



H2020 - EEB - 2017 - 766464 – SCORES

Self Consumption Of Renewable Energy by hybrid Storage systems



D 7.5 Hardware of the system: photographs of the installed system

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1 Background

In WP7 the developed subsystems (heat pump with buffer store, CLC storage, battery storage including converter and PV) are build up and connected to the existing domestic hot water and space heating system. The following chapter shows the installed hardware system on the demonstration site in Gleisdorf, Austria which is going to be demonstrated.



2 Pictures Demonstrator Gleisdorf

CLC-container (outside)

- Container next to technical room of office building



CLC-Reactor

- Real size of one reactor
- an actual fixed bed metal cartridge with resistive heating elements is inserted into the reactor to accurately emulate the CLC reaction including its thermodynamics (heat capacities and thermal diffusivities)
- Transfers Heat to CLC buffer storage



CLC buffer storage

- Vacuum insulated
- Takes up heat from one reactor discharge
- CLC buffer storage temperature stays < 100 °C



Pump + Valve + Flow meter

- Valve
- Pump for reactor cycle
- Flow meter (display)



Heat exchanger

- Heat exchanger for connecting CLC loop with main buffer storage in technical room



Air conditioning

- Necessary because the container is placed outside
- Prevent damage due to freezing
- More realistic conditions, when CLC storage will be placed in technical room of a building in final use



Control unit

- Control of the CLC system
- Data collection
- Communication exchange with BEMS



Heat exchanger/ buffer loop

- CLC loop (black)
- Buffer loop (red)
- Data and power supply for container
(right feed through)



Electric system container (outside)

- Container next to technical room of office building
- Photovoltaics installed on the roof
- Containing Battery, Converter, BEMS



BEMS-Station

- Left → batteries
- Middle → BEMS
- Right → Converter



BEMS

- Automated control
- Algorithm using demand and production prediction to operate the system in an optimized way
- „Brain of the system“
- Including data collection and monitoring system



Converter

- Converter connected to PV, power grid and battery system
- „Brain“ of the battery system



Second-Life batteries

- Electrical storage
- 5 batteries
- BMS control on top level
- Total storage capacity ~30 kWh



Heat pump control unit

- Local control of heat pump system including buffer (pumps, valves, electrical heaters, etc.)
- Measurements of heat pump system (flow and return temperatures, flow rates, buffer temperatures, etc.)



Buffer Tank

- 2 m³ size
- ~ 100 kWh storage capacity
- Central point of thermal system of the SCORES system
- Included electrical heaters (backup)



Heat Pump

- 2 heatpumps
- 12 kW each
- Max. flow temperature 65 °C
- Feeds heat into SCORES Buffer
- Low temperature ground source ~10 °C



Distribution Loop Control

- Measurements and control of distribution loop
- 70 °C grid temperature for DHW
- Lower temperature for space heating
- Control for LT-source emulation for heat pumps

