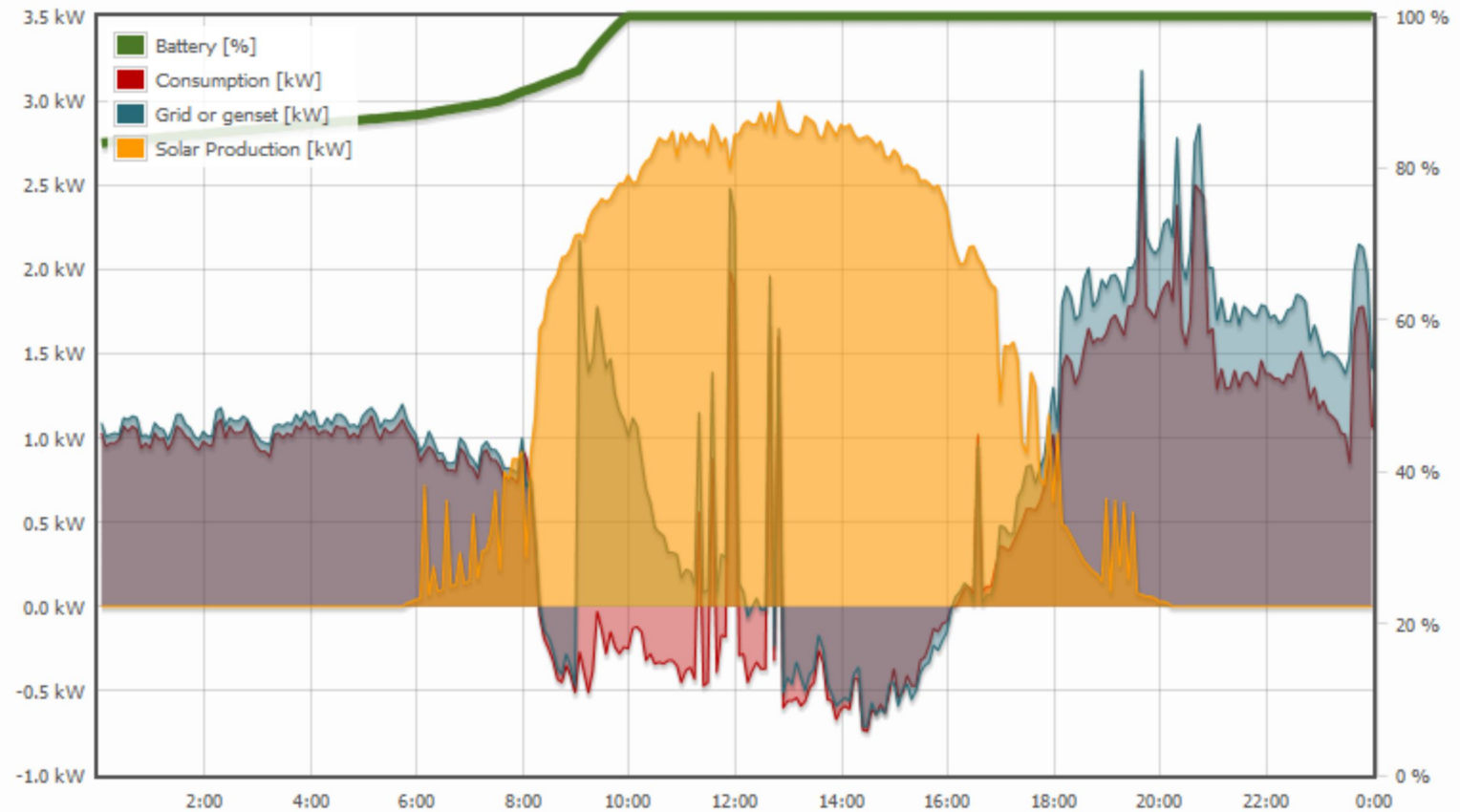
Max: 2.77 [kW]
Energy: 16.04 [kWh]

Grid or genset

Max: 3.18 [kW]
Energy: 22.24 [kWh]

Battery SOC

Max: 100.00 [%]
Min: 83.31 [%]



Graph Example: increasing consumption = ?



Od 27.08.2018

Do 27.08.2018

dnes

listopad

2018

Dashboard

Solar Production

Max: 5.86 [kW]
Energy: 33.14 [kWh]

Consumption

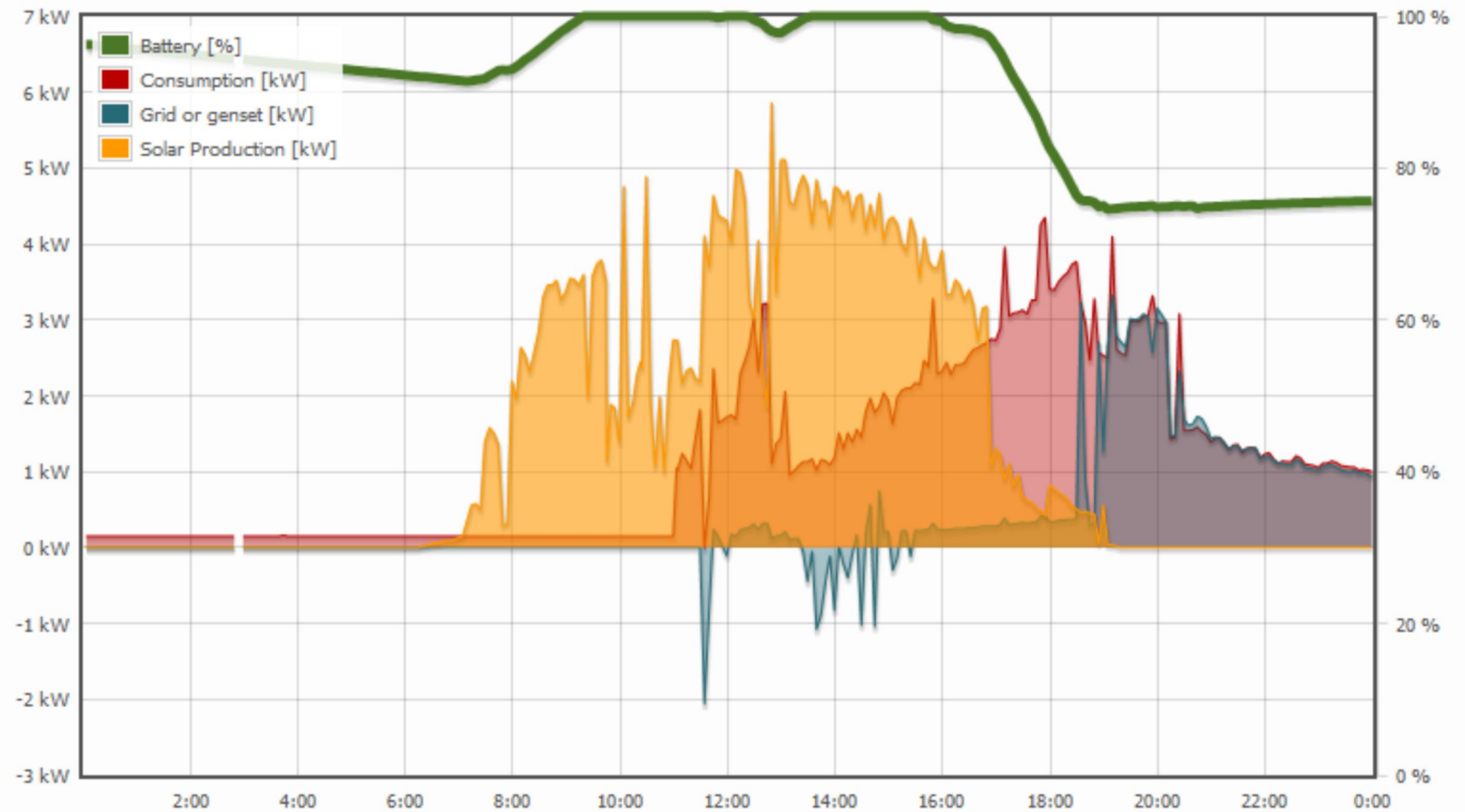
Max: 4.35 [kW]
Energy: 28.23 [kWh]

Grid or genset

Max: 3.33 [kW]
Energy: 9.62 [kWh]

Battery SOC

Max: 100.00 [%]
Min: 74.56 [%]



Graph Example: afternoon consumption discharge battery



Od 28.07.2018

Do 28.07.2018

dnes

listopad

2018

Dashboard

Solar Production

Max: 3.34 [kW]
Energy: 13.23 [kWh]

Consumption

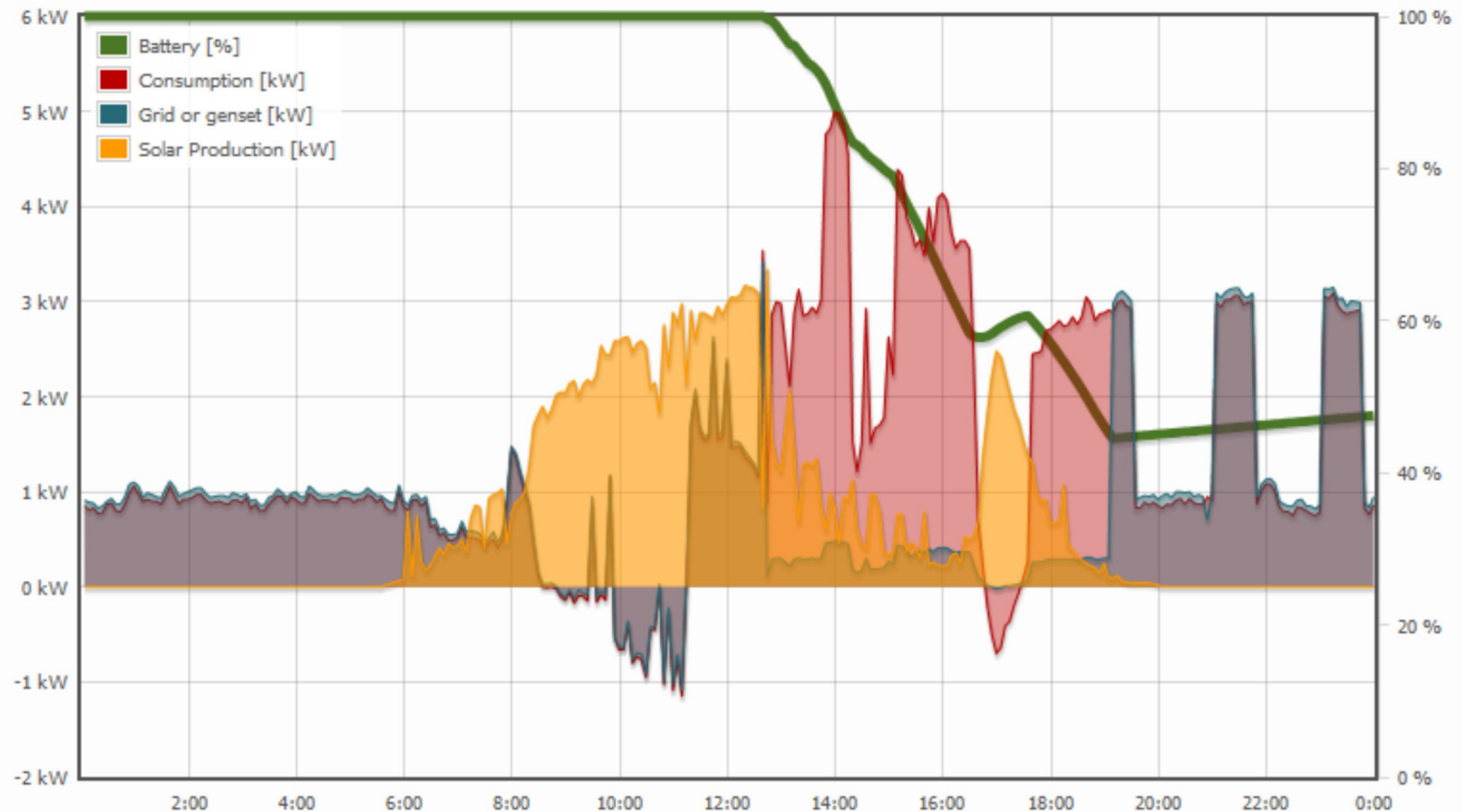
Max: 5.00 [kW]
Energy: 25.97 [kWh]

Grid or genset

Max: 3.42 [kW]
Energy: 11.88 [kWh]

Battery SOC

Max: 100.00 [%]
Min: 44.50 [%]



Graph Example: evening consumption, night peaks



Od 30.08.2018

Do 30.08.2018

dnes

listopad

2018

Dashboard

Solar Production

Max: 4.40 [kW]
Energy: 25.54 [kWh]

Consumption

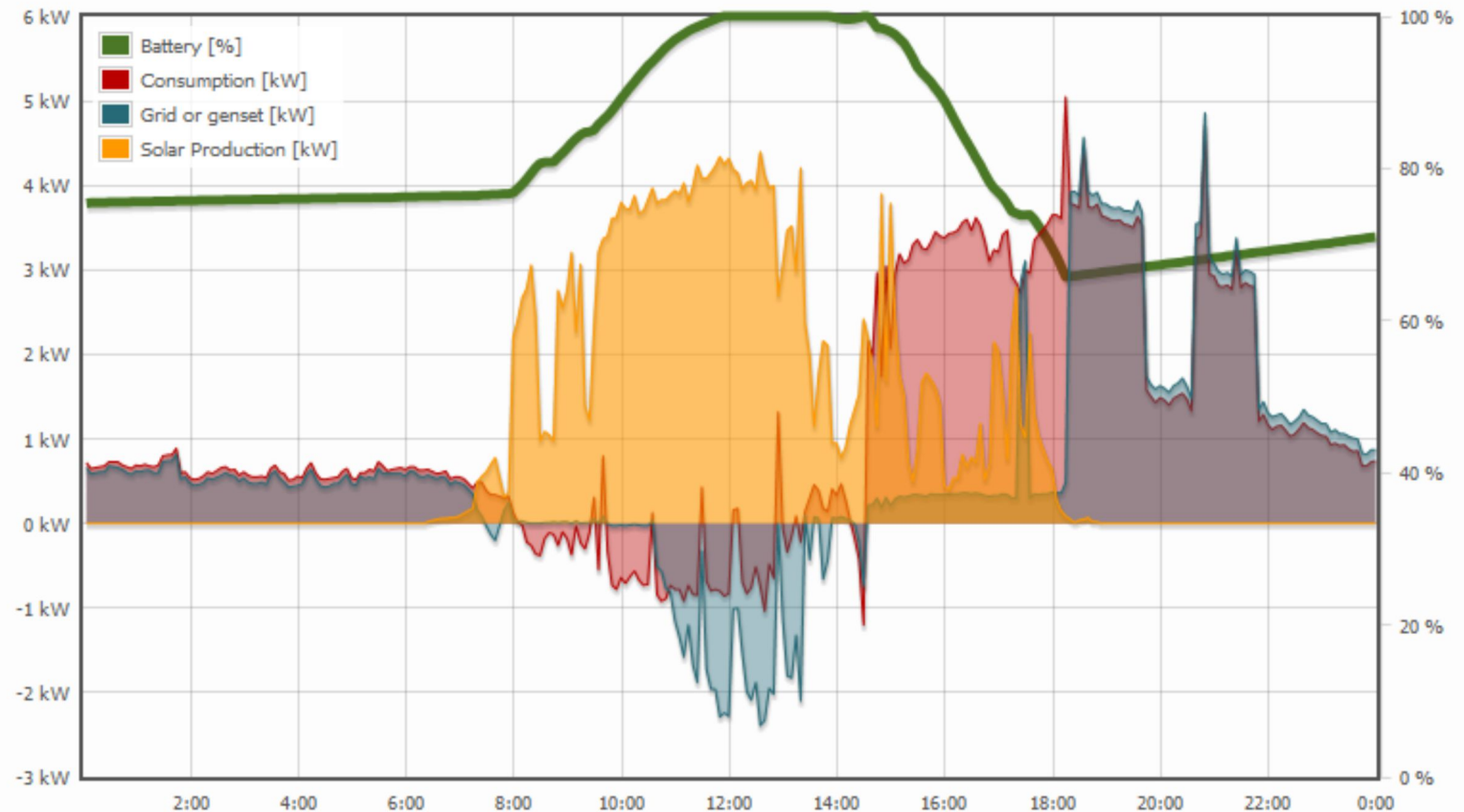
Max: 5.05 [kW]
Energy: 27.15 [kWh]

Grid or genset

Max: 4.86 [kW]
Energy: 14.68 [kWh]

Battery SOC

Max: 100.00 [%]
Min: 65.75 [%]



Graph Example: same situation + next day (charging)



Od 30.08.2018

Do 31.08.2018

dnes

listopad

2018

Dashboard

Solar Production

Max: 4.40 [kW]
Energy: 45.60 [kWh]

Consumption

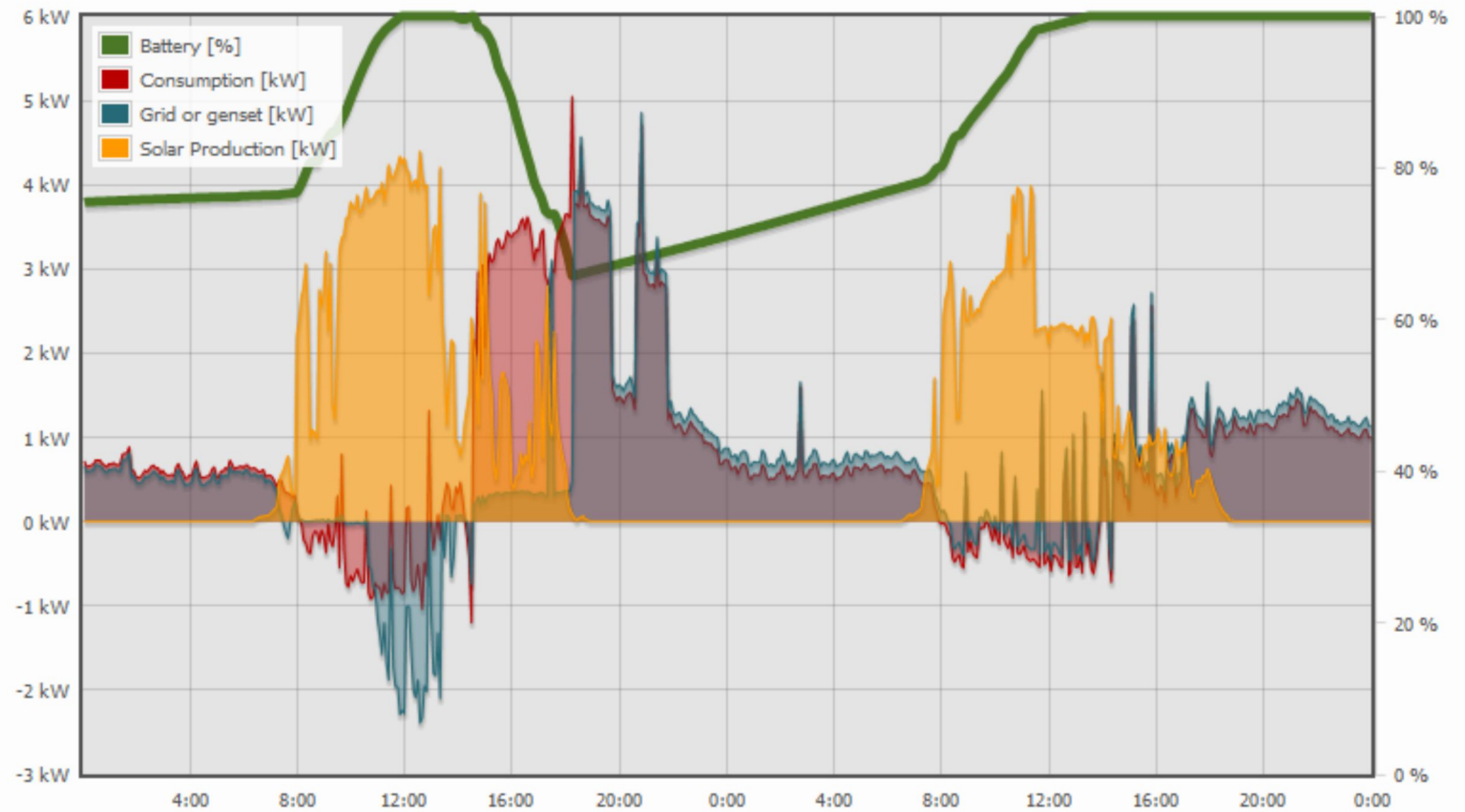
Max: 5.05 [kW]
Energy: 40.26 [kWh]

Grid or genset

Max: 4.86 [kW]
Energy: 31.26 [kWh]

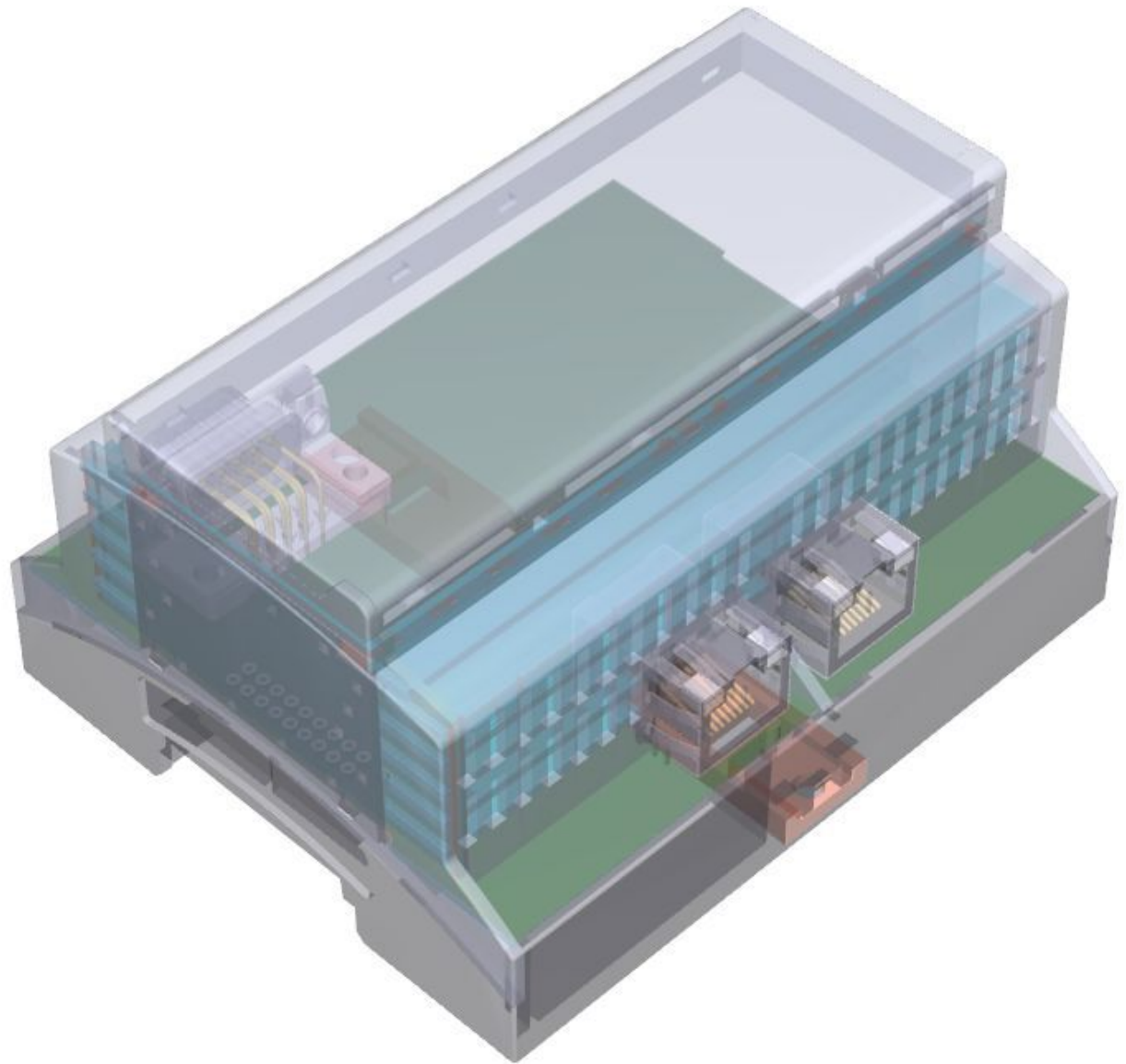
Battery SOC

Max: 100.00 [%]
Min: 65.75 [%]



Planned ... „miniCloud“ for DIN Rail

- For strict „in-house“ solutions
- Suitable for apartment house energy billing, banks
- 1x Gb ethernet
- 2x ARM Cortex A7, 1 GHz
- 1-2 GB RAM DDR3L 1.600 MT / s
- SATA SSD



Any questions are welcome!

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