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Louvres, Fins and Windows: the Co-Development of BIPV and Buildings.

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Research into sustainable innovation usually focusses on the technology as a self-contained entity and on the business models needed to support its uptake, rather than on the physical 'system' into which it must fit. The construction sector has a major role to play in the move to a low carbon economy; increasingly the technologies involved are integrated within the fabric of the building rather than being "bolt on" extras. It is not just business models that have to change, but also the project processes, team dynamics and types of design processes. This poses major challenges which are often overlooked and impede implementation. This research explores the integration of low carbon technologies into buildings by examining the uptake of Building Integrated PhotoVoltaic technology (BIPV) - a state of the art new technology moving beyond simple panels installed on the roof.

BIPV is one of the low carbon technologies increasingly specified on building projects to address the carbon reduction agenda. BIPV is relatively well defined, but is configured uniquely for each building. The process of its incorporation within buildings is complex, giving rise to multiple issues and a process of co-development between the building and BIPV. The aim of the research is to explore the mutual constitution of technologies and buildings, to better understand the challenges for construction professionals. The research includes analysis of how standard ways of working within projects may affect implementation and how the incorporation of the technology itself can shape the building.

A Social Construction of Technology approach is used to explore the problems and issues encountered and the solutions developed in three case studies of recent commercial new-builds which have included BIPV in the UK. In addition the research highlights common problems which develop when BIPV is specified and the effect of multiple shifting understandings and associated interests on design decisions. The importance of this work is to illustrate the conflict between the bespoke nature of BIPV in the UK and standard project processes adopted, which makes a contribution towards the understanding of the uptake and diffusion of low carbon technologies.

Findings demonstrate how informal groups of project actors with similar interests in BIPV set the agenda for the succession of problems and solutions which arises as BIPV is introduced into a building. Findings underline the multiple, conflicting criteria shaping design decisions relating to BIPV and the buildings in which it is incorporated. Findings also show how BIPV requires a level of integration that typically spans different work packages and how standard contractual structures can hinder implementation of this technology.