Example name: *Avon Theatre*

Template completed by:
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Photographs

For installations

BISTS Location: *Stratford, Ontario, Canada, 43°22'N 80°58'W*
Climate Type: *Dfa*
Building Use: *Theatre*

Level of BISTS integration
3. Adding to the architectural image

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

Type of BISTS:

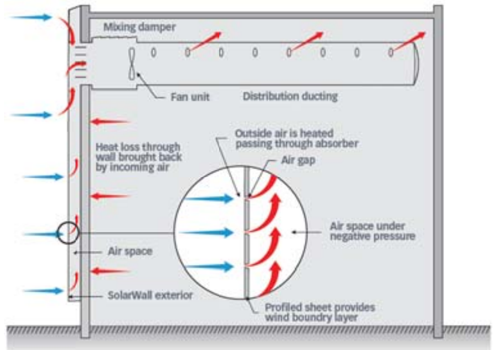
~~Active~~/Passive/~~Hybrid~~
delete as appropriate

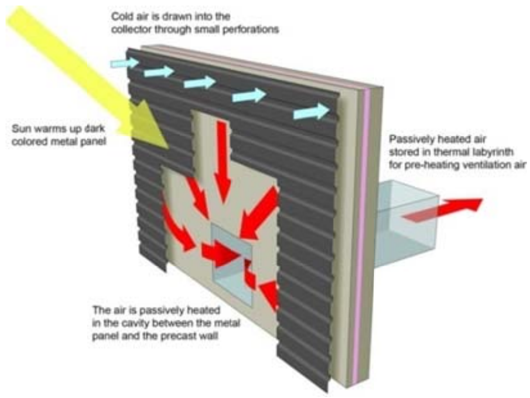
Function(s):
√ Air heating
O Water heating
O Combi-system
O Cooling/ventilation/shading
O PV/T
O linked to another system (e.g., heat pump)
O Other: ………………………
tick all that apply

Building element:

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

Drawings/Sketches/Cross-sections





BISTS characteristics:

The SolarWall solar air heating system preheats the incoming air before it reaches the HVAC system, thus overcoming the traditional heating load and reducing the greenhouse gas emissions. The black SolarWall system of the Avon Theatre is consisted of three large walls , one in the west (166 m²), one in the south (218 m²) and one to the east (104 m²), with a total area of 488 m² which covers the tower over the scene . The system is expected to reduce by 59 tons of greenhouse emissions per year and reduce the gas consumption by 28000 m³ per year.

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 *SolarWall air heating system was installed to strengthen the conventional heating system. The system was integrated and diversified architecturally an orthogonal volume, participating in the architectural concept of the building.* *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.*
System viability *Reduction of the costs for heating per year by $ 7000.*
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*

<table>
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BISTS Performance data

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

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Graphs for collector efficiency, seasonal energy gains, diurnal/seasonal solar fraction, etc.

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<tr><td colspan="2">

Additional information:

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Sources and references:

http://solarwall.com/media/download_gallery/SolarWallLEED_Sellsheet.pdf
http://solarwall.com/media/download_gallery/SolarWall_SellSheet.pdf
http://solarwall.com/media/download_gallery/cases/AvonTheatre_SolarWallCaseStudy_Y11.pdf

</td></tr>
</table>

INSTRUCTIONS

Please fill in as much information as possible.

Tick where appropriate.

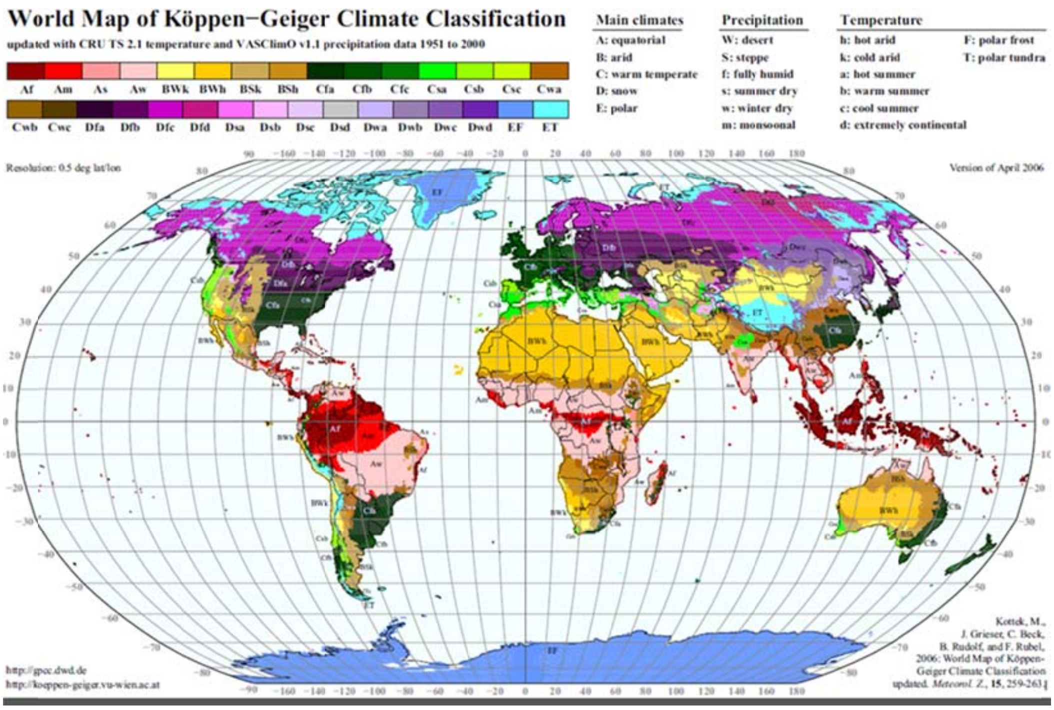
Text in red is suggested guidance. Insertinformation in provided space, removing red text as appropriate

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’