Housing in Purkersdorf / Austria

PROJECT SUMMARY

Renovation of a 19th century villa with four flats and construction of 10 passive-house units

SPECIAL FEATURES

60 m² solar collectors on the roof and 60 m² photovoltaic panels

ARCHITECT

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OWNER

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SHC
SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

IEA – SHC Task 37
Advanced Housing Renovation with Solar & Conservation

old house - previous state

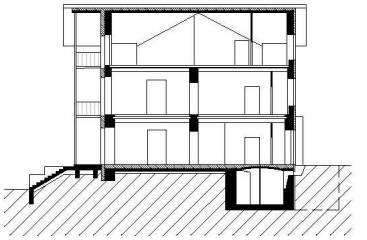
old house - interior

BACKGROUND

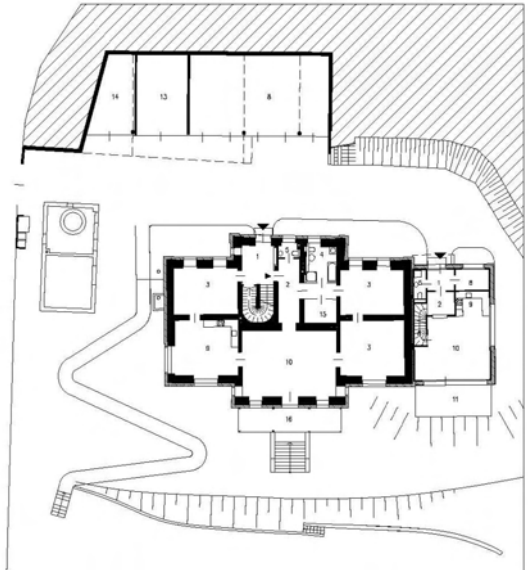
The massive exterior walls of this three storey 19th century villa were not insulated and still contained the original windows. The space heating was supplied by decentral located wood fired tiled stoves. The domestic hot water was prepared decentralized by electricity.

SUMMARY OF THE RENOVATION

- insulation of facades, roof and cellar
  (passive house energy standard is targeted)
- passive house suitable windows / renovation of windows
- construction of loggia
- mechanical ventilation with heat recovery and air heating
- solar collectors for domestic hot water preparation
- four flats
- biomass heating station



Villa – cross-section



Villa - ground floor

detached house - section

CONSTRUCTION

Roof construction

(interior to exterior)

Cross-laminated timber board – planed	110 mm
Moisture barrier	5 mm
Polystyrene	300 mm
Vapour pressure equalisation layer	5 mm
Water-proofing – two-layer	10 mm
Separating layer	5 mm
Vegetative substrate, filtering fleece, drainage	100 mm
Total	535 mm

Wall construction

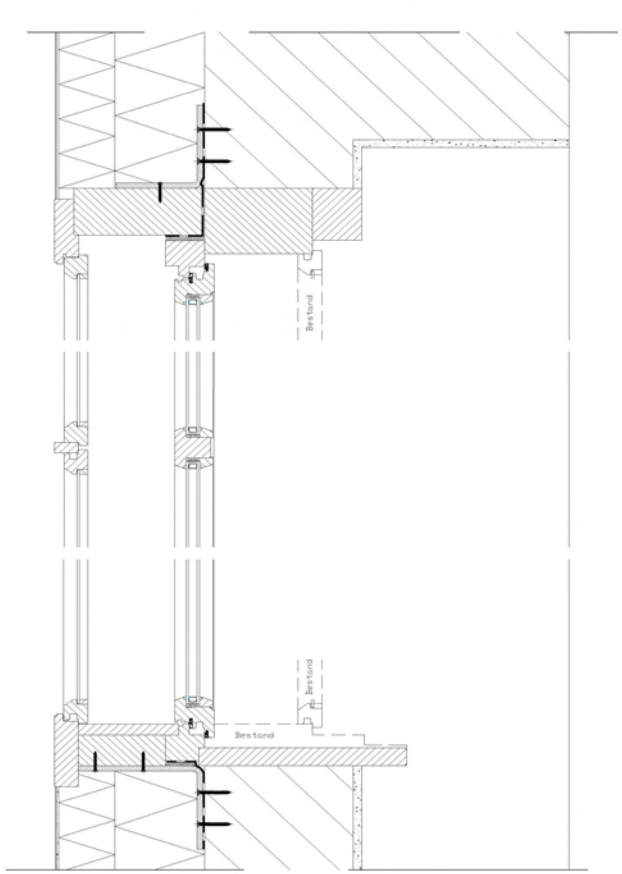
(interior to exterior)

Gypsum plasterboard	15 mm
Cross-laminated timber board	100 mm
Mineral wool in wooden grid – two-layer	300 mm
Wind-proofing	
Lath-wood	30 mm
Larch boarding	20 mm
Total	466 mm

Basement floor

(top down)

Parquet	15 mm
Cement screed	70 mm
Polystyrene	240 mm
Plaster floor	30 mm
Water-proofing	5 mm
Waterproof concrete basement slab	250 mm
Filter layer	50 mm
Antifreeze rubble	150 mm
Total	810 mm



window renovation – vertical section

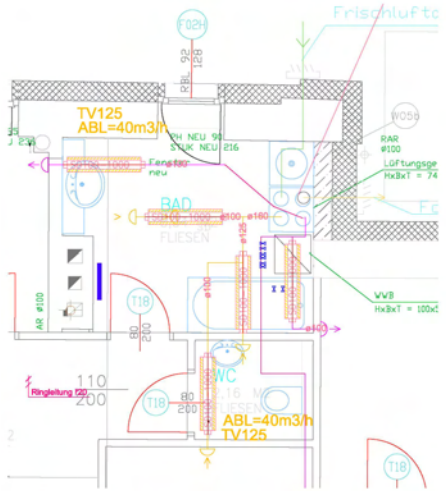
Old house / previous state – south façade

Summary of U-values W/(m²·K)

	New objects	Renovation
Roof construction	0.10	0.11
Walls	0.16/0.10	0.13
Basement ceiling	0.15	0.25
Windows	0.75/0.85	0.90

RENEWABLE ENERGY USE

The 60 m² solar collectors on the south-oriented roof of the existing building achieve an annual solar fraction of the solar heating system of 27.7 % (for domestic hot water and space heating).



Heating and ventilation system (flat no.4)

BUILDING SERVICES

A new centralised ventilation system with heat recovery (efficiency 85 %) will be installed.

Domestic hot water will be heated by solar collectors and biomass instead of decentral electric boilers in each apartment.

INFORMATION SOURCES

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