CO2 neutral buildings in CH-Männedorf - fully self sufficient

by Sebastien Eberhard / 2021-03-30 10:54:27 / International / 5578 / EN

New Construction

**Primary energy need:**

40.07 kWhpe/m².year

(Calculation method: Other)

**ENERGY CONSUMPTION**

<table>
<thead>
<tr>
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**Building Type:** Collective housing < 50m  
**Construction Year:** 2019

**Address 1 - street:** Saurenbachstrasse 8707 MÄNNEDOERF, Switzerland

**Climate zone:** [Dwa] Humid Continental Hot Summer, severe, dry winter

**Net Floor Area:** 1 884 m²

**Construction/refurbishment cost:** 7 200 000 €

**Number of Dwelling:** 16 Dwelling

**Cost/m²:** 3821.66 €/m²

**Certifications:**

Proposed by:

**General information**

This building received a mention at the national and international levels for the Energy & Temperate Climates Prize of the Green Solutions Awards 2020-21.

The latest lighthouse project of Umwelt Arena Schweiz in cooperation with exhibition partners and the HSR Hochschule für Technik Rapperswil is the first residential building in the world with an intelligent and consistent combination of photovoltaics, battery storage, synthetic e-gas/biogas and intelligent energy management (hybrid box). All this at amortizable costs for the building owner and the residents receive heat and electricity at zero cost.

A self-sufficient building with high-tech-eco-systems and products:

- A beautiful project realized by the owner of the Umweltarena in CH-Spreitenbach and designed by René Schmid Architekten AG in CH-Zurich.

- The buildings produce 105'900 kWh per year by BIPV-elements, PV-rooftop-installations, wind-turbine and other sources. The unused energy (summer) is transferred and turned into synthetic methane (which is CO² neutral) and can be re-electrified in winter. So the buildings produce more than consume.
- What is available as production and storage of renewable energies has been implemented.
- The tenants do not have to pay for electricity and heating.
- Some of the BIPV-elements are white - which is unique and gives new architectural possibilities.

Photo credit
Solaxess

Stakeholders

Contractor
Name: René Schmid AG, CH-Zurich // Solaxess SA CH-Marin
Contact: Mr. René Schmid // Peter Röthlisberger
http://www.reneschmid.ch

Construction Manager
Name: Umweltarena
Contact: Mr. Robert Grill
http://www.umweltarena.ch

Stakeholders
Function: Others
Umweltarena, CH-Spreitenbach
Mr. Robert Grill
www.umweltarena.ch

Contracting method
General Contractor

Type of market
Realization

If you had to do it again?
Always with pleasure - with even more and newer technologies.

Building users opinion
Facinated.

Energy

Energy consumption
Primary energy need: 40.07 kWhpe/m²·year
Primary energy need for standard building: 75 502.00 kWhpe/m²·year
Calculation method: Other
CEEB: 0.0105
Breakdown for energy consumption: Househol: 43'357, Hotwater 15'849, Heating 16'296

More information
This buildings produce more than they consume.

Real final energy consumption
Final Energy : 40,07 kWhfe/m².year

Renewables & systems

Systems
Heating system :
- Geothermal heat pump
- Combined Heat and Power
Hot water system :
- Heat pump
Cooling system :
- Water chiller
Ventilation system :
- Natural ventilation
Renewable systems :
- Solar photovoltaic
- Heat pump (geothermal)
- Micro wind
- Biogas boiler
- Energy recovery from waste
- Other, specify

Renewable energy production : 100,00 %
Photovoltaic system:
A ventilated photovoltaic façade envelops the entire building. The building material (façade panels) was replaced with active photovoltaic elements. The photovoltaic panels are directly screwed to the substructure in wood. In order to make this simple installation possible, the photovoltaic modules have been specially prefabricated with mounting holes.
White and dark, colored and textured photovoltaic facades like the ones we use in Männedorf serve as weather protection and energy generation at the same time.

Synthetic Methane:
Some of the excess solar power generated by the Männedorf superstructure in summer is sent to the power-to-methane pilot plant at the University of Applied Sciences in Rapperswil, where it is used to produce synthetic methane. This gas is CO2-neutral and is temporarily stored in the gas network, from where it is made available again to the residential complex in Männedorf in winter. There, the so-called Hybridbox® is used as the most important link, which, as an intelligent energy system, produces electricity and heat from the CO2-neutral “synthetic gas / biogas” as required.

Environment

Urban environment
Land plot area : 2 879,00 m²
Built-up area : 2,00 %

Products

Product
Beautiful white solar modules
Solaxess SA
Peter Röthlisberger
http://www.solaxess.ch
Product category : Structural work / Structure - Masonry - Facade
With the unique color-giving technology of Solaxess PV-Modules are transferred into a construction material. Also in white and bright colors. No solar-cells are visible - even not from close. Loved by architects and construction companies.

**Costs**

**Construction and exploitation costs**

Total cost of the building: 9 000 000 €

**Carbon**

**GHG emissions**

Building lifetime: 40.00 year(s)

**Contest**

**Reasons for participating in the competition(s)**

This building has received the Watt-d’or award in 2021.

More than 18 different eco-friendly-energy productions, storing, and saving systems combined into one system: Roof-top-Solar, beautiful white BIPV modules from Solaxess, wind turbine, energy-mgt-systems, energy-budgets for tenants, smart-home-mgt, Joulia-Shower, energy-efficient-elevator, and so on.

**Building candidate in the category**

Energy & Temperate Climates