Active Classroom Case Study
The Active Classroom is a 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
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
BIPVco CIGS module

- Polymer transparent coating
  - matted top sheet, pixelated for enhanced light collection
- Front electrode
  - with bypass diodes
- CIGS cells
  - high efficiency cells
- Back electrode
  - multiple cell Interconnects, improved energy harvesting
- Module substrate
  - standing seam, single-ply, or peal & stick
The south facing roof containing our BIPV modules
The north facing roof
Solar cell efficiency is only part of the story

Module efficiency (%)
The amount of energy that can be converted into electricity

Cell technology impacts electricity generated
- Silicon needs light perpendicular to module, TF does not
- All PV modules efficiency measured at 25C, not real-world conditions. Silicon worse than TF with temperature
- All PV modules degrade over time, silicon tends to degrade quicker than TF
- Shading disproportionally reduces performance of silicon, TF is proportional

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

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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
FLEXTRON – standing seam roofs

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