Sustainable Building Envelope Demonstration (SBED) Project

SBED
Sustainable Building Envelope Demonstration

Cardiff University
Prifysgol Caerdydd

TATA

ERDF
Llywodraeth Cymru
Welsh Government
Ewrop & Chymru: Buddsoddi yn eich dyfodol
Cronfa Datblygu Rhanbarthol Ewrop
Europe & Wales: Investing in your future
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SBED – Project

The project is backed with £1.8m from the European Regional Development Fund through the Welsh Government, secured by the Welsh School of Architecture, Cardiff University. It is delivered through partnership with Tata steel. A ‘match funded’ project, making its true value approximately £3m

SBED builds upon the research outcomes of the LCRI Low Carbon Built Environment (LCBE) project (ERDF R&D and Innovation funding through the LCRI Convergence Energy Programme) and on existing knowledge in Wales.

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SBED – Project Aim

- To design, model, test, prototype and monitor low carbon building systems incorporating transpired solar collectors (TSC) in eight ‘buildings in use’ (Wales Convergence areas).

  The full process of design, installation & operation, will be closely monitored and best practice in terms of installation and maintenance will be disseminated along with the performance of the technologies.

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SBED – Wales Convergence Areas

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SBED – Project Objectives

- To carry out a programme of demonstration and market transformation, laying the groundwork to successfully establish innovative energy generating building envelopes for low carbon design solutions, specifically PV cladding and Transpired Solar Collector (TSC) technologies.

- To utilise these existing and innovative techniques in providing building integrated energy generation as part of low carbon energy efficient design.

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SBED – Project Objectives

- To design, test, and prove the technical robustness of such systems in use in a range of building types representative of new build and retrofit projects.

- To evaluate the real life energy performance, capital and operating costs, of these innovative envelope solutions, and provide effective guidance for fully integrating the products into building planning, design and construction.

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SBED – Project Objectives

- To work with local enterprises for each installation and develop skills/knowledge to support the application of the new technologies in the Wales Convergence areas and beyond.

- Disseminate the effectiveness of TSC technologies and PV cladding to the wider building construction industry in Wales and encourage the use of these products for the benefit of Welsh economy through increased demand for manufacture and potentially develop a market for export.

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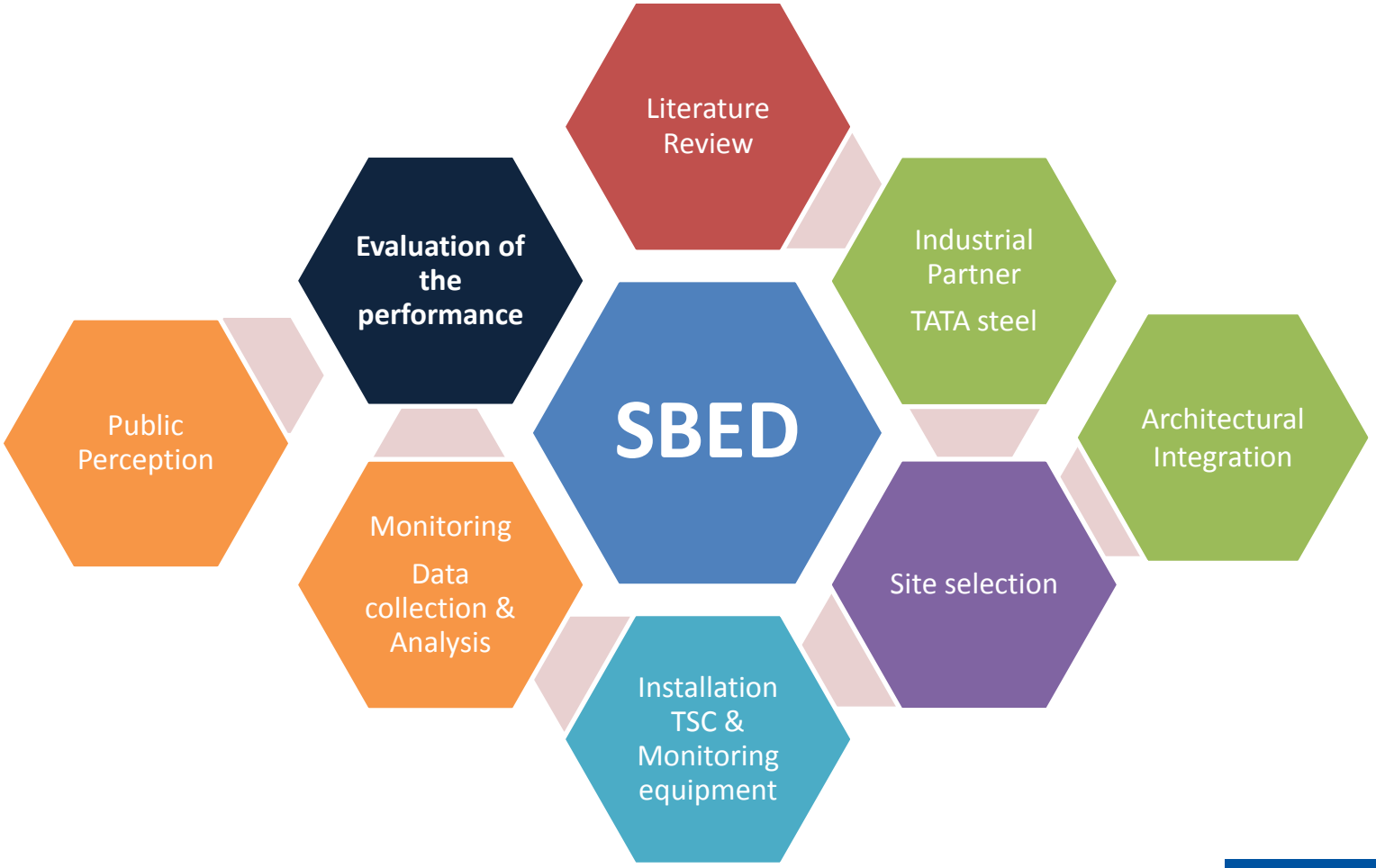
SBED Strategy



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Transpired Solar Collector

A transpired solar collector (TSC) is a solar thermal system which can be used to heat or preheat the ventilation air supply to buildings using solar radiation as its energy source.

It is a relatively new technology to the UK, however it was first invented and patented in the early 1980s by John Hollick and Rolf Peter and has been used in Canada and the US since the early 1990's.

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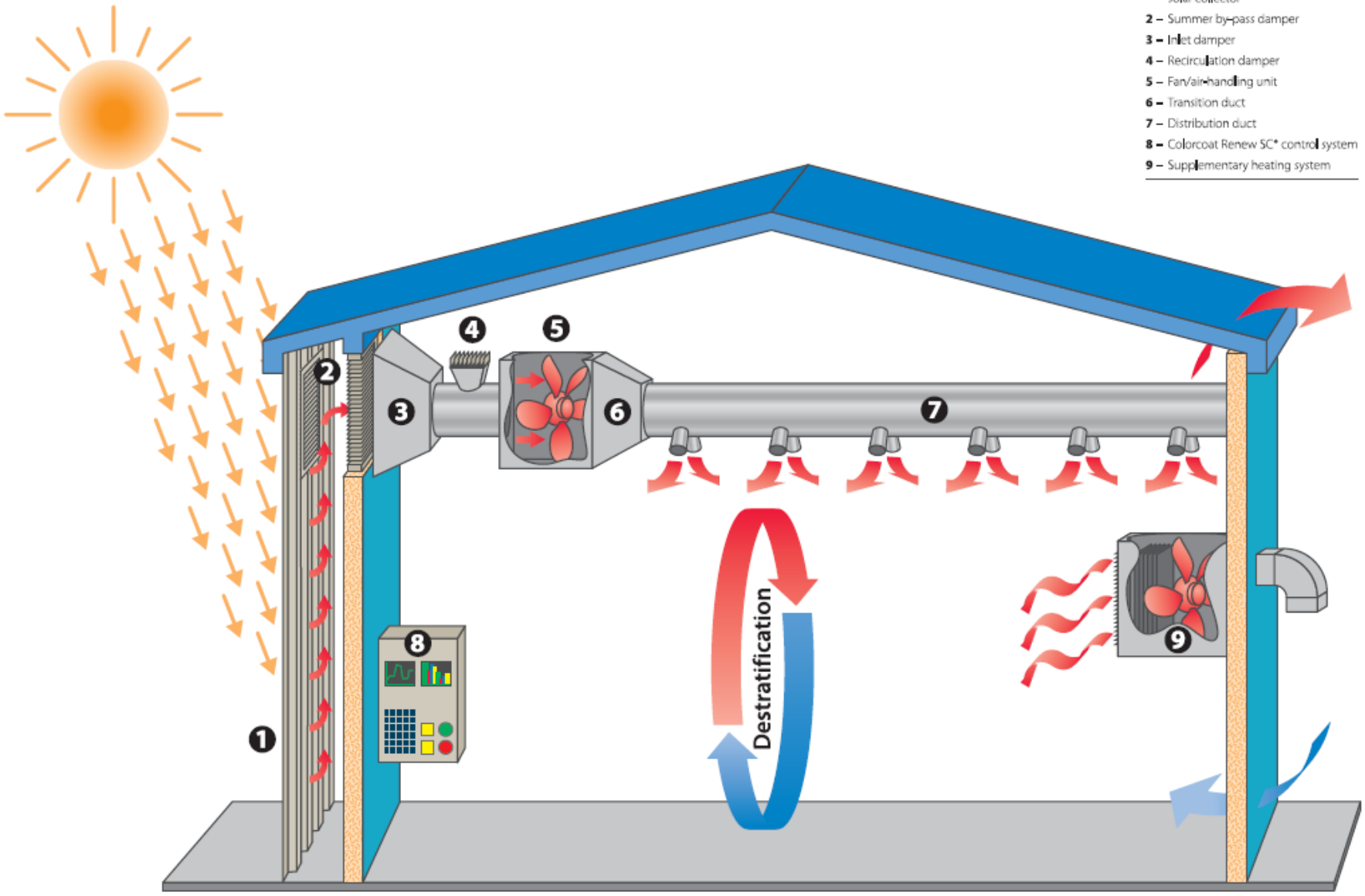
Colorcoat Renew SC® system overview



TSC Installations USA & Canada

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TSC Installation in the UK

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Orientation & Inclination

- Generally installed vertically
- The Technical Training Academy of Jaguar Land Rover is inclined 21^{o} from vertical.
- Roof Mounted TSC

CA GROUP. 2010. *CA Building Products: Case Studies.* [Online]. Available: http://www.cagroupltd.co.uk/ [Accessed 17 November 2012].

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SBED – Monitoring

WSA monitoring Aims:

- Stand alone TSC performance
- ‘real life evaluation of the energy performance of envelope solutions’
- CO^2 reduction – displaced energy
- Influences on performance
- Evaluate the integration of envelope solutions into new and existing buildings

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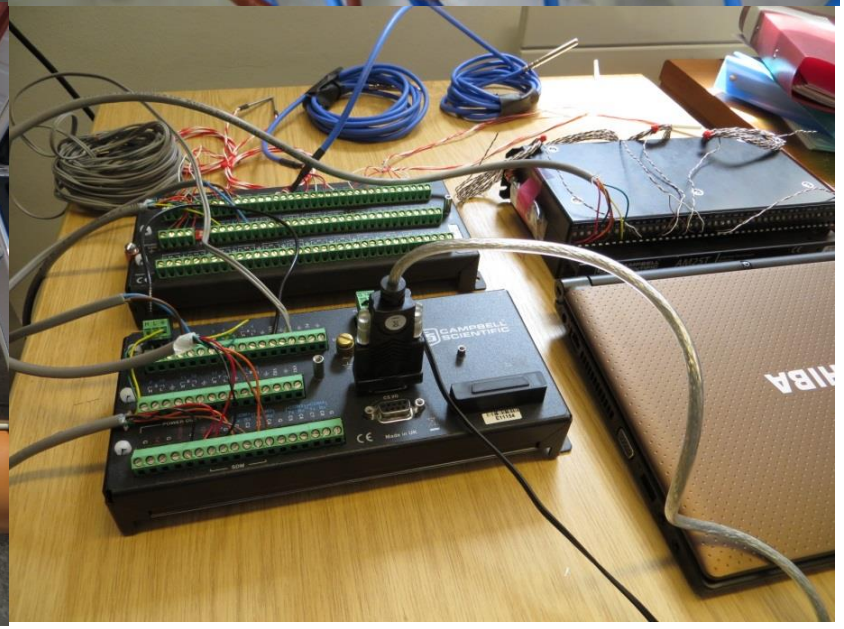
CAMPBELL SCIENTIFIC

SBED – TSC Installation

Building Type	Number
Residential	2
Commercial (Office/Retail)	2
Industrial /Process	2
Institutional (School / Hospital)	2

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Potential Demonstration Sites

Institutional

Industrial

Commercial

Residential

Institutional

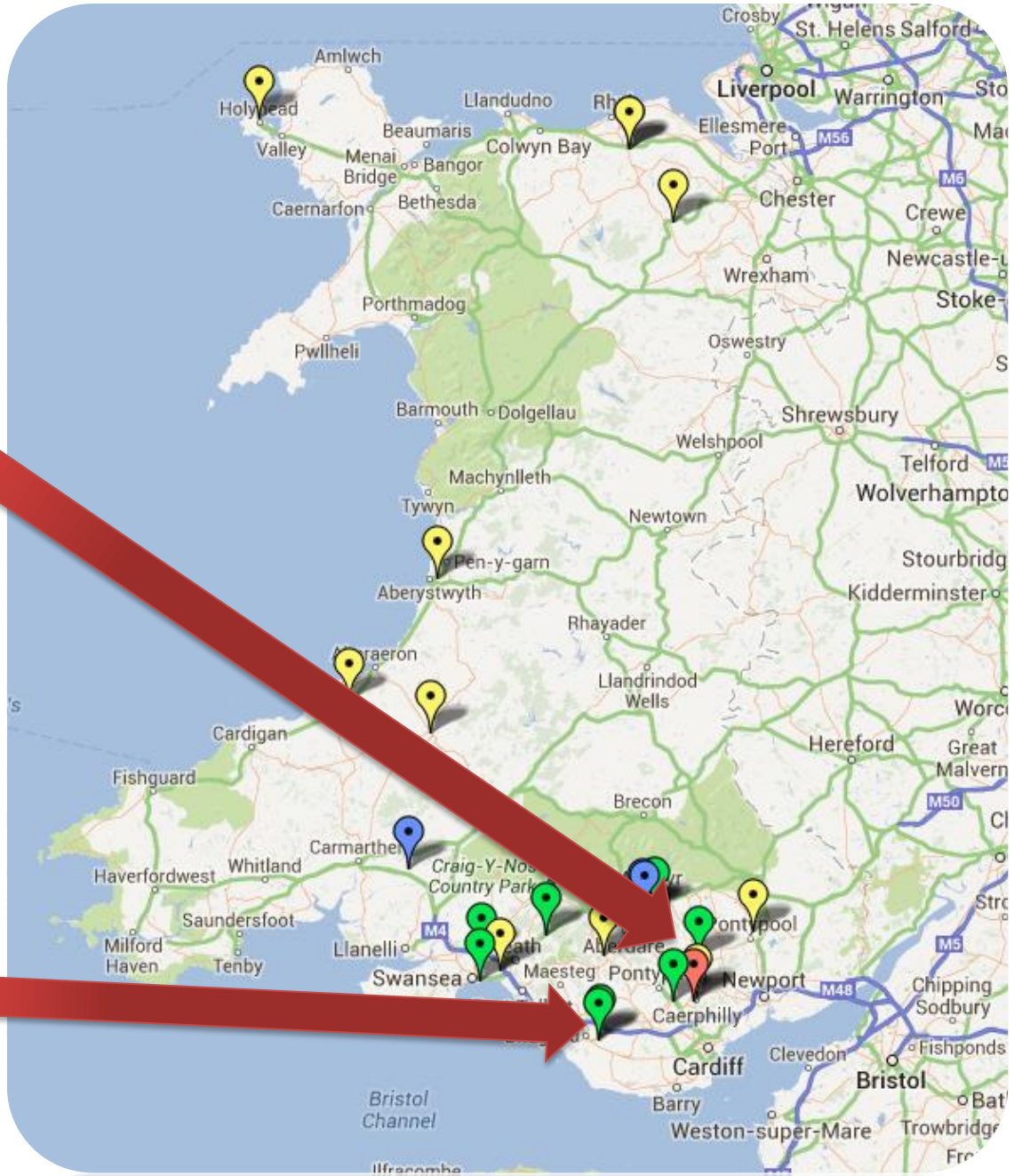
Glan Clwyd High School, St. Asaph, Denbighshire

Lampeter Comprehensive School, Ceredigion

Industrial

Seda – Blackwood, Caerphilly.

Ford Manufacturing Engine Plant, Bridgend



current status

Building Type	Number to be selected	Expected TSC Area	Number Submitted	Number Selected
Residential	2	40m2 each	1	-
Commercial (Office/Retail)	2	200m2 each	8	-
Industrial /Process	2	1000m2 each	7	2
Institutional (School / Hospital)	2	150m2 each	10	2
Total	**8**	**2780m2**	**26**	**4**

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TSC Installations in the UK

Profiled Cladding	Tongue & Groove Planks	Cassette
 	 	 
Good for large TSC installations due to structural rigidity. Can be laid vertically or horizontally	Generally easier to install than cassette panels	Can require additional stiffening ribs. Requires careful choice of module dimensions.

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SBED – State Aid – Demonstration Sites

- Building owners who agree to have the installed technology as a demonstration - to confirm amount of De minimis aid received to date. (Threshold is €200,000 per beneficiary within 3 fiscal year period).

- Building owners who wish to keep the installed technology at the end of project should have an independent evaluation of the residual value of the technology which will then be reported as De minimis to the building owner.

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SBED – Benefits

- Job protection / creation resulting from increased demand for services (installation and maintenance of the new systems)

- Energy and CO2 reductions for end users from the performance in use of the applications.

- Building operators and construction related industries will benefit from information gathered through monitoring, including data on energy saved, and dissemination on best practice, installation techniques, maintenance issues, etc.

*www.**sbed**.cf.ac.uk*

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Thank you


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