



Active Classroom Case Study

The active classroom partners

- The Active Classroom is full-scale building demonstration project, based at Swansea University's Bay Campus
- It contains a laboratory and classroom, used for teaching students, and is being used as more than a technology demonstrator- helping to understand building performance in the context of an education facility
- The project involved 20 partners- some of main ones are shown below



Active classroom overview

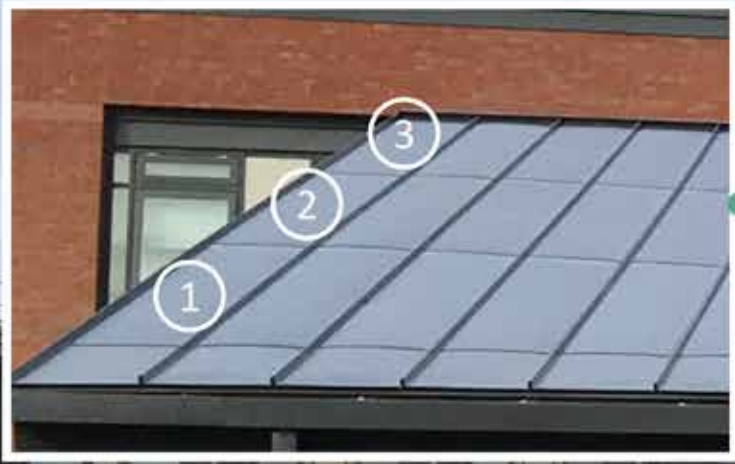
- Modular construction - all off site
- Highly insulated fabric, floor and roof
- Resistive heating integrated into floor panel
- South façade solar air collector (heating and warm water)

BIPVco PV modules
17.2kWp



Saltwater batteries
60kWh (2 days)






3 modules per sheet
115W per module
149 modules in total

FLEXTRON – commercial standing seam roofs



An aerial photograph of a solar panel array. The panels are arranged in a grid pattern, with rows and columns separated by dark metal rails. The panels themselves have a textured, dark grey surface. Three white callout lines with circular endpoints point to specific features: one points to a junction box on the underside of a panel, another points to the edge of a panel, and a third points to a rectangular area within a panel. An orange rectangular outline is drawn around the area indicated by the third callout line.

Junction boxes mounted on the underside of the module- we are able to mount on top as well

Tata Colorcoat Prisma Urban roof panels

56 CIGS cells in each module

Roof structure

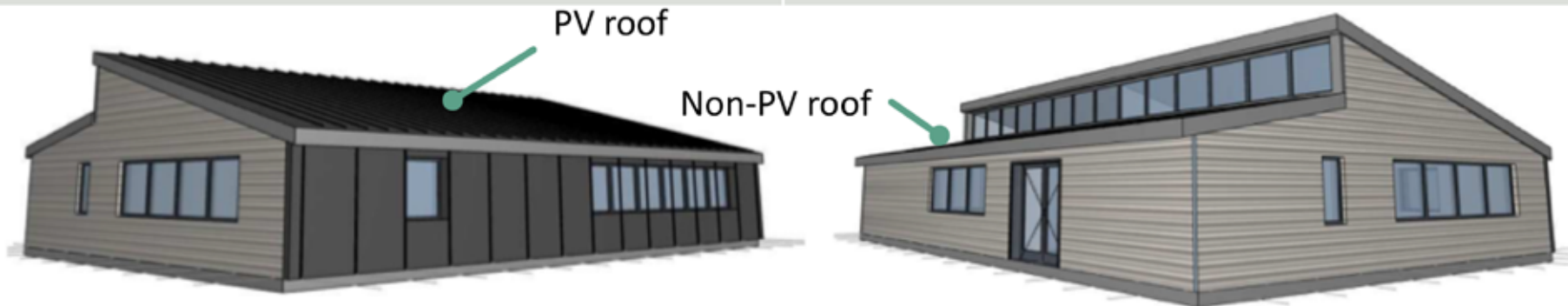


- Fully supported standing seam roof made by Tata
- built up system that has extra layer of OSB to contain cables
- Junction boxes concealed underneath the roof

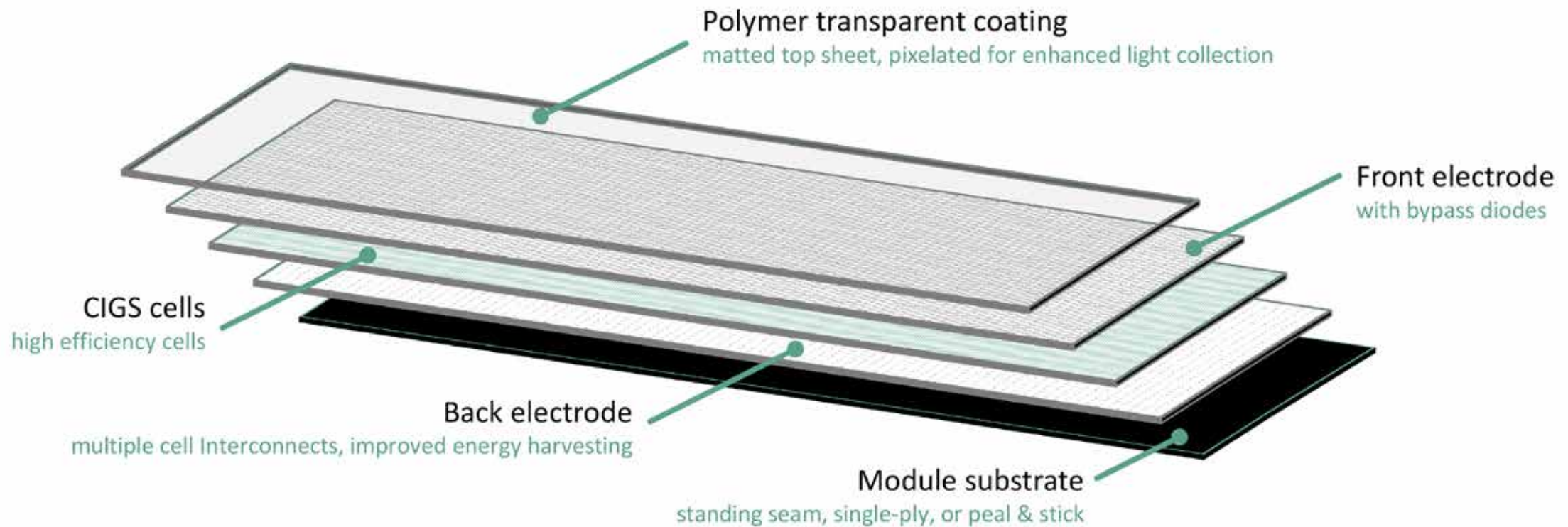
Notes: all costs for roof and PV, include all labour, materials & detailing; and exclude all BOS, wiring & invertors.
 PV modelled using PVGIS

Active classroom cost analysis – roof area 210 m²

BIPVco solution	Silicon crystalline solution
Tata Colorcoat Prisma roof with 17.2 kWp of integrated CIGS PV (135 Flextron modules)	Tata Colorcoat Prisma roof with 17.4 kWp of roof mounted cSi PV (66 modules)
- £65/m ² Colorcoat Prisma non-PV roof (40 m ²) - £210/m ² Colorcoat Prisma PV roof (170 m ²)	- £65/m ² Colorcoat Prisma (210 m ²) - £20,400 for silicon PV modules
Cost per Watt (including roof cost) £2.22/W Cost per Watt (excluding roof cost) £1.45/W	Cost per Watt (PV system only) £1.20/W
Payback year- 10	Payback year- 10
Total cost - £38,300	Total cost - £ 34,050



BiPVco CIGS module



The south facing roof containing our
BIPV modules

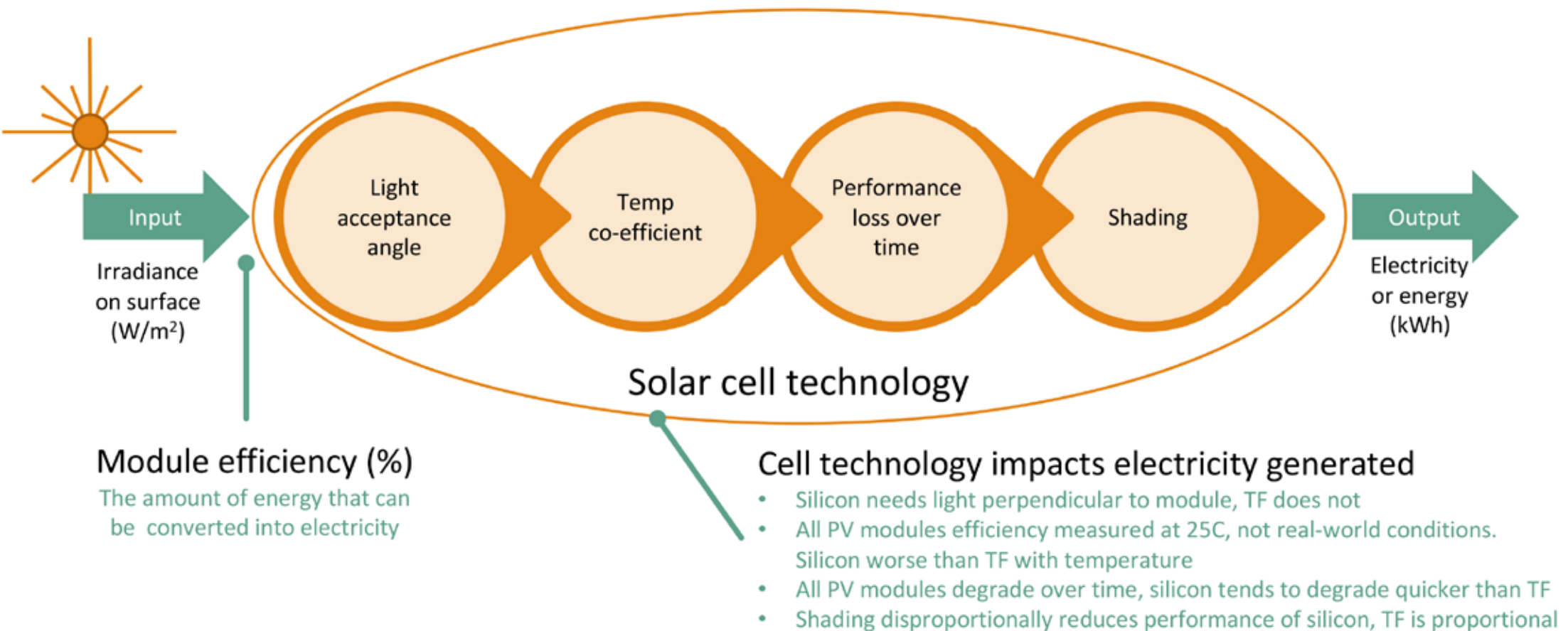


The north facing roof



Solar cell efficiency is only part of the story

power (W) = voltage (V) x current (I) and energy (kWh) = power (W) x time (in hours)



Why BiPVco is different

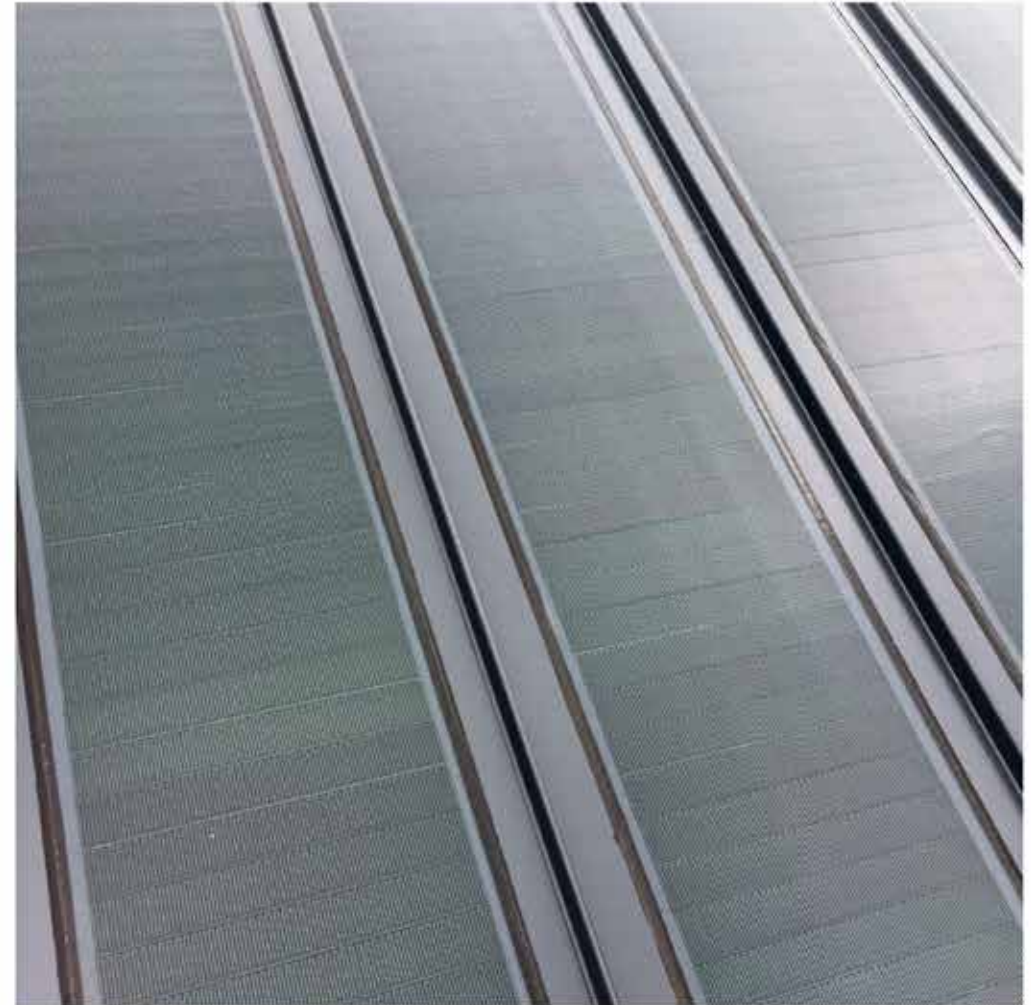
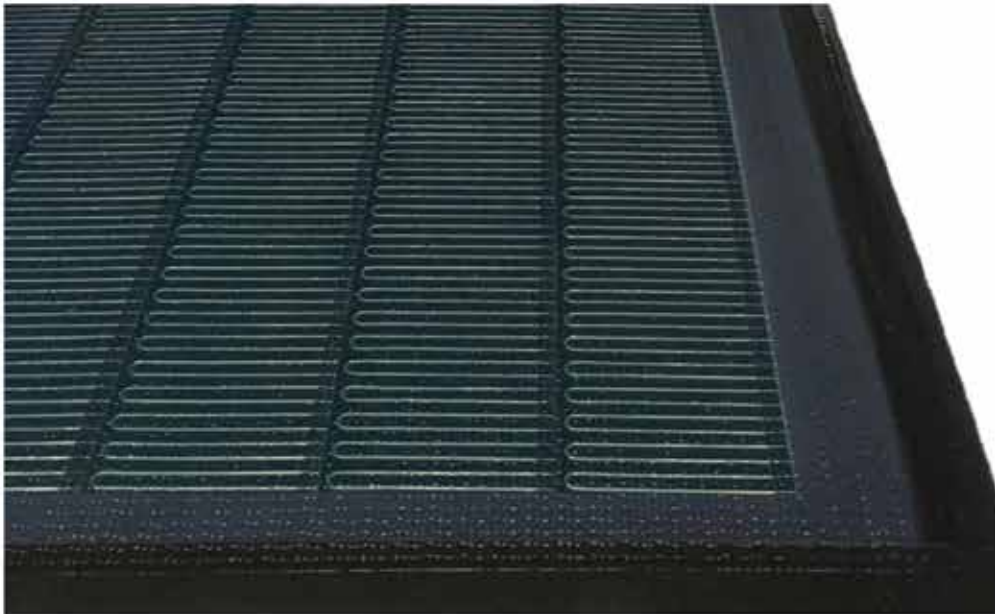
- BiPVco is **solar manufacturer** focused on the built environment
 - Market leading technology and processes proven over the past **5 years**
 - Based on **commercially proven** CIGS Technology
- We offer **consolidated** roof and PV warranties with our products
- **Flexible** manufacturing approach – multiple substrates, multiple dimensions
- Large format/high efficiency PV modules = **lower cost per Wp** installation
- Multiple product **design benefits** over silicon crystalline PV technology

Warranty, life span and O&M

- Warranty for combined PV and roof product is the no different to the traditional roof product
 - **Roofing product** up to **30 years** (location dependent)
 - **PV 25 year performance** warranty and **5 year product** warranty
- Who provides the warranty
 - Roofing partner issues roof warranty with our product included
 - BIPVco issues PV warranty once we have inspected the installed BIPV roof
- O&M
 - **No real difference** between **silicon** or **CIGS modules** in this regard
 - Our products coated with Teflon like coating (ETFE) , so **mostly clean themselves**
 - Required yearly inspection- to ensure no damage to module surface

METEKTRON – residential standing seam roofs

- Fully supported metal standing seam roof for residential applications
- 358 mm (w) up to 5923 mm (l)



BiPVco

The Building Integrated Photovoltaic Company

Thank you