Example name: *Bombardier (Canadair Facility)*

Template completed by:
Constantinos Vassiliades,
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For installations

BISTS Location: *Montreal, Quebec, Canada, 73° 35' W, 45° 30' N*
Climate Type: *Dfb*
Building Use: *Industrial*

Level of BISTS integration
2. Added to the design

O New Build
√ Refurbishment
O Other: ……………………
tick all that apply

Photographs

Type of BISTS:

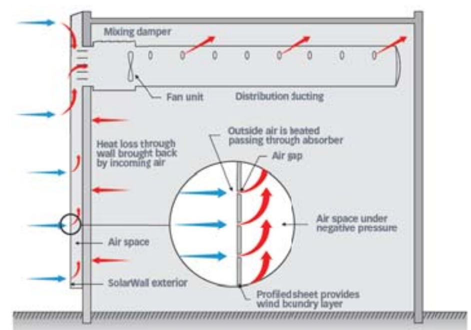
~~Active~~/Passive/~~Hybrid~~
delete as appropriate

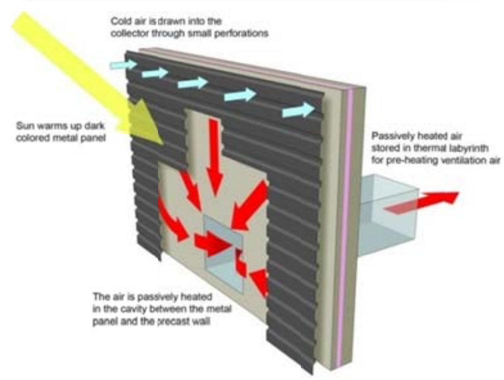
Function(s):
√ Air heating
O Water heating
O Combi-system
O Cooling/ventilation/shading
O PV/T
O linked to another system (e.g., heat pump)
O Other: ……………………….
tick all that apply

Building element:

√ Facade
O Roof
O Other: ……………………..
tick all that apply

Drawings/Sketches/Cross-sections





BISTS characteristics:

The system is installed on two sections of the complex. One 40° east of the south and another 50° west of south. The total surface of solar panels is 8826 m² plus an additional 1700 m² canopy. It is basically a second shell which is mounted on the outer walls of the building, and heats the air and then leads it inside the building. It is metallic in dark colour and it can be fabricated on site.

Stage of Development: Responsible: *Company.*

O Idea/Patent ……………………………………..
O Prototype ……………………………………..
O Demonstration ……………………………………..
O Integral building element ……………………………………..
√ Commercially available SolarWall
tick all that apply

BISTS description and context

In 1996 it was the largest solar air heating system in the world. The solar installation was integrated on the extensive renovations that were needed to improve the indoor air quality and the appearance of the aged buildings of the complex.
The architect overseeing the renovation project selected the handsome blue-grey color for the SolarWall collector and contrasted it with a white-colored canopy, which also acts as a manifold to ensure an even distribution of incoming air across the entire solar collector area. The overall intention was to redesign the building so that it was energy efficient, and aesthetically attractive.

System viability

The depreciation of €210265 (in 1996 prices), came in just 1,7 years.

Modelling and simulation tools developed/used

For example….new modules/types created for established simulation programs, stand-alone modelling, use of generalised codes, model outcomes, validation and accuracy. Design tools developed

BISTS Performance data

Based on:
O Estimation
√ Detailed simulation
CANMET's monitoring report.
√ 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/m²K
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.

Total System Performance - from CANMET's monitoring report.

Units	Active Solar	Other Savings	Total
KWh/m²/day	1.23	1.44	2.67
GJ/m²/year	1.21	1.42	2.63
Entire System			
GJ/year	10,678	12,531	23,210
$/year	70,688	82,955	153,600

Additional information:

Sources and references:

http://solarwall.com/media/download_gallery/SolarWall_SellSheet.pdf
http://solarwall.com/media/download_gallery/cases/CanadairBombardier_Y96_SolarWallCaseStudy.pdf
http://solarwall.com/en/products/solarwall-air-heating/how-solarwall-works.php

INSTRUCTIONS

Please fill in as much information as possible.

Tick where appropriate.

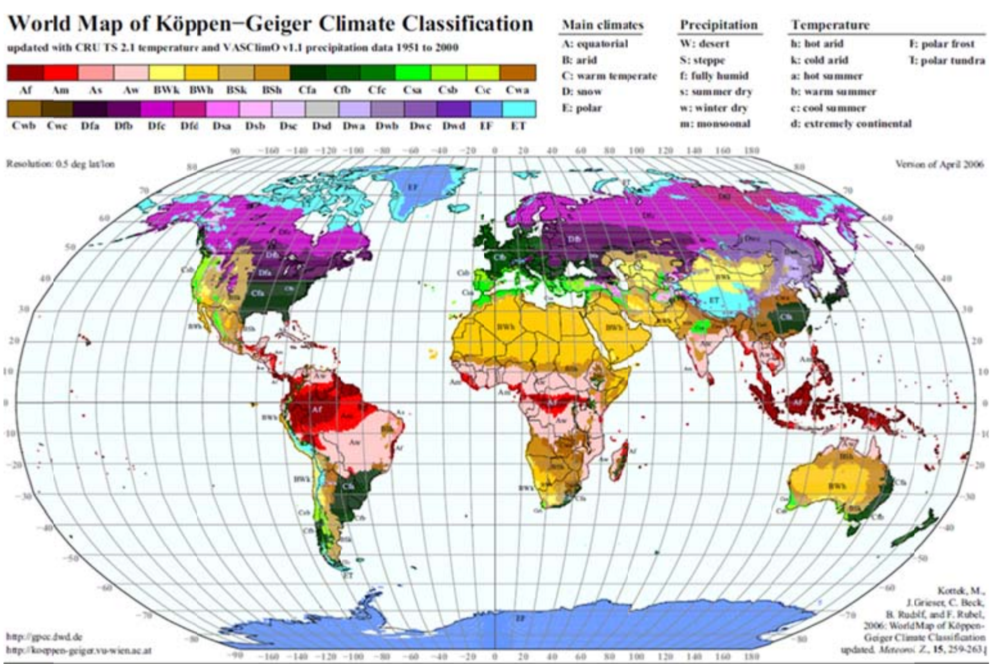
Text in red is suggested guidance. Insertinformation in provided space, removing red text as appropriate

If possible, use metric values.

If necessary, supply additional information on separate sheets

<u>Reference listing</u>

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'