
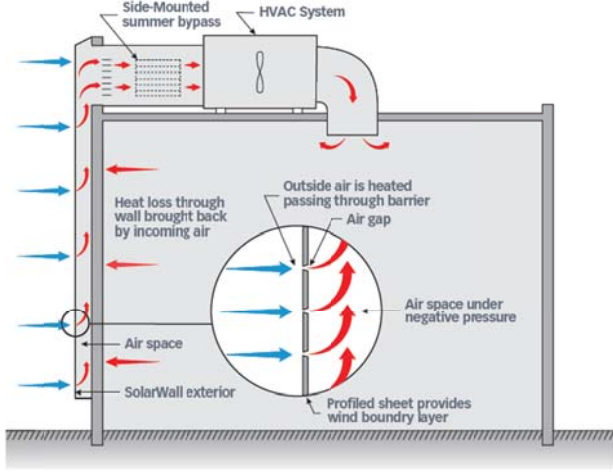


Example name: **Toyota Motor Manufacturing, Onnaing, France**

<p>Template completed by: Constantinos Vassiliades, vassiliades.constantinos@ucy.ac.cy</p> <p>For installations</p> <p>BISTS Location: <i>Onnaing, France,</i> 50°23'18"N 3°35'56"E Climate Type: <i>Cfb</i> Building Use: <i>Industrial</i></p> <p>Level of BISTS integration 3. Adding to the architectural image</p> <p> <input checked="" type="checkbox"/> New Build <input type="checkbox"/> Refurbishment <input type="checkbox"/> Other: <i>tick all that apply</i> </p>	<p><i>Photographs</i></p> 
<p>Type of BISTS:</p> <p>Active/Passive/Hybrid <i>delete as appropriate</i></p> <p>Function(s):</p> <p> <input checked="" type="checkbox"/> Air heating <input type="checkbox"/> Water heating <input type="checkbox"/> Combi-system <input type="checkbox"/> Cooling/ventilation/shading <input type="checkbox"/> PV/T <input type="checkbox"/> linked to another system (e.g., heat pump) <input type="checkbox"/> Other: <i>tick all that apply</i> </p>	<p><i>Drawings/Sketches/Cross-sections</i></p> 
<p>Building element:</p> <p> <input checked="" type="checkbox"/> Facade <input type="checkbox"/> Roof <input type="checkbox"/> Other: <i>tick all that apply</i> </p>	
<p>BISTS characteristics:</p> <p>The SolarWall solar air heating system was an ideal technology to help Toyota to achieve some of its ambitious green goals.</p> <p>The TMMF chose to "decorate" its system with the logo of the sun (which is on the top corner of the panel) to emphasize the fact that the wall is actually a solar collector.</p>	

Stage of Development: Responsible: Company.

- | | | |
|----------------------------------|---------------------------|-----------|
| <input type="radio"/> | Idea/Patent | |
| <input type="radio"/> | Prototype | |
| <input type="radio"/> | Demonstration | |
| <input type="radio"/> | Integral building element | |
| <input checked="" type="radio"/> | 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.

The solar air heating system heats the air that is needed in the factory. The SolarWall Europe Sarl. met with TMMF and designed a black system of 400 m² which is integrated in the ventilation system.

System viability

The system yields positive results and increases the temperature of the air entering the building by up to 9°C during the coldest months of the year.

It is estimated that the facility would result an annual energy savings of up to 25 % compared with conventional heating methods, with CO₂ emissions reduced by around 20 tonnes per year.

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

<p>BISTS Performance data</p> <p>Based on:</p> <p><input type="radio"/> Estimation</p> <p><input type="radio"/> Detailed simulation</p> <p><i>CANMET's monitoring report.</i></p> <p><input type="radio"/> Measurement/testing</p> <p><input type="radio"/> Long-term monitoring</p> <p><i>tick all that apply</i></p> <p>Performance parameters</p> <p>For integrated systems: key performance indicators -</p> <p><i>Solar savings fraction: %</i></p> <p><i>Light transmittance: %</i></p> <p><i>Solar transmittance: %</i></p> <p><i>Total solar energy transmittance: %:</i></p> <p><i>Solar heat gain factor: %</i></p> <p><i>Building fabric U-values: W/m²K</i></p> <p><i>Noise, fire, etc ratings</i></p> <p><i>Other:</i></p> <p>For separate collectors: performance rating coefficients - (EN12975, a0,a1,a2), ASHRAE, etc</p> <p>Other:</p>	<p><i>Graphs for collector efficiency, seasonal energy gains, diurnal/seasonal solar fraction, etc.</i></p>
<p>Additional information:</p>	
<p>Sources and references:</p> <p><u>http://solarwall.com/media/download_gallery/SolarWall_SellSheet.pdf</u></p> <p><u>http://solarwall.com/media/download_gallery/Hibbing-SolarWallCase.pdf</u></p>	

INSTRUCTIONS

Please fill in as much information as possible.

Tick where appropriate.

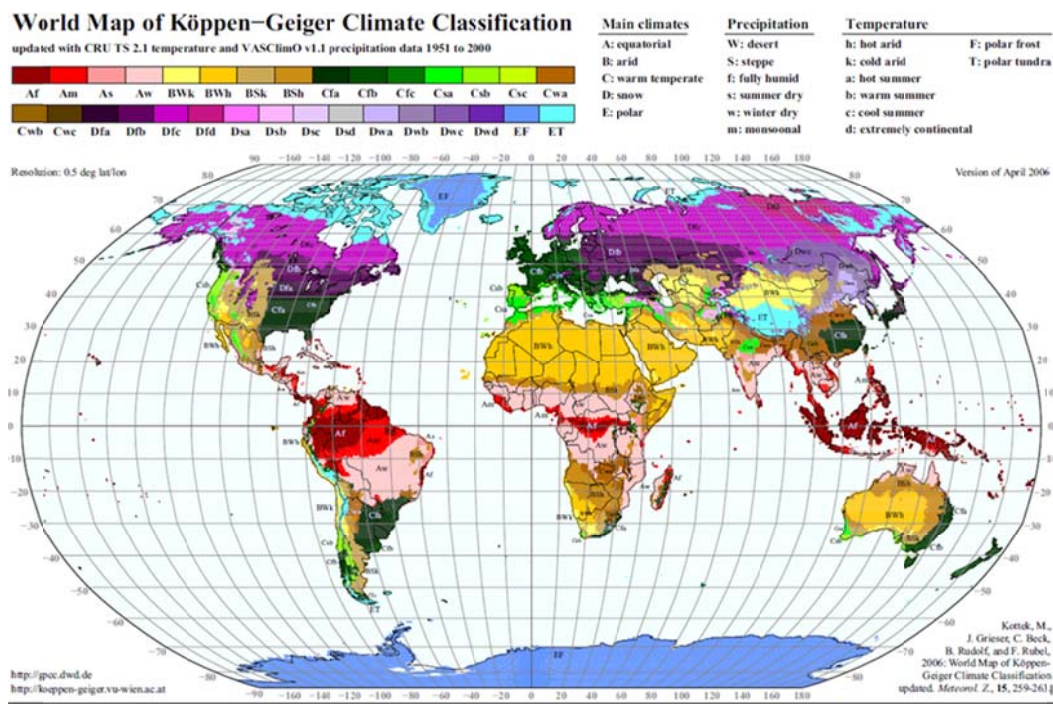
Text in red is suggested guidance. Insert information in provided space, removing red text as appropriate

If possible, use metric values.

If necessary, supply additional information on separate sheets

Reference listing

Köppen climate classification



(Kottik, 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'