Example name:

Template completed by:
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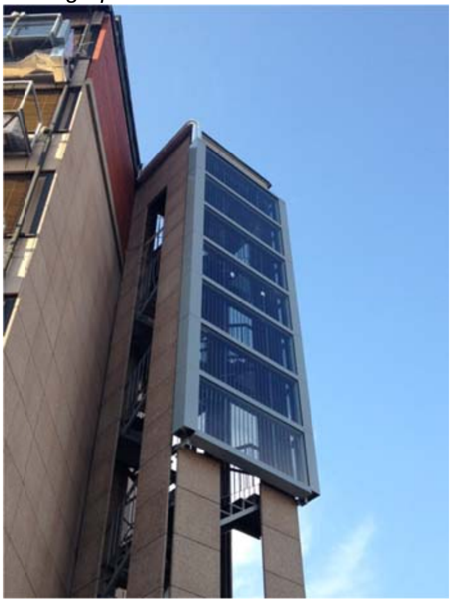
Photographs



For installations

BISTS Location: *Ljubljana, 46.070492,14.51453*
Climate Type: *C (Temperate/mesothermal climates)*
Building Use: *offices*

Level of BISTS integration
Rush 3

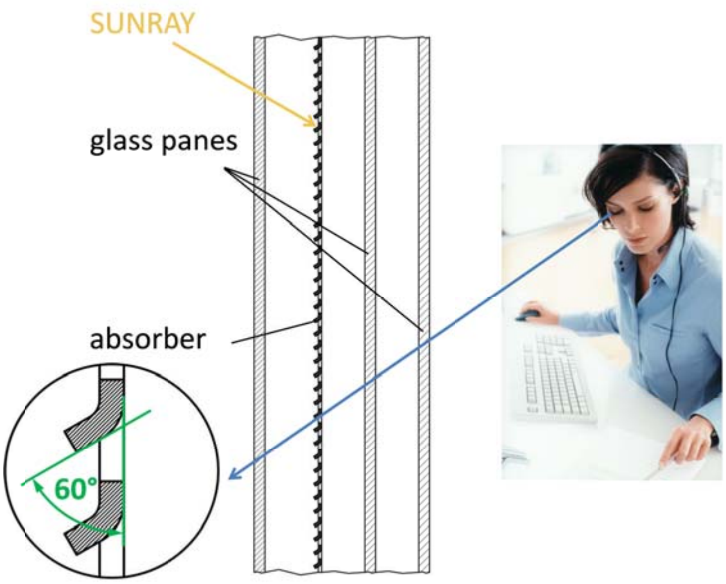
O New Build
x Refurbishment
O Other: ……………………

Type of BISTS:

Active, Passive and Hybrid

Function(s):
O Air heating
x Water heating
x Combi-system
x Cooling/ventilation/shading
O PV/T
O linked to another system (e.g., heat pump)
O Other: ……………………….

Drawings/Sketches/Cross-sections



Building element:

x Facade
O Roof
O Other: ……………………..

BISTS characteristics:

24 m^2 collector area, south and 15° towards east, pre-fabricated off-site

Stage of Development: **Responsible:** *Fraunhofer Institute for Solar Energy Systems, PERMASTEELISA S.p.A., ZAG*

O Idea/Patent ……………………………………..
O Prototype ……………………………………..
x Demonstration ……………………………………..
x Integral building element ……………………………………..
x Commercially available ……………………………………..

BISTS description and context

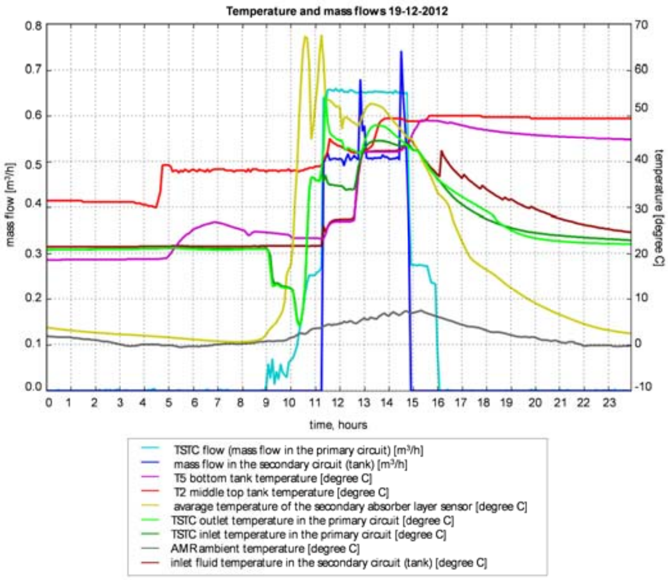
For the first time, semitransparent solar thermal facade collectors run a sorption chiller in a real building. The slat structure of the absorbers allows visual contact to the exterior while accounting for good solar thermal gains at the same time. The collectors are the wall of a staircase and support the building services for real offices in the building.

System viability

The cost of the double skin facade elements raises only by 10-15% when a semitransparent absorber is included. At the same time, the shading provided by the collector reduces the cooling load

Modelling and simulation tools developed/used

The semitransparent collectors are modelled in C and can be simulated within TRNSYS, coupled to a building and its building services.

BISTS Performance data Based on: O Estimation O Detailed simulation O Measurement/testing O Long-term monitoring **Performance parameters** For integrated systems: key performance indicators - For separate collectors: performance rating coefficients - Other:	*Graphs for collector efficiency, seasonal energy gains, diurnal/seasonal solar fraction, etc.* 

Additional information:

Sources and references:

C. Maurer, T.E. Kuhn, SHC with transparent façade collectors in a demo building, in: 1st International Solar Heating & Cooling Conference, July 10-12, San Francisco, USA, 2012.
C. Maurer et al., First measurement results of a pilot building with transparent façade collectors, in: 2nd International Solar Heating & Cooling Conference, September 23-25, Freiburg, Germany, 2013.

INSTRUCTIONS

Please fill in as much information as possible.

Tick where appropriate.

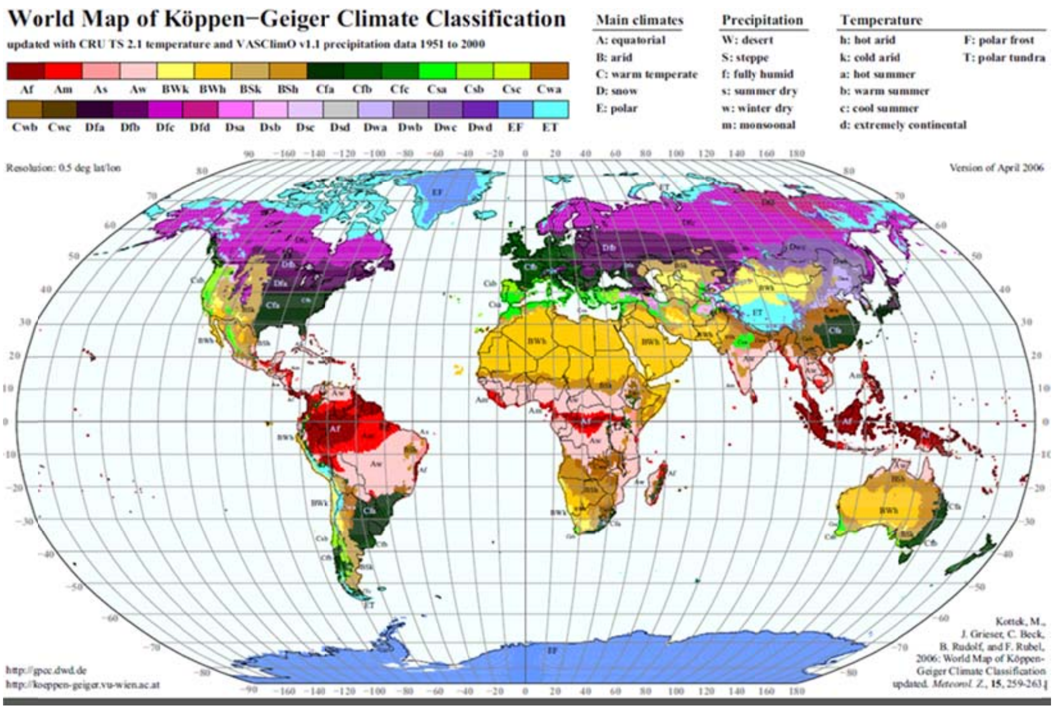
Text in red is suggested guidance. Insert information in provided space, removing red text as appropriate

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 Classification updated. 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’