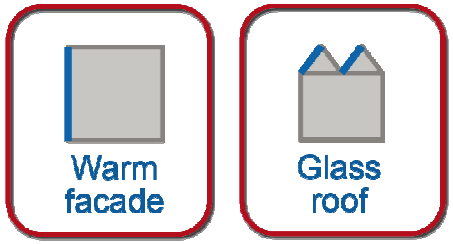
University of Applied Sciences and Arts of Southern Switzerland
Department of Environment Constructions and Design
Institute of Applied Sustainability to the Built Environment

SUPSI

Swiss BiPV Competence Centre



Stadtwerke Konstanz, Customer Service Centre

Konstanz (D)

Building Details

CONTACTS	Name	Website (or e-mail)
Owner	Stadtwerke Konstanz GmbH	www.stadtwerke.konstanz.de
Architect	Arch. Arnold Wild, Stadtwerke Konstanz	www.stadtwerke.konstanz.de
Energy Consultant	Ertex Solar GmbH	www.ertex-solar.at
PV Installer	Lindner Group, Arnstorf, Germany	www.lindner-group.com

BUILDING

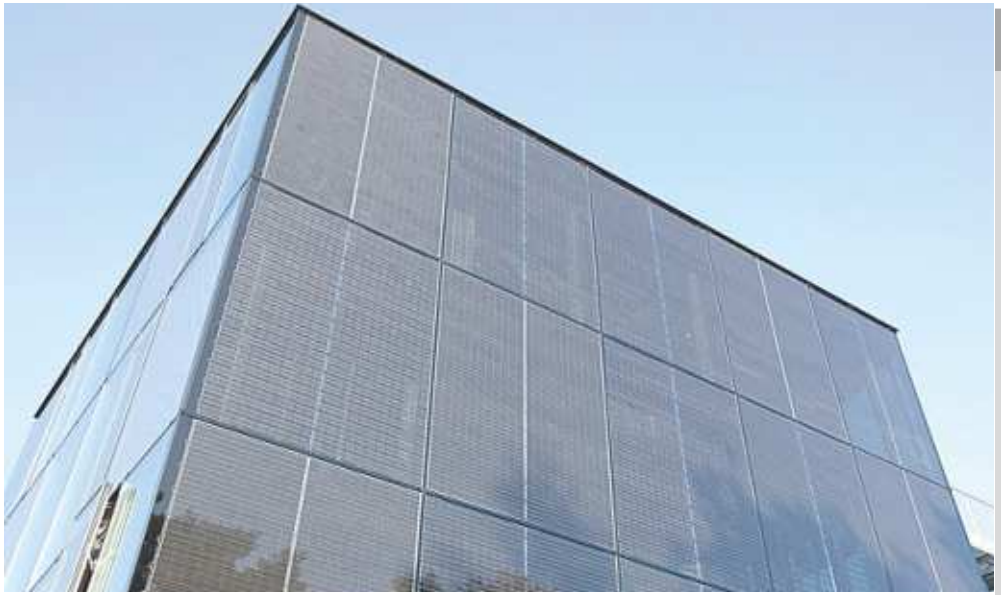
Completion year	2011 Building		2011 Plant	
Category	New	Renovation	Enlargement	Other
Typology	Residential	Administration	Industrial	Sport
	Agricultural	Urban	Historical	Other

Building Energy Performance **kWh/m² y**

Description

This building, known as the "energy cube" is Stadtwerke Konstanz Customer Center in Constance (D). It is built to generate more energy than it consumes over its useful life. The cube shape is chosen as the most energetically optimal geometric shape for a building. The energy is produced by sun and earth to provide heating and cooling systems. The high-performance of building are based on a customised solar facade with a peak power output of 23 kWp. The south side of this four-storey cube comprises 20 specially manufactured solar modules made of glass and integrated into the post and beam structure of the facade. These act also as shading elements. A double facade (triple insulating glass) with sun control louvers and inboarded glass sliding doors. The space between the glass panels is mechanically ventilated. Alongside the transparent facade elements there are opaque surfaces that can be illuminated using different coloured LED lights.

Aknowledgments Plus Energy Building



BiPV Details

LOCATION OF PLANT

Roof	Flat roof	Sloped	Curved	
Façade	Cladding	Balcony	Greenhouse	Curved
Glass	Façade	Roof	Solar shading	Canopy
Orientation	South	West	East	North
BiPV System	Trasparent Façade (curtain wall)			

ARCHITECTURAL EVALUATION

Color	Black
Transparency	22 %
Frame	

COSTUMIZATION LANGUAGE AT COMPONENT SCALE

PV CELL | **MODULE LAYERING** | **MODULE FEATURES** | **DUMMIES**

DESCRIPTION Customized modules by Ertex Solar: triply insulated glass with glass packets up to 64mm.
Largest PV modules: ~ 3 x 4 m; 1.246 kWp; 1,014kg

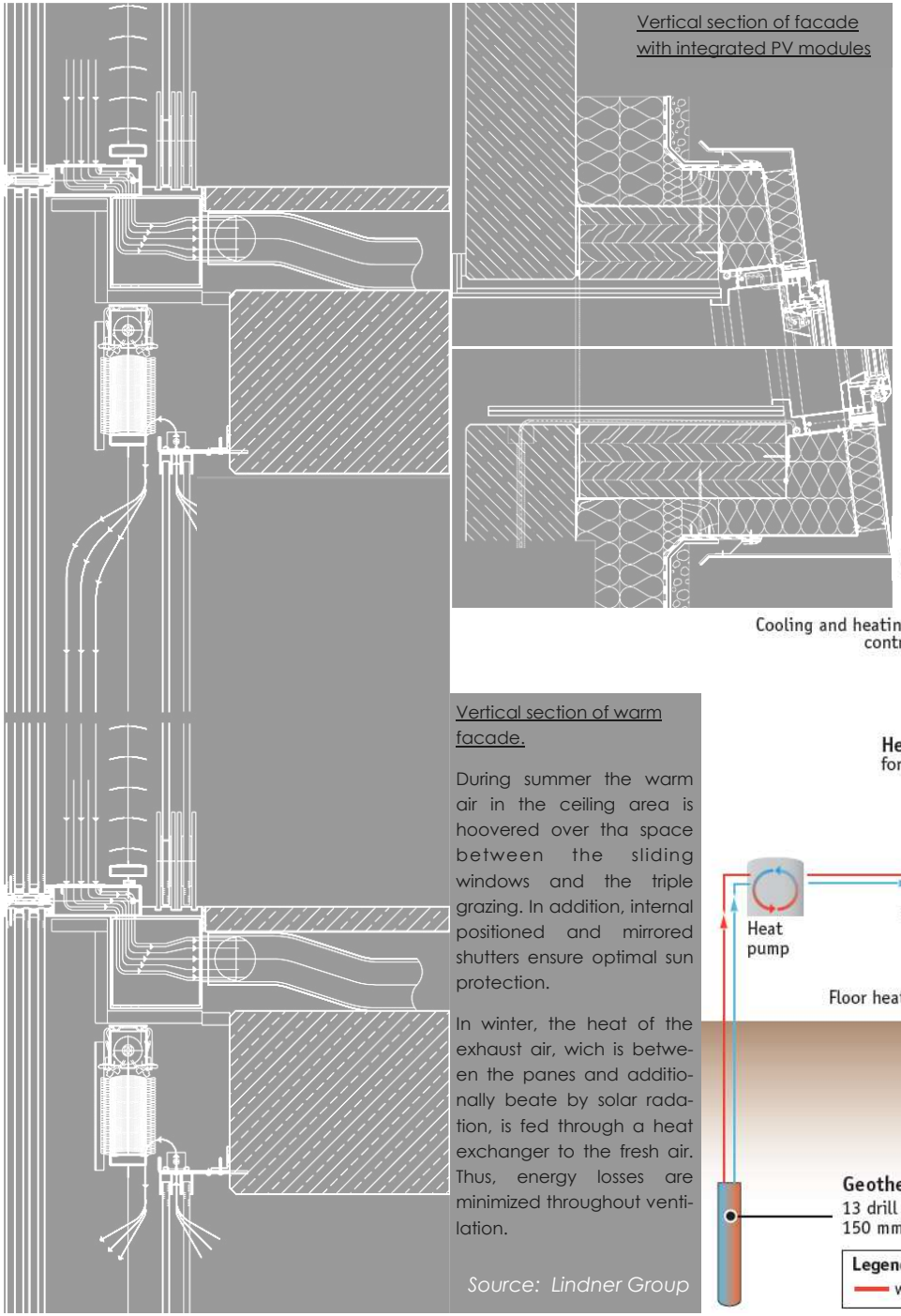
SPECIFICATION

Photovoltaic	Monocrystalline	Multicrystalline	Thin Film
PV Module	**Cells**	Sunways semi-transparent cells	
	Module	17 VSG-ISO (max dimensions 2988x3911)	
Power	**kWp**	24.54	
Size	**m²**	230 (Façade)	
Energy production	**kWh/year**		
Cost	**€/m²**	-	

BiPV Details

BUILDING SYSTEM INFORMATION

Trasparency	OPAQUE	TRASPARENT	G Value 0.13 %
Constructive system	MASSIVE BUILDING		LIGHTWEIGHT
Ventilation system	NOT VENTILATED	MICROVENTILATED	NATURAL VENTILATED
U value (W/m² K)	0.11 (opaque fields)		



Vertical section of facade with integrated PV modules

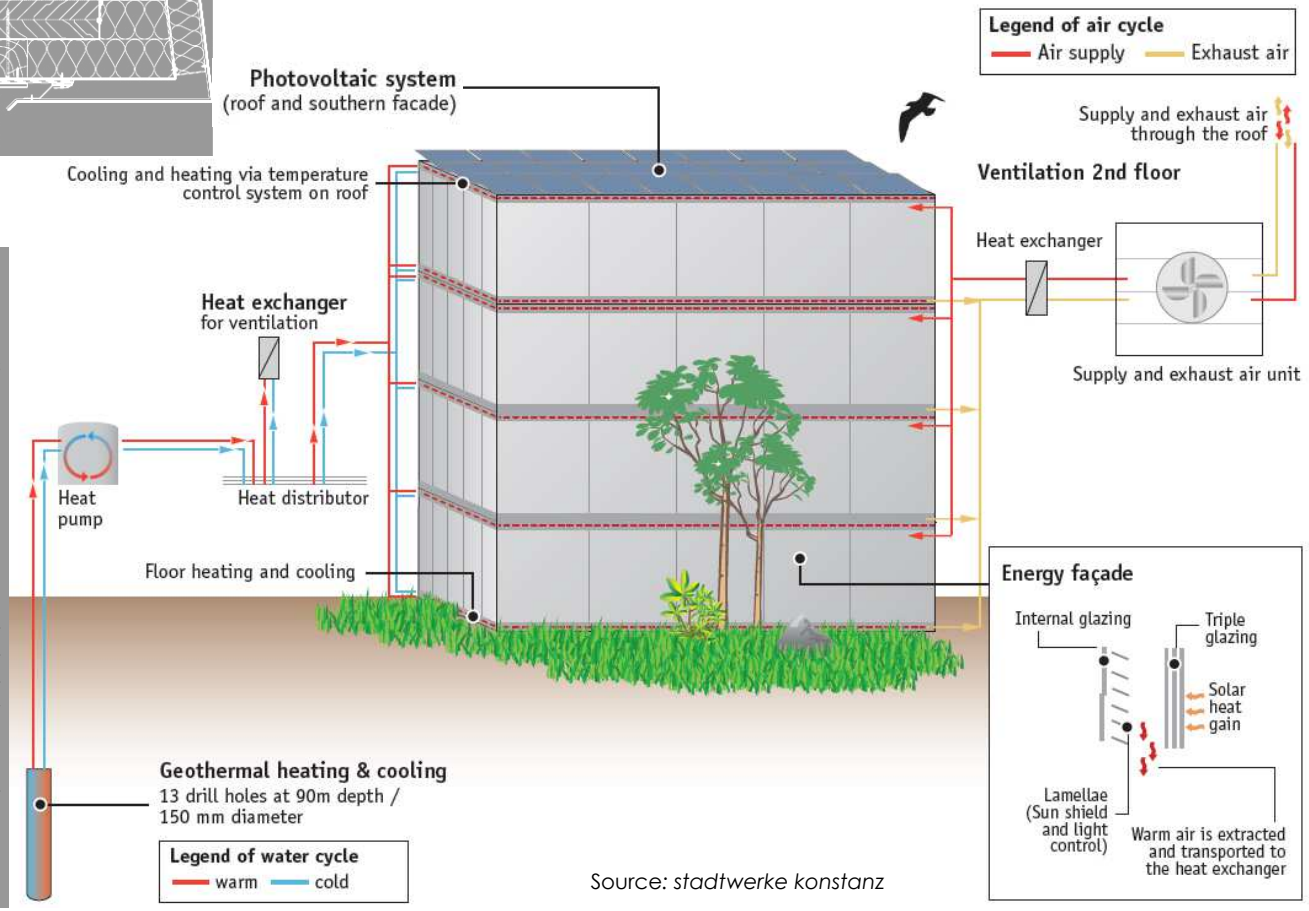
Vertical section of warm facade.

During summer the warm air in the ceiling area is hoovered over tha space between the sliding windows and the triple grazing. In addition, internal positioned and mirrored shutters ensure optimal sun protection.

In winter, the heat of the exhaust air, wich is between the panes and additionally beate by solar radation, is fed through a heat exchanger to the fresh air. Thus, energy losses are minimized throughout ventilation.

Source: Lindner Group

Cube of Stadtwerke Konstanz (Constance Public Utilities)



Source: *stadtwerke konstanz*