Example name: *Northern Arizona University Distance Learning Center, AZ, USA*

Template completed by:
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For installations

BISTS Location: *Flagstaff, Arizona, USA, 35°11'57"N 111°37'52"W*
Climate Type: *BWh*
Building Use: *Research Center*

Level of BISTS integration
3. Adding to the architectural image

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

Photographs

Type of BISTS:

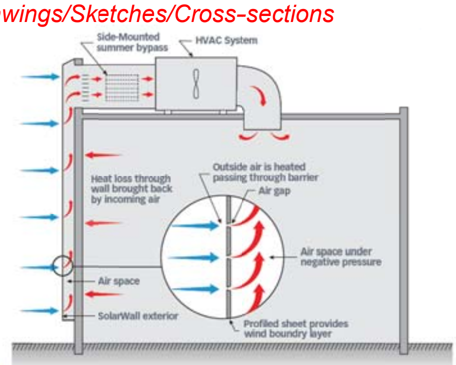
~~Active~~/Passive/~~Hybrid~~
delete as appropriate

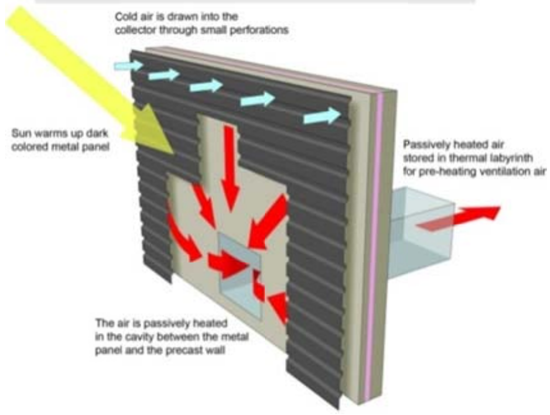
Function(s):
√ Air heating
O Water heating
O Combi-system
O Cooling/ventilation/shading
O PV/T
√ linked to another system (e.g., heat pump)
O Other: ………………………
tick all that apply

Building element:

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

Drawings/Sketches/Cross-sections





BISTS characteristics:

The building scored Silver LEED. To achieve this, they have implemented a variety of green technologies. The most important green technology is SolarWall solar air heating system in the south. The system was chosen because it provides solar heated fresh air in winter, and functions as a "screen shading" during the summer. The SolarWall system provides excellent quality air for classrooms, faculty offices, and a television studio. The system got six points in the LEED rating. The architects designed it in such a way that the horizontally positioned SolarWall became one of the main visual characteristics of the building.

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

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.
Conserval Engineering Systems, designed the system for the rich sunlight of the south - facing side of the building, embedding it in the mechanical system of the building. The total area of the solar panels is 263 m².

System viability

The system is expected to produce over 412 million BTUs of renewable energy annually. The system will also reduce greenhouse gas emissions by 29 tons of CO_2 every year, and its estimated repayment is under 8 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
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:

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

Additional information:

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/NorthernArizonaUniversity_Y09_SolarWallCaseStudy.pdf

INSTRUCTIONS

Please fill in as much information as possible.

Tick where appropriate.

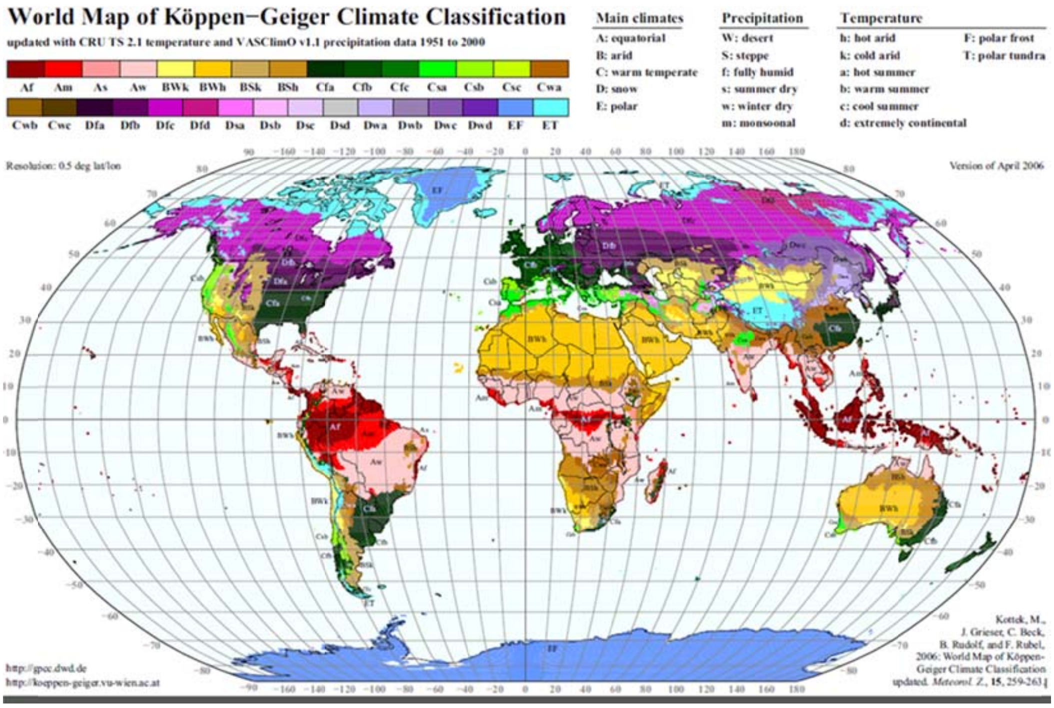
Text in red is suggested guidance. Insertinformation in provided space, removing red text as appropriate

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'