GLASSX® - glazing with phase-change material

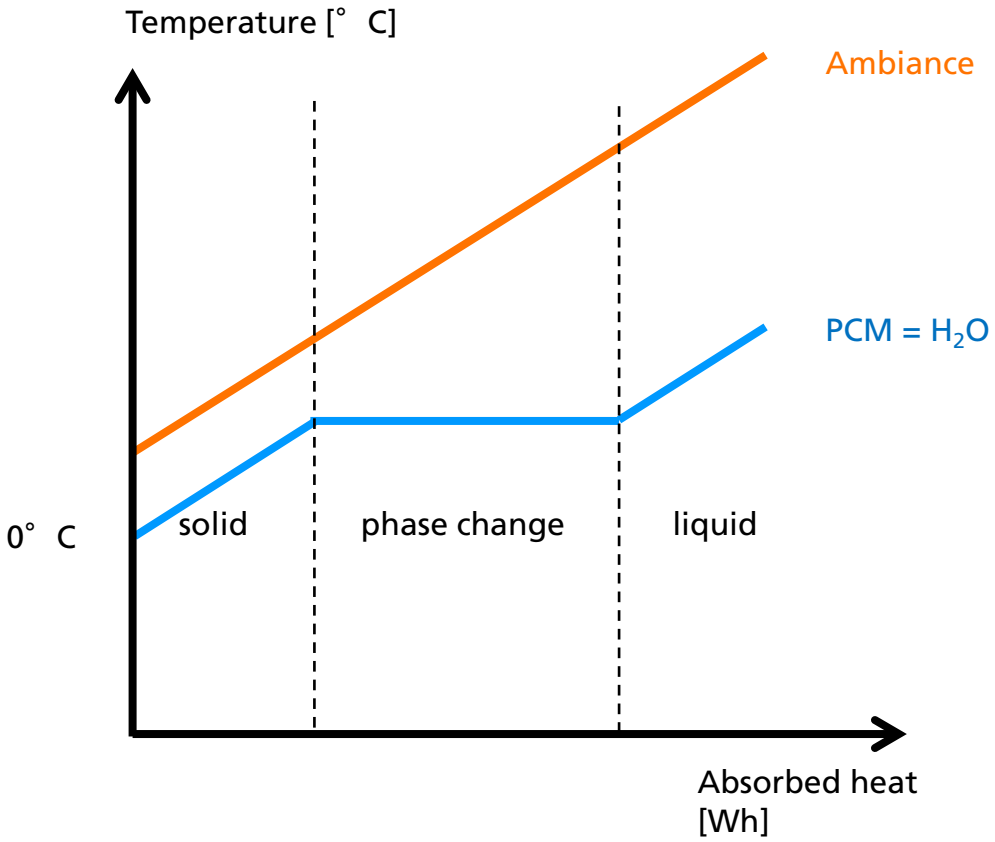
GLASSX

Buildings that are bright and sun-heated in winter …

… but stay pleasantly cool in summer

Phase changing materials (PCM) are able to store large quantities of energy in small volumes

« With the energy needed to melt 1 kg of ice, the same amount of water can be heated from 0° C to 80° C »

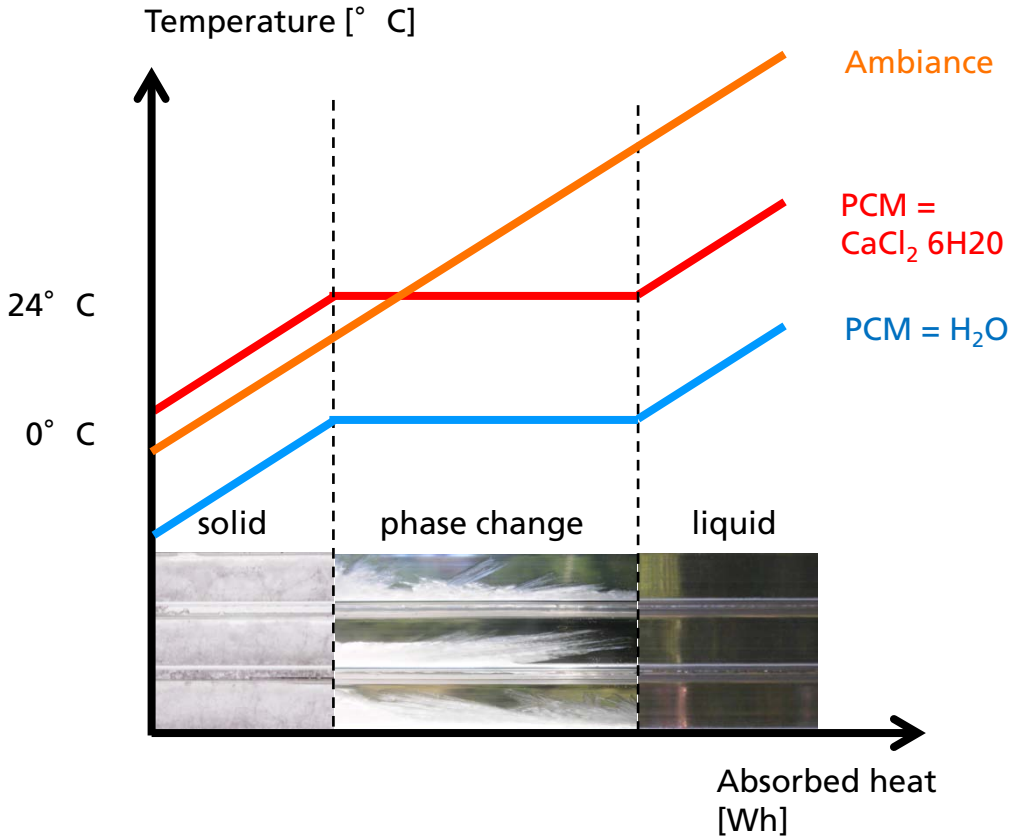


Phase changing materials (PCM) are able to store large quantities of energy in small volumes

=

16mm of PCM

25 cm of concrete



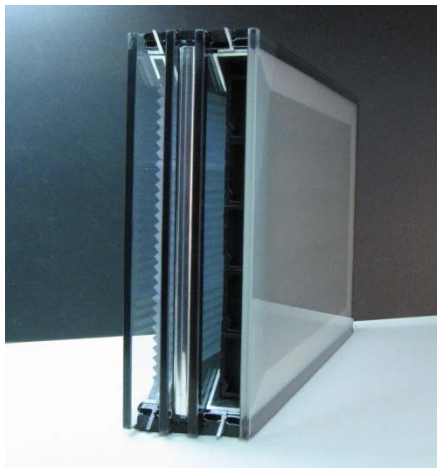
$CaCl_2$ 6H20:= Calcium-Chloride Hexahydrate

GLASSX® - translucent glazing with thermal storage capacity

GLASSX®store

« Effective thermal mass for lightweight structures »

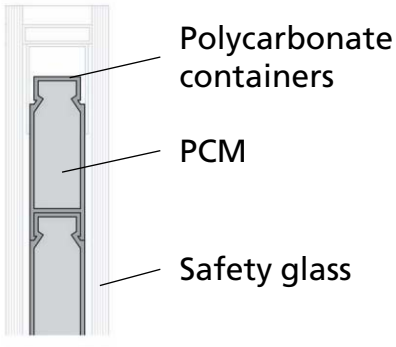
GLASSX®crystal



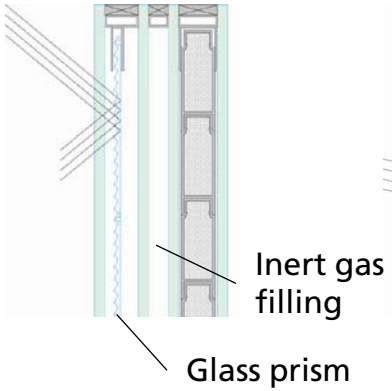
« Thermal insulation, heat storage and sun protection in one package »

Installation

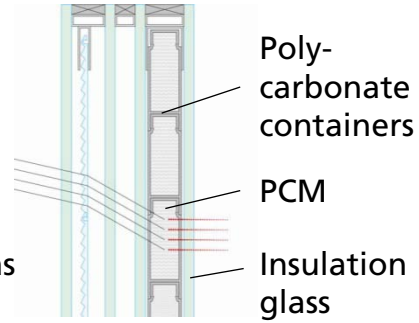
Structure



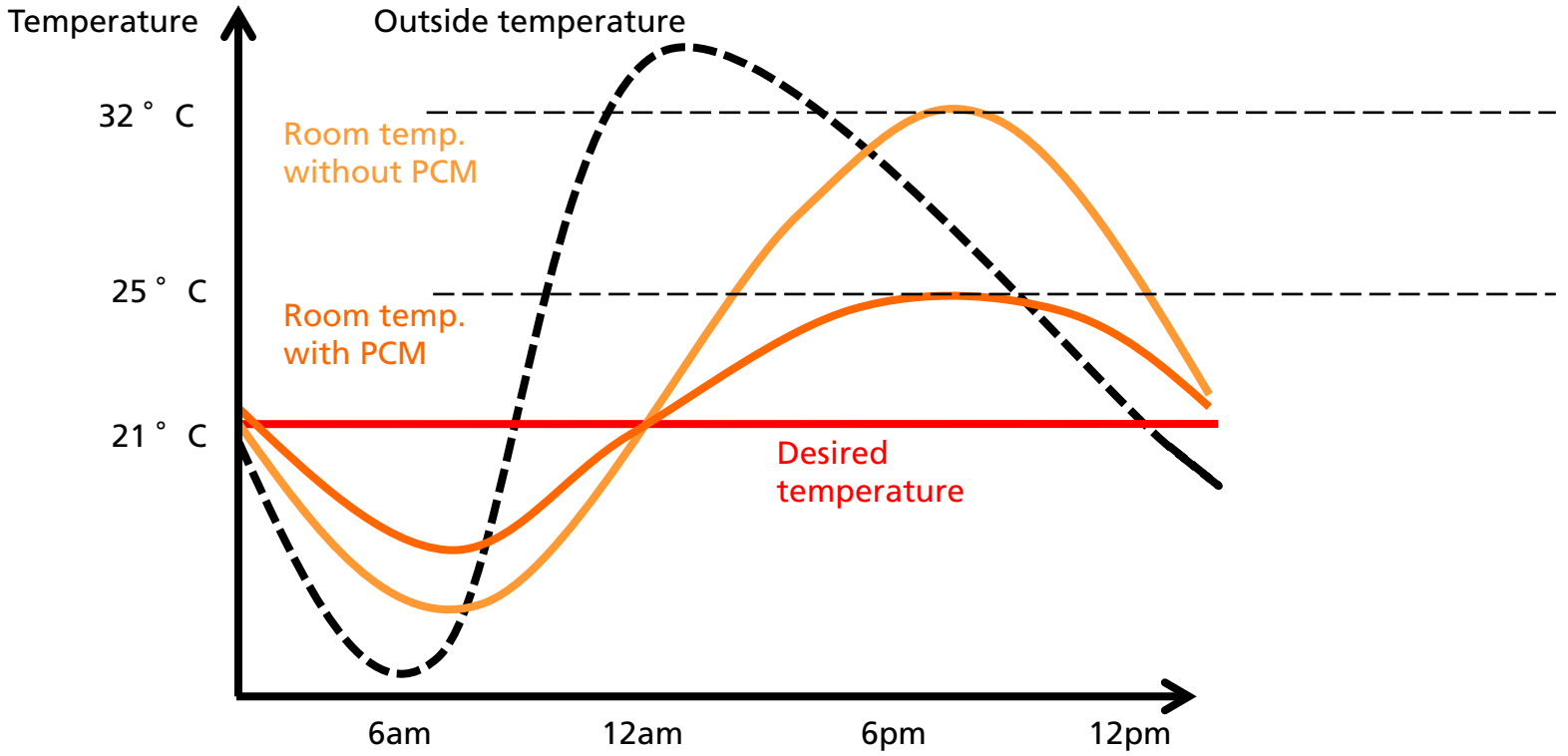
Summer



Winter

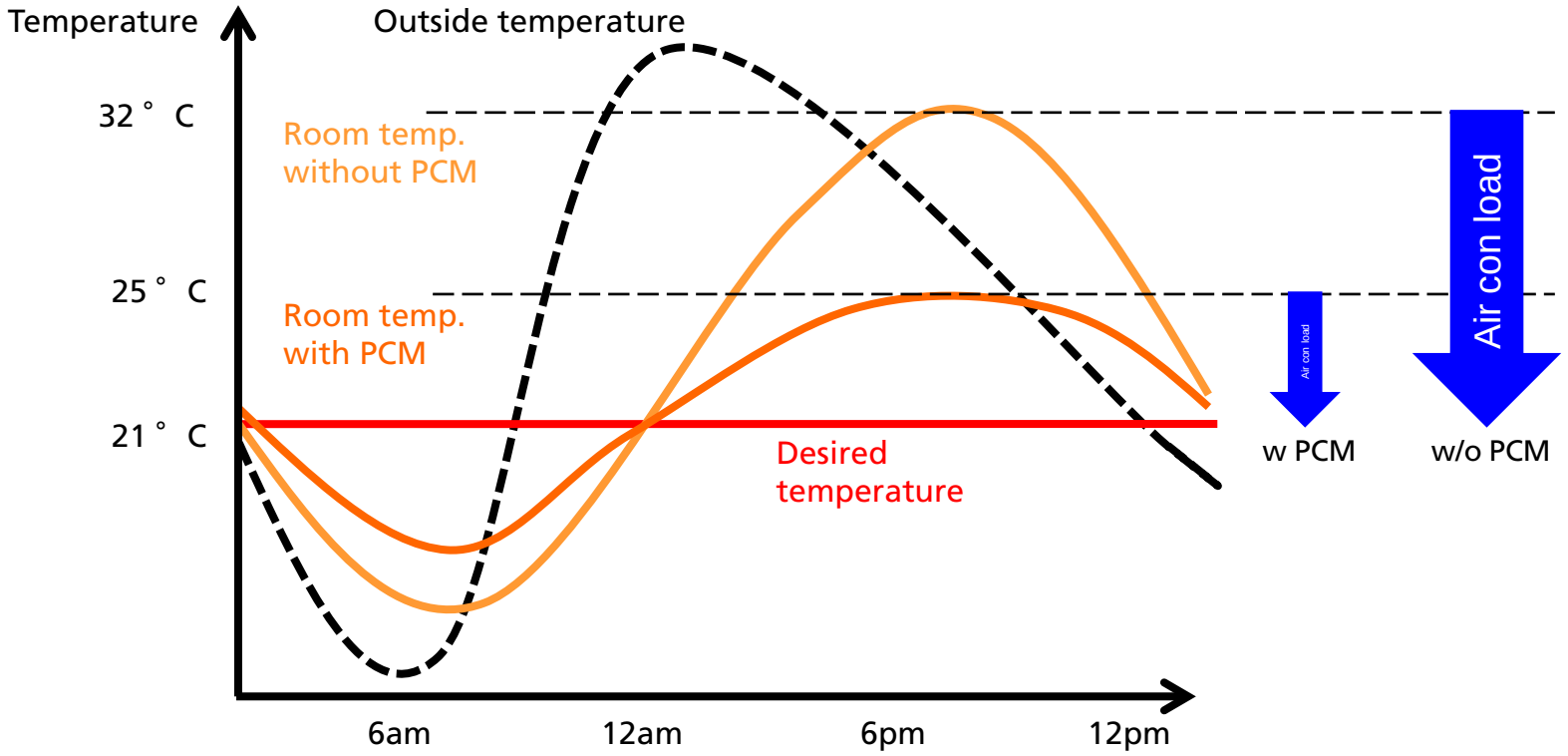


Due to their heat storage capabilities, PCM panels minimize variations in room temperature over the course of a day



PCM façade elements reduce necessary cooling power (= size of air con)

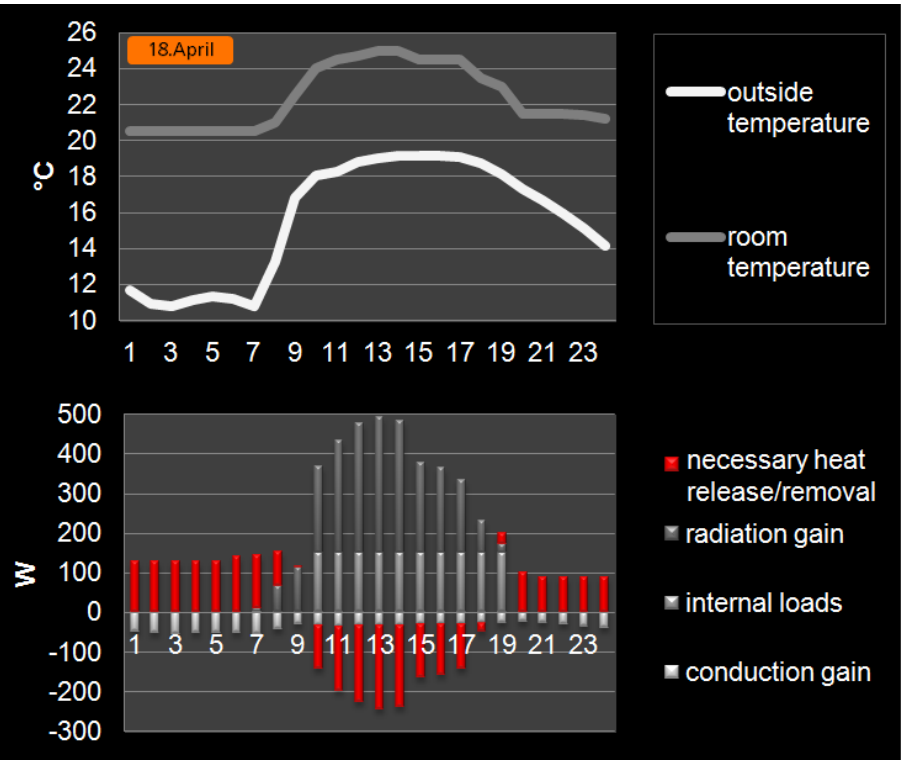
Due to their heat storage capabilities, PCM panels minimize variations in room temperature over the course of a day

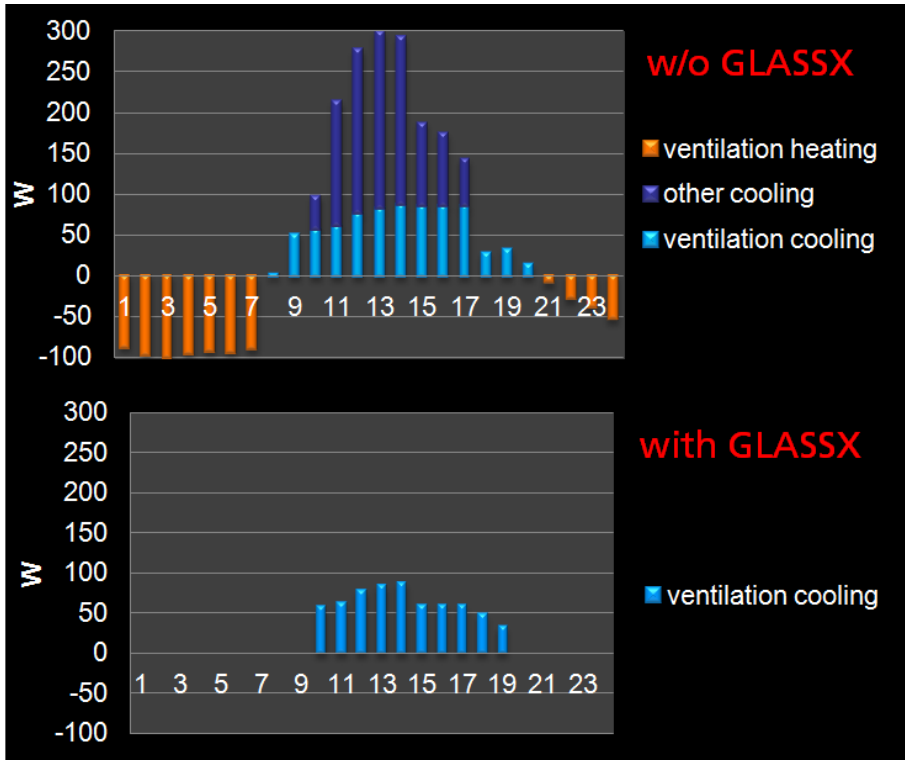


PCM façade elements reduce necessary cooling power (= size of air con)

The use of GlassX products can therefore drastically cut size and energy consumption of cooling and heating equipment

« Example: South-facing office building in Cyprus - 30% GLASSX®store in curtain-wall façade »





	Without GLASSX	With GLASSX
Power for ventilation cooling	9 W/m2	9 W/m2
Power for additional cooling	22 W/m2	-
Power for ventilation heating	10 W/m2	-
Energy needed for cooling	0.17 kWh/m2	0.06 kWh/m2
Energy needed for heating	0.08 kWh/m2	-

Case Study 1 – School

- **Daylight concept**: Compared to massive walls the rooms receive much more daylight
- **Climatisation concept**: Small-sized air conditioning and passive cooling elements
- **Installation:** GLASSX®store elements are mounted 5-10 cm behind the curtain wall, architect has full freedom to design outer façade
- **Ventilation system:** Grills in the floor release air that streams along both sides of the GLASSX element

Object:	'Centre professionelle', School
Location:	Fribourg, Switzerland
Architecture:	Butikofer de Oliveira Vernay Sarl
Volume:	120 m2 GLASSX®store

Case Study 2 – Office building

- **Daylight concept**: Elements allow the use of unobstructed daylight in summer without risking overheating
- **Climatisation concept**: No active cooling or heating installed, building is cooled by passive night air flow and heated by the sun
- **Installation:** GLASSX®crystal elements installed as part of the outer façade, covering approx. 40% of the south-facing building shell
- **Ventilation system:** Comfort ventilation with some degree of underground heat storage installed

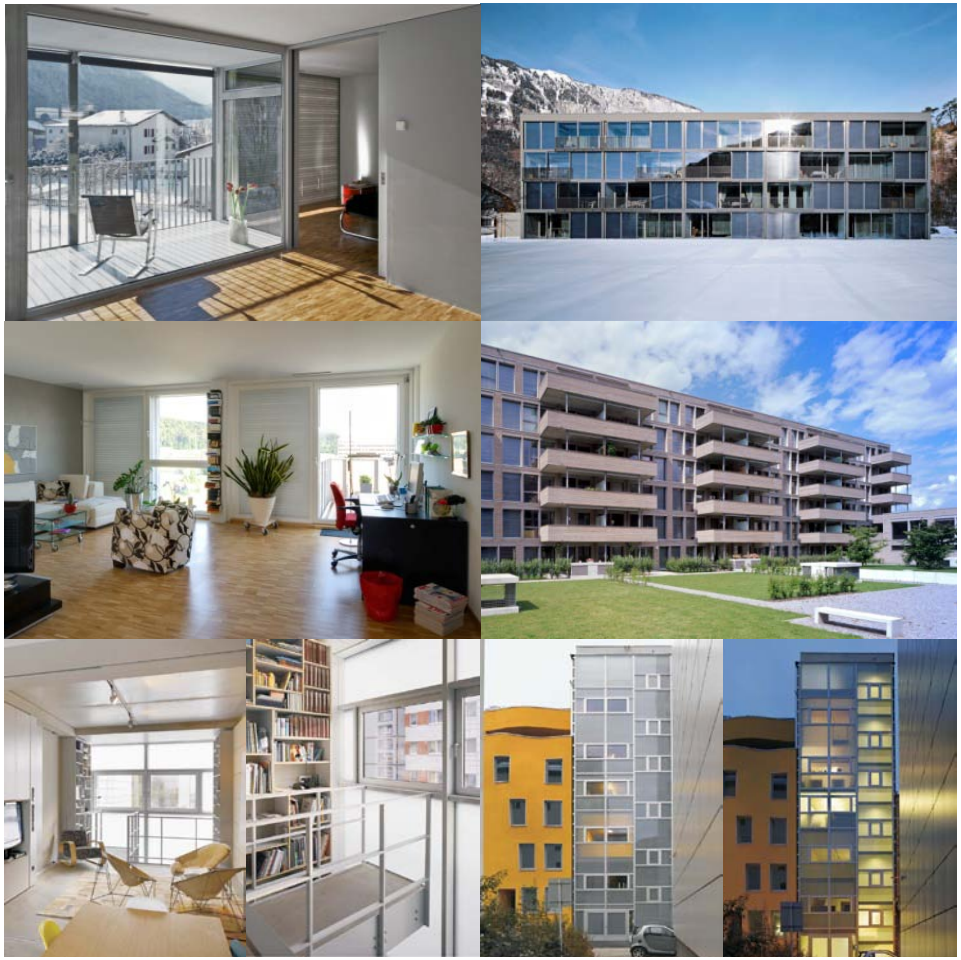
Object:	Marché International, Office building
Location:	Kemptthal, Switzerland
Architecture:	Beat Kämpfen
Volume:	120 m2 GLASSX®crystal

Selected references

ALTERSWOHNEN
2005, retirement residence
Domat-Ems, Switzerland
140 m² GLASSX crystal
Architect: Dietrich Schwarz
(www. schwarz-architekten.com)

EULACHHOF
2006, multi-family residence
Winterthur, Switzerland
1220 m² GLASSX crystal
Architects: Dietrich Schwarz
(www. schwarz-architekten.com)

N7 NIEDERWALDSTRASSE
2006, multi-family residence
Berlin, Germany
100 m² GLASSX prism (prism only)
Architect: Christa Fischer
(www.fischerinnen.de)

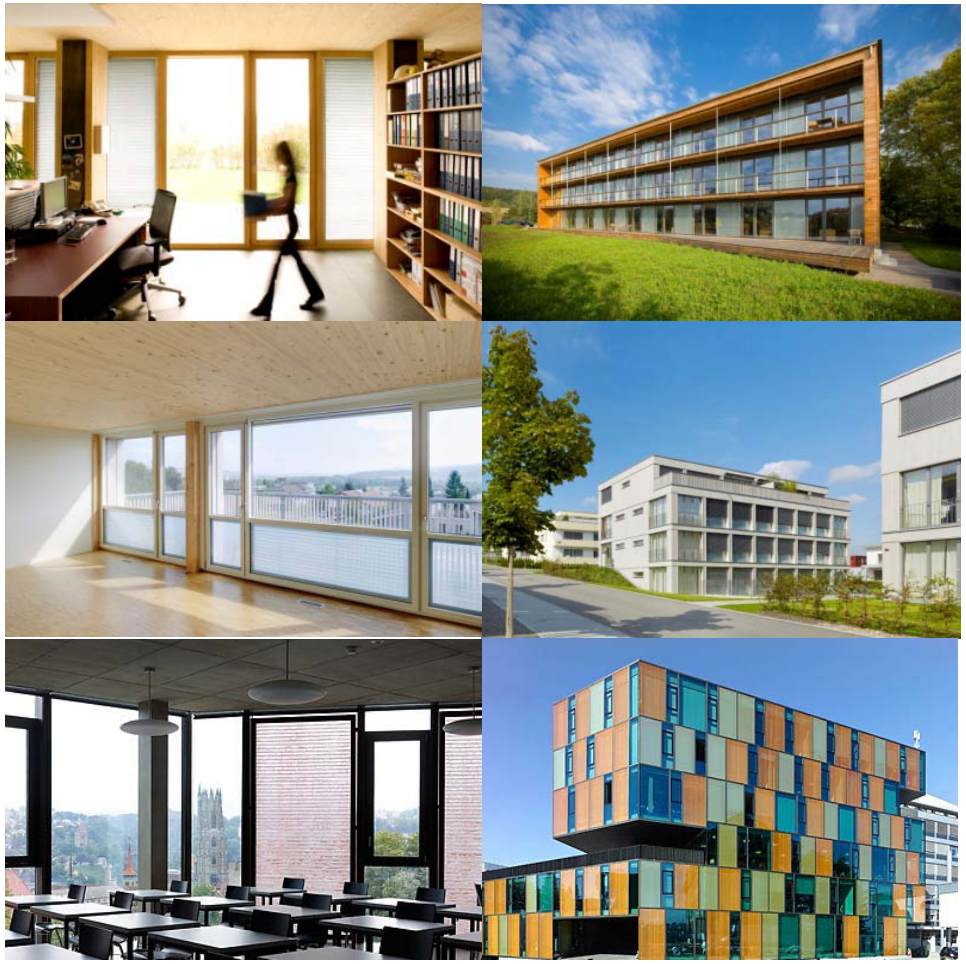


Selected references

MARCHÉ INTERNATIONAL
2007, office building
Kemptthal, Switzerland
120 m² GLASSX Crystal
Architect: Beat Kämpfen
(www.kaempfen.com)

SILENCE
2009, housing estate
St. Erhardt, Switzerland
200 m² GLASSX crystal
Architect: Dietrich Schwarz
(www. schwarz-architekten.com)

CENTRE PROFESSIONNEL
2010, school
Fribourg, Switzerland
120 m² GLASSX store (PCM only)
Architect: Serge Butikofer
(www.b-o-v.ch)



Thank you