Example name: Office building and production hall with solar collectors integrated in the façade

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For installations

BISTS Location: Vorarlberg, Austria
47° 25' N, 9° 97' E
Climate Type: -
Building Use: *commercial*

Level of BISTS integration
Rush classification 3

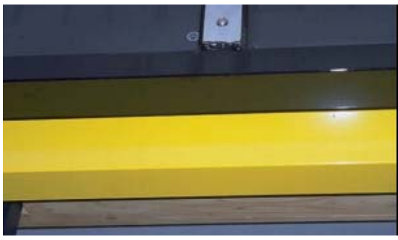
Ox New Build
O Refurbishment
O Other: ……………………

Type of BISTS:

Active

Function(s):
O Air heating
Ox Water heating
Ox Combi-system
O Cooling/ventilation/shading
O PV/T
Ox linked to space heating system

O Other: ………………………



Building element:

Ox Facade
O Roof
O Other:

BISTS characteristics:

Solar collector:
Glazed flat plate water collector
Dimensions: 3000 mm length, 95 mm width

The solar system is a combined system, contributing to both domestic hot water preparation and space heating.

- Heated area: 479 m2 office area + 1389 m^2 production hall
- 80 m^2 façade integrated solar collectors (directly south oriented)
- Heat store: 950 l water heat store
- Auxiliary heating: Bio diesel block heat and power plant
- Heat distribution: wall and floor heating

Stage of Development:Responsible:

O	Idea/Patent	…………………………………..
O	Prototype	…………………………………..
O	Demonstration	…………………………………..
Ox	Integral building element	AKS DOMA Solartechnik …………………………………
Ox	Commercially available	AKS DOMA Solartechnik Project design: Gruppo Sportivo (Bludenz), MHM (Dornbirn)

BISTS description and context

The head quarter of the Austrian solar collector producer AKS DOMA Solartechnik was, at the opening in spring 1999, one of the first buildings with CO2 neutral energy supply. The energy and electricity demand for the offices with 470 square meters and the production hall with a floor area of 1,380 m2 is covered exclusively from renewable energies. The heat distribution in the office building is performed via a wall heating system. The production hall is heated via a floor heating system integrated in the concrete floor. The concrete floor (90 cubic meters) is used both as a radiator as well as a heat store. As a result of the excellent thermal insulation of the building and the corresponding dimensioning of the wall- and floor heating systems, the system can be operated with very low flow temperatures. These low supply temperatures offer ideal conditions for the operation of the solar thermal plant.

System viability

Modelling and simulation tools developed/used

BISTS Performance data Based on: O Estimation O Detailed simulation *Specify software(s) used* O Measurement/testing O Long-term monitoring *tick all that apply* **Performance parameters** For integrated systems: key performance indicators - *Solar savings fraction: %* *Light transmittance: %* *Solar transmittance:%* *Total solar energy transmittance: %:* *Solar heat gain factor: %* *Building fabric U-values: W/m^{2}K* *Noise, fire, etc ratings* *Other:* For separate collectors: performance rating coefficients - (EN12975, a0,a1,a2), ASHRAE, etc Other:	*Graphs for collector efficiency, seasonal energy gains, diurnal/seasonal solar fraction, etc.*
Additional information:	

Sources and references:

[1] Basnet, A., Architectural Integration of Photovoltaic and Solar Thermal Collector Systems into buildings, Master's Thesis**,** Norwegian University of Science and Technology, Trondheim, 2012.

[2] Probst, M. C. M., Roecker, C., Towards an improved architectural quality of building integrated solar thermal systems (BIST), Solar Energy 81 (2007) 1104–1116.

[3] HQ AKS DOMA Solartechnik.pdf, http://www.iea-shc.org/

[4] http://www.domasolar.com/.

INSTRUCTIONS

Please fill in as much information as possible.

Tick where appropriate.

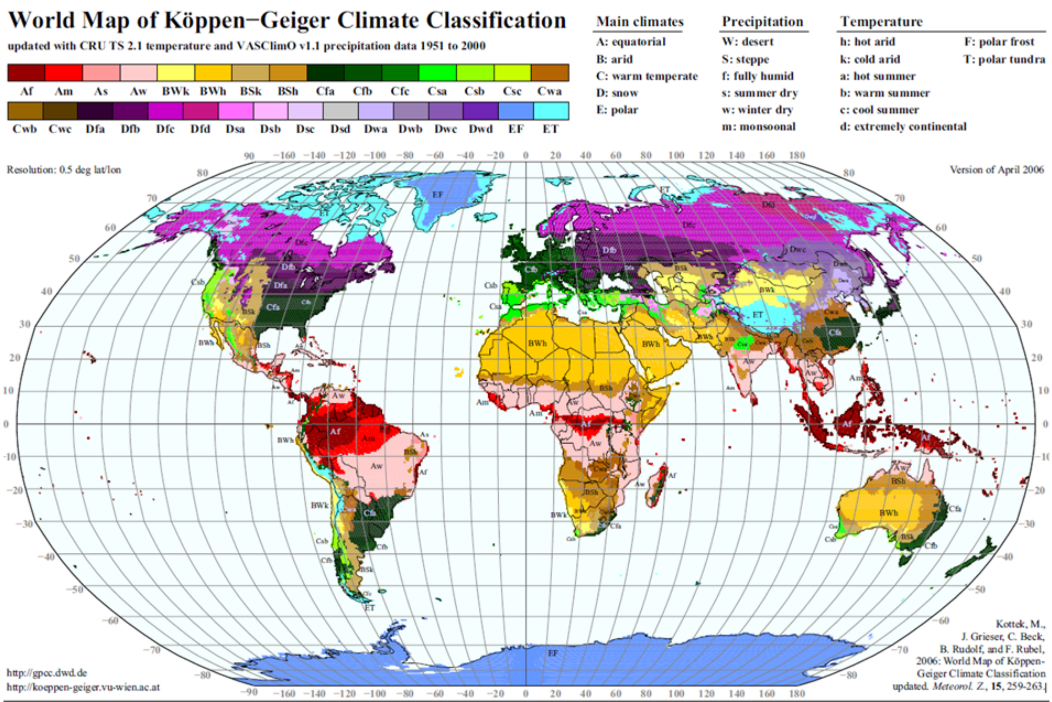
Text in red is suggested guidance. Insertinformation in provided space, removing red text as appropriate

If possible, use metric values.

If necessary, supply additional information on separate sheets

Reference listing

Köppen climate classification



(Kottek, M.,J. Grieser, C. Beck,B. Rudolf, and F. Rubel,2006: World Map of Köppen-Geiger Climate Classificationupdated. Meteorol. Z., 15, 259-263.)

Reijenga classification
The integration of PV systems in architecture can be divided into five categories:

1. Applied invisibly
2. Added to the design
3. Adding to the architectural image
4. Determining architectural image
5. Leading to new architectural concepts.

(Reijenga, TH and Kaan, HF. (2011) PV in Architecture, in Handbook of Photovoltaic Science and Engineering, Second Edition (eds A. Luque and S. Hegedus), John Wiley & Sons Ltd, Chichester, UK)

Rush classification
The architectural/visual expression of building services systems are identified as:

Level 1. Not visible, no change
Level 2. Visible, no change
Level 3. Visible, surface change
Level 4. Visible, with size or shape change
Level 5. Visible, with location or orientation change

(Rush, RD. (1986) The Building systems integration handbook Wiley, New York, USA)

Collector test standards

BS EN 12975-2 2006 'Thermal solar systems and components solar collectors - Part 2 test methods'
ASHRAE Standard 93-2010 'Methods of Testing to Determine the Thermal Performance of Solar Collectors'
ASHRAE Standard 95-1987 'Methods of Testing to Determine the Thermal Performance of Solar Domestic Water Heating Systems'