

Institution: Oxford Brookes University

Unit of assessment: 16 Architecture, Built Environment and Planning

a. Context

Commitment to improve the quality and management of the built environment is integral to the work of the Architecture, Planning, and Real Estate and Construction departments at Oxford Brookes University. Research seeks to understand and enhance policy and practice, shaping places and spaces across multiple scales. The work impacts in many areas of the built environment, including public policy and policy processes, professional practice and commercial activities. There is ongoing engagement with stakeholders across the public, private and third sectors. Impacts are underpinned by ten distinctive research groups, eight of which come under the umbrella of the 'Oxford Institute for Sustainable Development' (OISD). These are: Low Carbon Building; Place, Culture and Identity; Architectural Engineering; Spatial Planning; Environmental Impact Assessment; Urban Design; Construction and Project Management; and Real Estate and Land Policy. Two further groupings, the 'Centre for Development and Emergency Practice' and the 'Design, Theory and Practice' group, extend activities beyond sustainable development *per se*. This diversity clearly implies different levels and types of impact which emerge in more or less direct ways.

Impacts can be broadly situated within three interlinked 'arenas': (i) Developing and exploiting new technologies and evaluative techniques; (ii) Evaluating and influencing policy processes and regulatory frameworks; and (iii) Shaping practice, capacity building, and changing behaviours. Across these arenas impacts are generated variously through commercial exploitation and technology transfer; the development of guidance, metrics and internationally recognised standards, together with associated knowledge transfer/capacity building; and indirect impacts that are more subtle and intangible in character but which are nonetheless influential in terms of advising, informing, and shaping the policy landscape.

b. Approach to impact

The following examples illustrate the important role of relations with key users in developing impact across the three arenas. With regard to (i) 'new technologies and evaluative techniques' the 'Architectural Engineering' research group is currently charged by Tata Steel (previously British Steel, then Corus) to lead an intensive R&D programme around light steel construction, the primary structural technology for the rapidly developing modular and off-site volumetric construction sectors. This has generated essential design data for light steel in the areas of building physics, durability and construction, and structural compliance, and subsequent construction of full scale test buildings. The research has facilitated major private sector infrastructure investment programmes to deliver products at commercial volumes. Data has assisted manufacturers to achieve approval from building control agencies including local authorities and specialist providers such as Lantac, NHBC and Zurich. Major applications now exist in the housing sector, key worker and student accommodation, schools, hotels and healthcare, as well as general applications such as infill walls and framing in commercial and industrial buildings.

In (ii) 'Evaluating and influencing policy processes and regulatory frameworks', the *Green Guide to Specification* founded within the Real Estate and Land Policy group has become the industry and legislative standard for the selection of lower environmental impact construction materials. From 2007 onwards, *Green Guide* rated materials have had to be specified as part of the Code for Sustainable Homes standards which are now required in order for any new residential development in the UK to be granted Planning Permission. *Green Guide* is also cited in the UK Government's Homes and Communities Quality Standards (2007) and is the official UK Government Buying Standard for construction products. Additionally, at least 16 UK Local Authorities have published design guides using *Green Guide* as the standard for housing and commercial construction projects.

In (iii) 'Shaping practice, capacity building, and changing behaviours' research in the Place, Culture and Identity group on the management and promotion of prehistoric heritage in the Eastern

Impact template (REF3a)

Mediterranean region continues to underpin capacity-building amongst professionals, public sector employees and stakeholders at cultural heritage sites. Building on the original 'Training, Education, Management and Prehistory in the Mediterranean' project (TEMPER, funded by the EU Euromed Heritage II programme 2001-3, with Cambridge University and partner organisations in Turkey, Greece, Malta and Israel) training has been provided since 2008 to: Brandenburg Technical University, Germany (2009); Turkish Ministry of Culture staff (2011); local stakeholders, officials and professionals in Kars, Turkey in a project jointly funded by UNESCO concerning the site of Ani (2010); and archaeologists and conservators at archaeological sites, Istanbul, Turkey (2012).

Impact is integral to research design within the UoA. For instance, Gupta's ESRC-funded £1.14m EVALOC (Evaluating Low Carbon Communities - RES-628-25-0012) project adopted an action-research methodology which entailed an iterative cycle of action and reflection where low carbon community groups (funded through Department of Energy and Climate Change's Low Carbon Community Challenge) are involved as co-researchers in shaping the design, implementation, and interpretation of the research programme and its outputs, as well as being subjects of the research. Alternatively, impact plans may support the work of government departments and agencies by developing appropriate dissemination materials for users, or address key industrial or commercial issues.

An important aspect of project design is to make full use of existing networks with user-communities. The Built Environment disciplines have well-established links with local authorities, central government departments, commercial interests, representative groups and other users. Substantial research projects have appointed advisory groups including non-academic partners who have a track record of expertise, practice and/or dissemination in the relevant field. For example, Marshall's ESRC research fellowship (2008-10) 'Infrastructure and Spatial Planning' included advisory board members from DCLG, FoE, SEEDA and Arup, as well as private consultancies. Similar arrangements are utilised in 'SNACC: Suburban Neighbourhood Adaptation for a Changing Climate' (EPSRC 2009-12, - EP/G060959/1), with 3 active local authorities, 6 international visiting researchers and 10 industry partners; and 'Retrofit 2050' (EPSRC 2010-14, EP/I002162/1) which has 11 project partners across the public and private sectors.

HEIF funding (managed by the University's Research and Business Development Office) is an important means of engaging with industry and commerce. Major projects include, 'Accreditation and Testing for Off-Site Manufacturing (ATOMIC)' and 'Counting Real Carbon' (CRC). ATOMIC has generated £500k in the census period, and established sector leading test facilities currently operating at full capacity and serving a wide cross-section of the UK composite and built-up cladding industry, structural component suppliers and off-site modular buildings providers. Current turnover is approximately £300k p.a. with a large proportion of activity focussed on innovative market leading product developments. CRC has generated £1.1m additional income and expanded the client base to include leading social housing providers (Sanctuary housing group, Thames Valley Housing), local authorities (Swindon Borough Council, West Sussex County Council, Oxford City Council, Bicester Town Council), volume house builders (Crest Nicholson, Barratts), private developers (Ecos homes), architectural practices (Penoyre & Prasad LLP, Ridge, NPS Northeast) and charities (Institute for Sustainability, Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust, Bioregional).

The UoA also supports Knowledge Transfer Partnerships; a KTP was established (2009-10) with Architype, a London-based practice with a long-standing reputation in sustainability, to conduct post-occupancy evaluations and develop supporting infrastructure, underpinning the company's success in the first 'Cut the Carbon' Building Award sponsored by CITB Construction Skills (2011). As part of the annual Personal Development Review process academic staff identify opportunities for impact generation within their research. Impact related aspects of research design are also reviewed by the Faculty Research Grants Panel. Externally-funded research projects can, subject to workload planning approval, be used to increase the proportion of time spent by individuals on research and knowledge exchange activities. The University also operates a 'Central Research Fund' of around £800k-£1m per year which is used to fund projects which support staff in extending OBU research priorities, including promoting impact.

Impact template (REF3a)**c. Strategy and plans**

A number of initiatives have recently been introduced, or are planned, to further facilitate the achievement of impact. These will operate at various levels: (i) Broad 'structural initiatives' will be addressed within a research strategy review in AY 2013-14, and potential refinements to the structure of OISD research groups implemented thereafter. This process will be directed towards a consolidation of research themes based around 'grand challenges' in the Built Environment disciplines, including: 'Designing and planning for resilience and climate change'; 'People, energy and buildings'; 'Innovations and energy transitions'; 'Spatial planning and mobility', and 'Inclusive communities and livelihoods'. The purpose is to clarify the strategic foci and impact; (ii) A re-constituted Faculty Research Grants Committee has been operating since September 2011 and is committed to introduce an explicit evaluation of impact plans in grant panel reviews of proposals in 2013-14; (iii) The Faculty of Technology, Design and Environment instituted a 'Next 10' programme in Autumn 2012 where additional resource, senior mentoring and an associated PhD studentship are used to increase the personal research capacity of outstanding mid-career research staff. One of the initial five funded bids was from the Built Environment disciplines, facilitating, for example, a direct research-based contribution pivotal to the successful Oxford-Oxfordshire City-Deal Eol in early 2013. The success of the Next 10 scheme will be extended through further annual funding rounds from Autumn 2013 onwards.

d. Relationship to case studies

The four cases selected demonstrate the main types of impact introduced in Section (a) and exemplify key aspects of the approach to impact within the UoA: Direct engagement with users; the place of impact in research design; the exploitation of strong networks; and the range of University support. First, the *Green Guide to Specification* (Shiers), which is cutting across arenas (i) and (ii), enables designers and constructors to select building materials and components which have the lowest environmental impact. Supported by Government and industry as part of BREEAM and the Code for Sustainable Homes programmes, *Green Guide* has been used to reduce environmental impacts for over 230,000 construction projects with a further 1.07 million projects registered awaiting certification worldwide; Second, and again across arenas (i) and (ii), the Thermal Comfort Unit (now part of the Low Carbon Buildings Group) under the leadership of Nicol has been at the forefront in developing, applying and promulgating the 'adaptive approach' to thermal comfort. This work has been influential internationally on ways of thinking about comfort, and its research findings have been embodied in national professional guidance for building services engineers (via CIBSE), as well as influencing international standards bodies (ASHRAE standard 55, CEN standard 15251); Third, predominantly in arenas (i) and (iii) Glasson has pioneered research on the local socio-economic impacts of major power station projects, introducing new planning techniques and associated mitigation measures used by a wide range of stakeholders including developers, local communities, local authorities and other agencies, and recently forming part of the EDF application to the Infrastructure Planning Commission to build Hinkley Point C (2011), plus consultation studies for Sizewell C (2012); Fourth, integrating all three arenas Gupta's counting carbon research has brought together the disparate fields of energy modelling and spatial mapping to create the RIBA award-winning model DECoRuM®, which is able to measure, model, map and manage domestic CO₂ emissions on an urban scale. This incorporates a 'community energy monitoring toolkit', designed to present results on impacts and effectiveness of low-carbon interventions to community groups. In 2009, the LCB group entered into a partnership with the GeoInformation® Group, to exploit DECoRuM research to provide carbon mapping services to local authorities. Internationally, principles of carbon counting research have underpinned the development of UNEP's Global Common Carbon Metric (CCM) tool and protocol which is currently being developed as an ISO standard on carbon metric of buildings (ISO/TC 59/SC17).