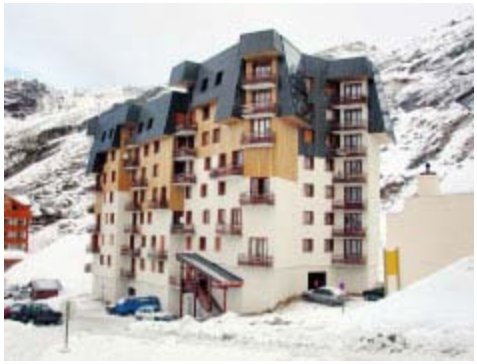
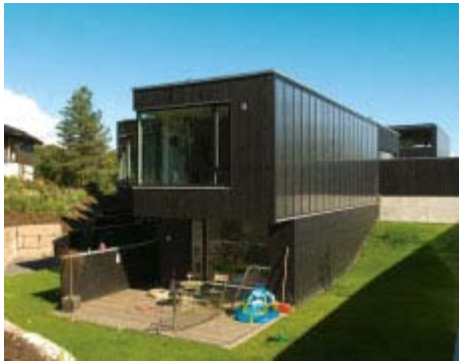
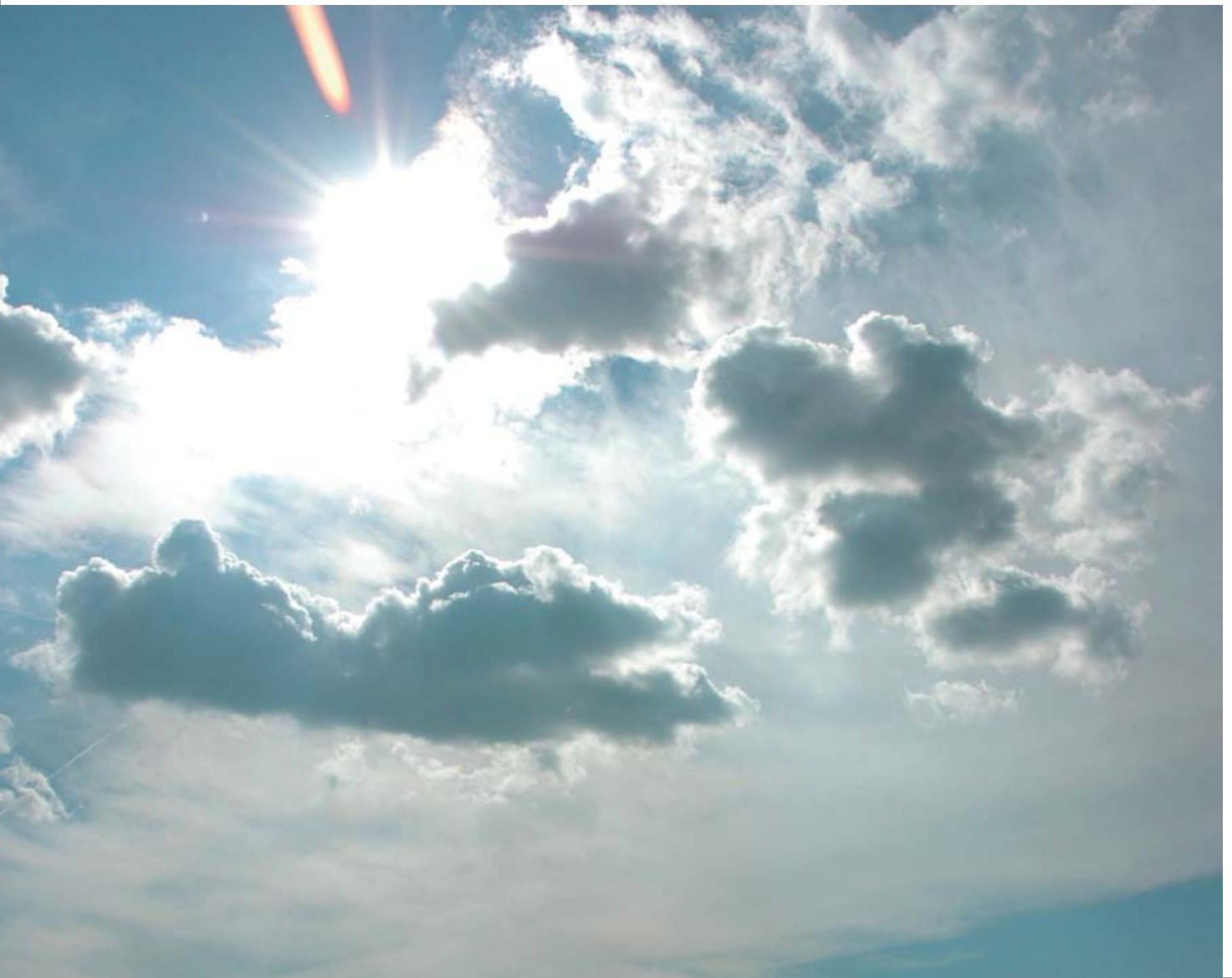
BUILDING INTEGRATION OF





SOLAR THERMAL COLLECTORS



Editorial

Solar collectors are today an indispensable technology for space heating and preparing hot water. Modern solar collectors not only meet high technical standards but are also becoming increasingly used as architectural design elements in roofs or facades, as can be seen from the multitude of such systems installed to date.

The times in which collectors were mounted on buildings for the sole purpose of gaining energy have long since passed. Today, collectors take on a multitude of additional functions such as protection against the elements, providing shade and thermal insulation, and are a new element in architectural design. The solar industry has already reacted to these trends and offers optimised solutions for the architectural integration of collectors into the roof and facade.

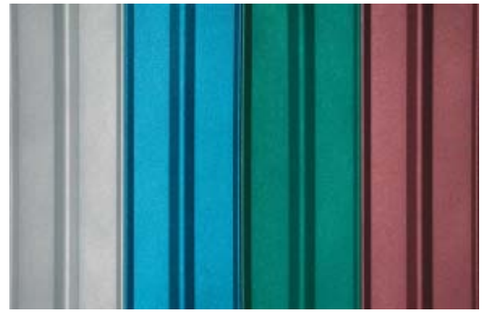
Since the architecture defines the dimensions used in the design of the façade, collectors with specially tailored dimensions are the rule rather than the exception. Façade collectors become a part of the external skin of a building and take on the functions of protecting and sealing the building from the elements.

Up until now, solar collectors have always been black, which did not always fit in with the aesthetics of a particular building. New developments in coatings mean that coloured collectors are now available with only small reduction in collector efficiency.

Six examples from Austria, France, Germany and Norway are presented in the following pages with the aim to illustrate how solar thermal collectors can be a part of a building and even give it an extra touch of sustainability, emphasizing the appearance of energy efficiency. This booklet was produced within the EU-funded project NEGST (see last page for further information on the project).

We hope these examples can serve as an inspiration for future buildings, with heating systems supported by solar thermal energy.

Sunny regards
Charlotta Isaksson & Dagmar Jaehnig
AEE INTEC / Austria



Available collector colours / Picture source: AEE INTEC

Salzburg

Austria

Home for disabled people with solar domestic hot water preparation and space heating

Year of system installation	2004/2005
Year of building construction	2004/2005
Size of the system	95 m²/67 kW_{th} façade collectors 25 m²/2,5 kW_e photovoltaic panels on the roof of the building
Building architect	brandmüller+brandmüller, Salzburg, Austria **www.arching.at/brandmueller**
Collector manufacturer	AKS DOMA **www.aks-doma.com**

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Solar thermal collectors were the architects' request for this home for disabled people. However, an all-too technical character as a result of the façade integrated collectors was avoided through the application of wooden windows. In addition, safety barriers in front of the balconies and windows were installed in coloured glass to soften the appearance and provide a positive atmosphere. <<

Josef Brandmüller, architect

Picture source: AKS DOMA

Dornbirn

Austria

Multi-family building with solar domestic hot water preparation and space heating

Year of system installation	1998
Size of the system	90 m²/63 kW_{th} façade integrated
Building architect	Roland Gnaiger & Udo Mössler, Linz, Austria **www.ufg.ac.at**
Collector manufacturer	AKS DOMA **www.aks-doma.com**

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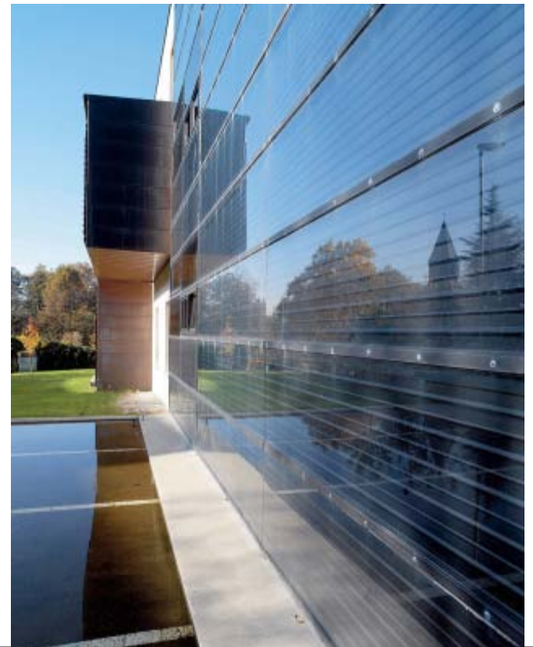
The collectors are directly integrated into the building. It constitutes the south-west façade and integrates the windows in the winter garden. Further, the black, reflecting glass surface is a part of the "art for the construction" – it is continued on the ground in the form of a water surface reflecting the black colour of the collectors. <<

Roland Gnaiger and Udo Mössler, architects



Picture source: AKS DOMA

Hamburg Bramfeld

Germany

Terraced houses with solar domestic hot water preparation

Year of system installation	1996
Year of building construction	1995
Size of the system	3,000 m²/2.1 MW_{th} (4.500 m³ storage tank)
Building architect	Architect Phillipi, Hamburg, Germany
Collector manufacturer	Wagner & Co Solartechnik GmbH **www.wagner-solartechnik.de**

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The pretty location inspired the architect to develop 18 terraced houses and two storey residential buildings. The urbanistic design follows the topographic profile very well. Four rows of terraced houses were oriented north south and slightly displaced so that a good view is possible for all the inhabitants. The aesthetic integration of the solar collectors was shown to be a profitable assignment for Architect Phillipi. He took the creative opportunity to use the large continuous roof area available to integrate a total of 3,000 m² solar collector area.

The collectors, as they are integrated into the roof, have a positive architectural effect and thereby an influence on the building's architecture. <<

Tobias Weiss, architect

Picture source: Wagner & Co Solartechnik GmbH

Leipzig

Germany

Multi-family building with solar domestic hot water preparation

Year of system installation	2004
Year of building construction	1973
Size of the system	295 m²/207 kW_{th}
Building architect	DENK architekten ingenieure GbR, Leipzig, Germany **www.denk-ai.de**
Collector manufacturer	Schüco International KG **www.schueco.de**

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This eleven storey multi-family residential building, from 1973, was constructed with precast concrete slabs, and has 167 apartments. It was renovated in 2004 - 2005 and an energetic renovation was a major issue. The façade got a "face-lift" with added insulation and nine pre-fabricated balcony blocks, on which the solar thermal collectors were mounted. <<

Picture source: Schüco International KG

Val Thorens

France

Multi-family residential building with solar domestic hot water preparation

Year of system installation	2001
Year of building construction	1976
Size of the system	63 m²/44 kW_{th} integrated in the roof
Building architect	J.P Chiantello, STUDIO ARCH, Tresserve, France
Collector manufacturer	CLIPSOL www.clipsol.com

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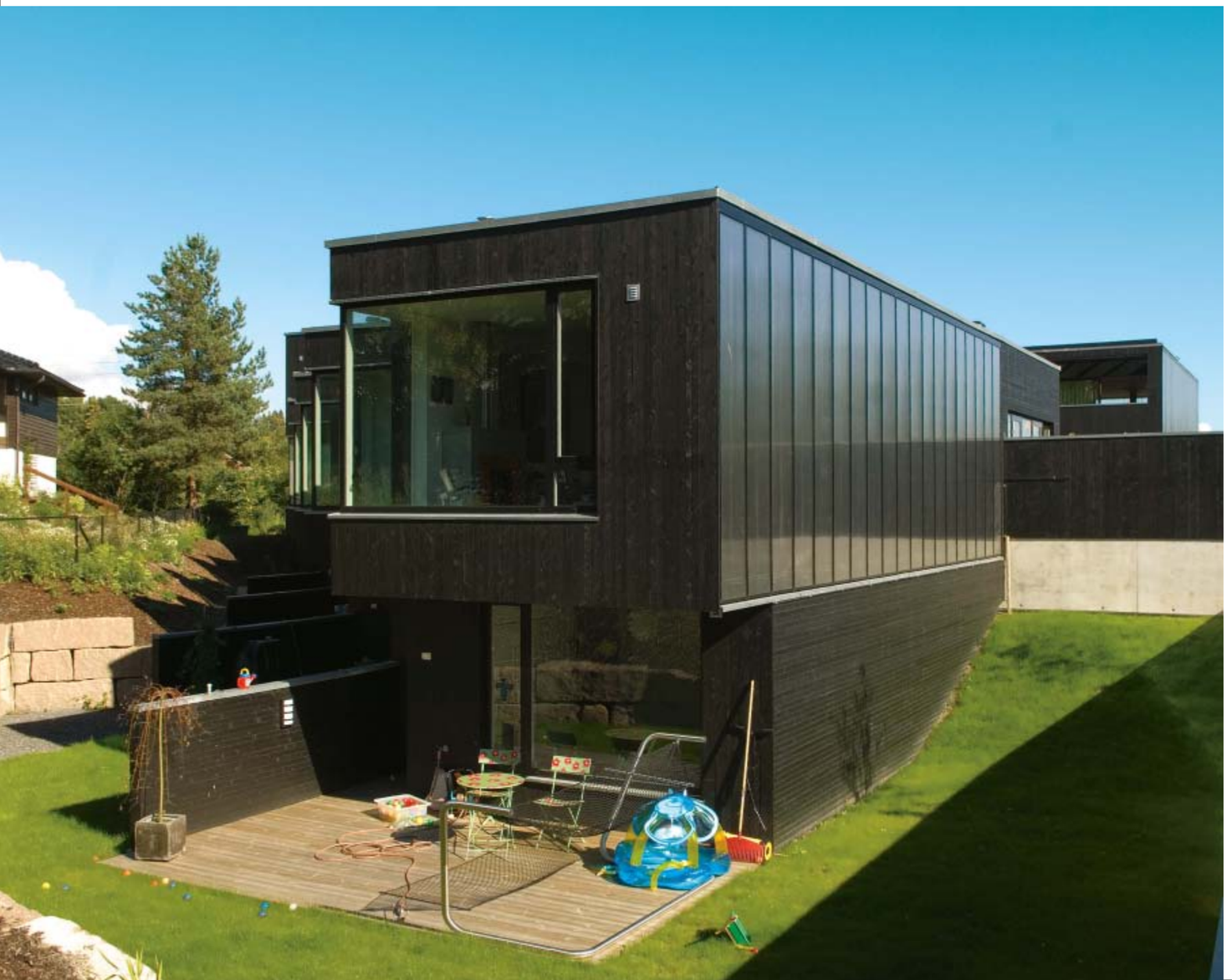
The building “Gebroula”, a residential dwelling for seasonal workers in the sports resort Val Thorens, was renovated in 2001. The existing façade and the balconies were very worn by the rigorous climatic conditions at the high altitude. The new metal “crowning” of the roof, which protects the architectonic elements of the façade, made it possible to integrate solar collectors in the south side of the building and to fit harmoniously in the sculptural play of the cover. <<

J. P. Chiantello, architect

Picture source: CLIPSOL and CHIANTELLO



Oslo

Norway

Terraced houses with solar domestic hot water preparation and space heating

Year of system installation	2005
Year of building construction	2004 - 2005
Size of the system	97 m²/65 kW_{th}
Building architect	Dahle/Dahle/Breitenstein AS, Oslo, Norway **www.dbark.no**
Collector manufacturer	Solarnor AS, Oslo, Norway **www.solarnor.no**

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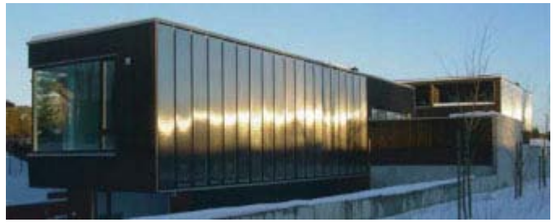
The solar collector façade combines in an exceptional way an innovative heating system with modern design, green energy, high comfort, healthy indoor climate and ultimate user-friendliness for the inhabitants. The solar collector façade contributes to give the building an architecturally modern and stylish design. The dark, reflecting surfaces are attractive building elements, simultaneously giving life to the buildings south-facing façade, producing energy and acting as a sound barrier for road traffic.



It is important that the standardized industrial products in the design work are accepted by the architect for the integration of solar thermal building elements. The building and construction sector's development of industrial products and building methods should never be an obstacle but a challenge for good architecture. <<

Christian Dahle and Kurt Breitenstein, architects

Picture source: Ståle Skogstad

About NEGST

The overall objective of the EU-supported project NEGST (New Generation of Solar Thermal Systems) is to provide a framework for research in order to bring more cost-effective solar thermal systems, particularly for domestic hot water preparation and/or space heating on the market. This is necessary in order to contribute to the European Union's Action Plan with regard to the reduction of CO_2 emissions and the cost effective supply of renewable energy sources.

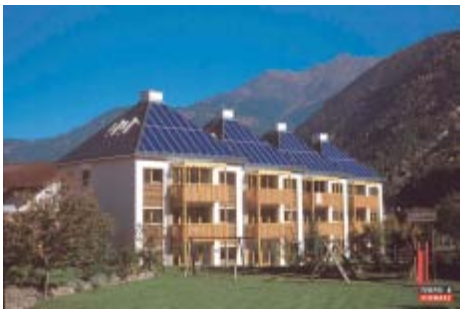
Part of the project NEGST is concerned with evaluation and preparation of efficient methods of integrating solar thermal collectors into buildings.

AEE INTEC

NEGST is a project financed by the European Commission DGTREN within FP6

www.swt-technologie.de/html/negst.html

Further Examples on Building Integration



Coloured roof integrated solar thermal collectors

Ried im Oberinntal, Austria
Picture source: TiSun

Balcony integrated solar thermal collectors

Telfs, Austria
Picture source: Siko Solar

Retrofit with solar panels integration

Frankfurt/Main
Germany
Picture source: Schüco International KG

Applied coloured collectors

Serfaus, Austria
Picture source: Mayer