Buildings Guide
Upgrade to ultra-low-energy buildings

Schoenholzerstrassee Berlin

Detailed Good Practice Building

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08/2015

Building Name and ID

Building Name:	Schoenholzerstrasse
Building ID:	Will be filled out by bigEE
Real:	Real
Published:	Will be filled out by bigEE
Date entered:	31.08.2016

Picture

Photos:

General Information

Building Name:	Schoenholzerstrasse
Climate Zone:	Temperate
Project State:	New Build

Building Sector:	Residential
Building Type:	Multi-Family
Mode:	Closed
Energy Efficiency Level:	ULEB

Year Built:	2009
Location:	Schoenholzerstrasse
Municipality:	Berlin
State:	Berlin
Country:	Germany
Geo. Latitude:	52,538 °N
Geo. Longitude:	13,398 °N
TFA:	2777,6 m^2
Treated Building Volume:	10460 m^3
Number of Dwellings:	20
Cost/m^2:	2170 €/m^3

Summary

Description

The Schoenholzer Building is a 7 storey Passive House residential building in mixed construction with a massive core and a wooden light-frame construction façade. This building was the first multi-storey Passive House to be built in Berlin. Located in Berlin Quarter of Berlin Mitte the building is owned by Living in Urban Units an owner association/cooperative formed especially for the construction of the building.

Built as a Multigenerational building, it was completed in 2009 and has 12 self owned apartments and 8 Cooperative apartments. As a multigenerational building, one third of the apartments were reserved for older residents and 11 of the apartments were planned for families with children. All rooms have barrier free access. Apartments vary in size from 60 to 140 m^2. The largest apartments in the middle of the building can be adapted according to the life cycle of the owners to two smaller apartments if needed. To allow for a flexible planning firewalls were built on both sides of the elevator. This allows rooms towards the street to be orientated to either apartment to the left or right. The apartments are planned around a large living dining room and living room combination. . In the middle zone there is a false ceiling containing the ventilation pipes. This allows a reduction in the use of corridors and the rooms to the north and south to be equally supplied with fresh air. Room heights are 2,50m in the bathrooms, 2,70 in the middle zones and 2,90 m in the living room.

Common areas include the roof terrace and the garden as well as a lounge and a washing room.

The building is painted in a light sandy colour with red accents and uses ecological renewable wood as well insulation from recycling. In aiding the fast completion time the building was built using prefabricated construction methods.

Overall Performance

The building was built as to Passive House standard and uses only around 80% energy as compared to a Reference Building. This case study demonstrates that it is possible to build a multi-generational high-rise building in a energy efficient ecological manner.

Cost and cost effectiveness

The overall costs amounted to 4530000 € or around 2170 €/m^2

Project Description

General Information

Year of construction:	2009
Year of refurbishment:	-
Status :	Closed
Treated Floor Area:	2777,6
(Gross floor area):	-
(Gross volume):	10460 m^3
Number of floors:	7
Areas:	
Number of units:	20
Number of occupants:	Will be filled out by bigEE from excel file
Elevation:	49 m
Orientation:	
Average Summer Temperature	18,6 °C
Average Summer Humidity	64 %
Average Winter Temperature	0 °C

Architectural Description:

(Stakeholders)

Owner :	Living in Urban Units (LUU Gbr) / WEG
Investor:	Living in Urban Units (LUU Gbr)
Developer:	LUU Gbr
Architect:	Deimel Oelschläger Architekten Partnerschaft
Construction Firms:	-
Contracting Method:	-
Building Services:	Ingieuerbüro IB Hanka
Statics:	Ingieuerbüro Jockwer und Partner
Craftsperson	
Building physics	Deimel Oelschläger Architekten & Passivehouse Institute

(Urban Environment)

The building lies in a dense inner city block edge building structure.

Land plot area:	856 m^2
Built up area:	377,50 m^2
Green space:	478,5 m^2

Certificates and Compliance

MEPS (Minimum Energy Performance Standard)

Description or list of Minimum Energy Performance Standard which building must comply to

Needs to comply with green buildings laws: No
Needs to comply with energy efficient buildings laws: Yes

Certificates

The building is Passive House certified

Special Features

Additional Sustainable features

References:

Passive House Institute. 2016. Passive House Database. www.passivhausprojekte.de
Diemel Oelschäger Architects. 2010. Praxisbeispiele für nachhaltiges Planen und Bauen. Architektenkammer. Berlin
Diemel Oelschäger Architects. 2010. Passivhaus Objektdokumentation, Mehrgeneration Wohngebäude in Berlin-Mitte. Berlin
Diemel Oelschäger Architects. 2010. LUU Living in Urban Units Schönholzer Str. 13/14 10115 Berlin. Berlin

Data reliability/Source (Internal) BigEE, External literature

Envelope

Summary Construction:

The construction of the building is that of a mixed construction with a lift weight timber panel façade with cellulose insulation and with a massive cement core.

The concept sees the building envelope including the stair well as the insulating surface. This was planned so as to reduce thermal bridging. To reduce all thermal bridges the external façade was hung in front of the building shell. The wooden balconies are suspended via the wooden façade so as to reduce thermal bridging. The light-weight timber panels in the façade are field with recycled Isoflock as an insulation. The installation layer assures the F30 fire safety compliance as well as adding to the sound insulation of the apartment. Only the fire walls to the neighbouring buildings were constructed with masonry. In principle the facades in the roof are constructed using the same principles of those in the facade.

To save costs the insulation in the sole is divided into an outer and inner insulation. In addition to this a drainage system through foam glass below the above mentioned insulation ensures drainage of leakage water.

Interior wall partitions are ferrocement in filled with sand-lime bricks as a bracing wall.

Airtightness is achieved through oriented strand board (OSB) in the façade and airtight tape at the joints between the façade and the interior walls and slabs. As regards to the airtightness, a certified blower door test was done on the building. The first air tightness test was completed with the finishing of the external façade and all leakages were corrected. The second control was carried out after completion. The results were 0,51 resulting n50-value, demonstrating an adequate airtightness. As the ventilation system could not be completely sealed the pressure test is higher than in reality.

Design:	Heavy weight construction
A/V Ratio:	0,27 m^{-1}
U-Value Building:	ni
Thermal bridging:	Calculated according to Passive House
Air tightness:	Will be filled out by bigEE from excel file
Air tightness:	0,51 /h
Shading:	Movable shading elements
Solar reflectance roof:	Ni.

External Wall Build Up Strasse (Will be filled out by bigEE from excel file)

The external wall is a light-weight wood panel façade system

(Note Table must be added to as needed, it will be variable.)

Material	Thickness, cm	Thermal Conductivity λ

Plaster		-
Mineral wool Insulation	6	-
Wood fibre board	1,5	-
(Joints/rafter)		-
Isoflock 040 (insulation)	24	-
OSB board	1,5	-
Mineral wool insulation	7	-
Epoxy fiberglass laminate. outer shell	1,25	-
Epoxy fiberglass laminate. outer shell	1,25	-

Total Thickness	-	
U-Value (Thermal transmission coefficient)	0,116	W/m^2K
Total Area	-	

Basement Floor Build up (Will be filled out by bigEE from excel file)

Material	Thickness, cm	Thermal Conductivity λ
Screed	5	-
(Sound Insulation 035)		-
Concrete foundation	10	-
Insulation	10	-
Foam glass ballast	16	-

(Note Table must be added to as needed, it will be variable.)

Total Thickness	-	
U-Value (Thermal transmission coefficient)	0,158	W/m^2K
Total Area	-	

Roof Build Up (Will be filled out by bigEE from excel file)

The roof is a mix with a green roof and roof terrace

Material	Thickness, cm	Thermal Conductivity λ
Concrete	22	-
Insulation (Polystrol 035)	25	-
Tarred Sealing	1,2	-
Green Roof		

Total Thickness	-	
U-Value (Thermal transmission coefficient)	0,138	W/m^2K

Total Area	-

Window

The windows are energate 1202Afi, a triple glass window with a timber-aluminium combination, with a solid wooden core and aluminium shell. These are built into the layer of the air tight OSB. This allowed for simple detailing and cost saving. The triple galzing is a Häussler Passiv Therm 4/16/6/16/4. The windows in the ground floor are protected from prying eyes with movable panels

Glass Infill:	Argon	
Coatings/Tint :	-	
Solar Heat Gain Coefficient:	51%	
U-Value Glass:	0,6	W/m^2K
U-Value Window Frame:	-	
U-Value Window	0,79	W/m^2K)
Total Area:	-	

Door

The door is a wooden casement door energate 1202Afi

U-Value Door	0,9	W/m^2K)
Total Area:	-	

Passive Strategies

The passive heating strategies (after Passive House) have been done so well that heating is supplied almost alone through solar and internal heat sources. To reduce overheating in summer two wooden folding sliding shutters are located in front of each window.

Additional Information

The building makes use of green building principles with the use of ecological materials as well as the of grey water.

Systems

Intro:

Design temperature Summer:	19 °C
Design temperature Winter:	19 °C

Heating System

Heating is via a condensing gas boiler with a buffer tank. Heating of the rooms is through the ventilation air supply and in some rooms such as the bathrooms due to heightened comfort needs. A mix of heat register and floor heating is used in the bathrooms depending on their type and size.

Type of System:	Gas condensing boiler
Central/decentral:	Central
Storage Tank (heating):	Buffer Tank
Controls:	-
Heating Capacity:	-
Thermal Efficiency:	-
Energy Source:	Gas
Annual Final Energy Demand:	-

Hot Water Systems

Hot water is supplied through distribution circulation and individual pipes. It is heated via the condensing gas boiler with support from a 27m^2 solar hot water system which provides 31% of the total heated water needed.

Type of System:	Gas condensing boiler
Central/decentral:	Central
Storage Tank (hot water):	Buffer Tank
Controls:	-
Heat Capacity :	-
Energy Source:	Gas
Annual Final Energy Demand:	-

Solar Hot Water System

A part of the roof is used for a solar hot water system and heating assistance.

Solar Thermal collector:	-
Aperture Size:	27 m^2

Orientation:	-
Inclination Angle:	-
Hot water covered by solar:	-
Heating covered by solar:	-

Ventilation System

The Ventilation system is a TSL 150 G DC Schmeißer decentralized ventilation system with heat recovery. Each apartment has its own ventilation system which directly enters and exits the facade. In the planning care was taken to make sure that a short circuit of the ventilation does not take place. The ventilation is located in the bathrooms and goes through the middle zones before being distributed to the rooms. Exhaust air is through the kitchen and bathrooms.

Type of System:	Mechanical HRV
Central/decentral:	Decentral
Controls:	-
Flow Rate:	-
Heat Recovery Ratio:	85 %
Energy Source:	-
Annual Final Energy Demand:	-
Circulating Pumps:	-
Annual Final Energy Demand:	-

Power Generation

There is a PV system installed.

Electric power :	-
Total electricity production:	-

Renewable Energy System

Renewable systems: -

Photovoltaic:	-
Aperture Size:	-
Orientation:	-
Inclination Angle:	-

Auxiliary Systems

Auxiliary Energy: -

Heating System:	-
Cooling System:	-
Hot Water:	-
Solar Hot Water:	-
Ventilation System:	-

Smart building systems: -

Energy Efficient Lighting and Appliances: -

Energy Consumption

Intro:

Energy consumption data were simulated with PHPP in 2010. Simulation results were as follows:

Primary energy used:	-
Specific primary energy reference building:	34 kWh/m^{2}a
Specific primary energy demand:	73 kWh/m^{2}a (93 kWh/m^{2}a including electricity PHPP)
(Calculation method: e.g. EnEV):	PHPP / ENEV
Final energy:	-
Breakdown final energy consumption:	-
Heating System:	12,08 kWh/m^{2}a
Cooling System:	-
Hot Water system:	10,49 kWh/m^{2}a
Ventilation system:	-
Auxillary Energy:	3,49 kWh/m^{2}a
Renewable systems:	-
Smart building systems:	-
Renewable energy production:	-

GHG emissions (hidden 2012)

Any information on Green House Gas savings

GHG Annual emissions:	10,1 kg/m^{2}a
GHG Building Lifetime emissions:	-

Costs

Intro:

To keep costs low the building was constructed in wood panel façade within a concrete compartment framework and pre-fabricated.

Envelope costs :	-
Systems costs :	-
Building Costs (Envelope & Systems)	3250000 €
Total investment Costs:	4530000 €
Cost/m^2:	2170 €/m^2
Annual total costs:	-
Annual total costs/m^2:	-
Yearly energy costs:	-
Early energy savings against reference building:	-
Internal Rate of Return:	-
Static payback time:	-
Dynamic Payback time:	-

Cost and cost effectiveness

The building received KFW 40 Efficient House Promotion

Assumptions

Real interest rate:	-
Local Currency:	Euro
Currency Rate (Date):	1:1 €
Energy Prices:	Float €/kWh
Electricity:	Float €/kWh
Gas:	Float €/kWh
Oil:	Float €/kWh
Wood:	Float €/kWh
Other:	Float €/kWh

Costs

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The bigee.net platform informs users about energy ef ciency options and savings potentials, net benef ts and how policy can support achieving those savings. Targeted information is paired with recommendations and examples of good practice.

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Financial support

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

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