

## Power to the people democratisation driven by coated steel products

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Each year Tata Steel in the UK produces 100 million square metres of building cladding that ends up as the facades and roofs of buildings. Globally, steel building cladding is orders of magnitude more than this. In the UK, innovation in coating technology for metallic and organic systems now gives these lifetimes guaranteed for up to 40 years. These products are essentially stable but 'dumb' in that they do not do anything but look nice and keep the rain out! Given their lifetime is around twice that of a current solar panel coupled with the innovation that is occurring in printed solar cells which can be produced in the laboratory with efficiencies now over 28% and solar thermal collectors which can combine with inter-seasonal storage, it seems an obvious step to explore the potential of these materials to have integrated generation technology to absorb the sun's energy. Considering the area of cladding made in the UK alone and that one sun is roughly equivalent to 1000 Watts, if we can apply a 10% solar cell to the steel this equates to around 1GW peak power per year of production! In this lecture Professor Dave Worsley will describe progress to-date on achieving this goal in relation to both applications in the UK and in India and Mexico where the Team are engaged with local communities to repurpose simple printing presses to make solar cells local to where they are needed. Real world examples of solar powered buildings will be discussed together with the way in which spare power can be deployed to drive the electric vehicle revolution or provide power for communities who may never have grid connections in the way we view them currently.

### **Bio:**

Professor Dave Worsley is author and co-author of 135 scientific publications on functional coating product development. He has worked closely with the coatings industry since the mid-1990s, following an industry sponsored PhD (Johnson Matthey), an Industrial Fellowship (Astra Zeneca) and a British Steel Fellowship.

As a Tata Steel sponsored Professor at Swansea University, Dave leads a number of national and international consortium projects supporting the transformation of industry to a lower carbon future. To date he has led the development of over £120M investment in collaborative training, research and innovation.

With his research background in materials for solar energy and functional coatings, Dave has pioneered the concept of 'Active Buildings®' - buildings that can generate, store and release their own heat and electricity by using integrated renewable energy technologies. To account for the shift to electric vehicles being championed globally, charging facilities have also incorporated in the demonstration building design.

In 2011 he led the creation of the [SPECIFIC®](#) Innovation and Knowledge Centre (IKC), a consortium of more than 50 partners from industry, academia and government to develop this concept. SPECIFIC® specialises in the scale-up of new technology from the lab to full-scale building demonstrators and collaborates extensively to support early commercialisation and adoption of new renewable technologies and systems. The Centre has strategic academic collaborations with many UK institutions plus internationally in India, Mexico, Kazakhstan and USA.

Proving the concept works at full-scale, the [Active Classroom®](#) and [Active Office®](#) buildings on the Swansea University Bay Campus have both won numerous industry awards. In 2017, the GCRF-funded [SUNRISE](#) was added to the Portfolio – taking the concept of Active Buildings® overseas to rural Indian communities. Working with Indian industrial partners, the first demonstrator is to be built at IISc Bangalore in Spring 2022.

[With steel products and energy integral to the supply of materials in the manufacture of land, air and sea transport and construction, by employing Active Buildings® there is an opportunity to address the UK Steel Industry's 2050 de-carbonisation targets.](#)