

<p>Institution: University of Lincoln</p>
<p>Unit of Assessment: 16 Architecture, Built Environment and Planning</p>
<p>a. Context</p> <p>Impact within the unit & institution: Our impact strategy, aligned to that of the institution, seeks to develop wider communities of engagement and extend the reach of our expertise beyond academia. Research in the Centre for Architectural Research is directed towards influencing the development of high-quality sustainable environments from the macro-urban to the micro-environmental scale. Four research groupings, Sustainable Architecture, Liveable Cities, Cultural Contexts and Habitat, seek to produce demonstrable impacts by engaging with a wide range of stakeholders at regional, national and increasingly international levels to disseminate knowledge and skills and change behaviours and practices.</p> <p>Research beneficiaries: Include individuals and communities, the professions (architecture and design), small and large businesses, local authorities, policy makers and third sector NGOs. The research has had both a direct impact on our research partners but also, as it cascades outwards, has had, and will continue to have broader impacts on its wider audiences. Aspects of the School's research (e.g. with city councils), have considerable indirect impact, resulting in ongoing social, economic and cultural benefits.</p> <p>Types of impact & relationship to the research activity: Examples of impact are to be found across all four research groupings; our research has impacted upon:</p> <ul style="list-style-type: none"> • Local authorities: for example the development of an approach for the reduction of Hull City Council's carbon footprint through a Knowledge Transfer Partnership (KTP) with NPS Ltd (KTP008021). • Commercial sector: for example through a KTP with Simons Group (KTP006662) to minimize the carbon footprint of buildings designed and constructed by the Group. • Third sector: for example by working with Hill Holt Wood Social Enterprise to design and construct the award winning Woodland Sustainable Community Building through a KTP (KTP000717), and the work with Lincolnshire Community Foundation through a KTP (KTP006565) to optimize the usage of over 800 community buildings. • Policy makers: for example by collaborating with the Carbon Trust and Defra during the consultation stage for the development process of "Specification for the assessment of the life cycle greenhouse gas emissions of goods and services PAS2050", which came into effect in 2008 (BSI Oct 2008, ISBN 978 0 580 50978 0). • The professions: for example by publication of <i>The Cultural Role of Architecture</i> (Hendrix), stemming from an international conference. • The community: for example by the exhibition 'Fifty buildings 50 years'. <p>Commitment to impact: We have created a distinct pathway to impact that identifies the key stages of impact generation and development in the life cycle of our research portfolio. In doing so, we have created a rich environment in which staff at differing stages in their careers can see impact as a normative scholarly practice. Impact is central to institutional and College strategies, as well as the Centre plan; a College Impact Focus Group has been instigated and an impact co-ordinator for Architecture identified.</p>
<p>b. Approach to impact</p> <p>Impact plans: Architecture and its related subjects are by their nature practical and vocational disciplines, and the UoA seeks to foster an understanding of research, as indeed it does with design itself, where value, in the short- and long-term, lies in the positive effect it can have in both supporting well being and creating positive change in its intended audiences. The Centre's approach to impact builds on this ethos by fostering a research culture that not only produces measurable and direct impacts on its immediate partners, but also elects to work with partners who will themselves in turn create change and bring benefit to the communities and organizations with which they work. We aim to ensure that this secondary impact of our research is both wide and enduring. The research model at Lincoln is underpinned by a sustainable funding base for research that promotes cross-disciplinary activities among research groups and between research centres. This model also encourages pan-University collaboration and recognizes the need for engagement with the external world (University Strategic Plan). In support of this agenda the College of Arts, of which the School is a component part, has developed a policy and put in place both physical and economic resources to sustain and develop the School's research culture.</p> <p>Staff impact: Since 2008, the School has sought to increase impact by progressively engaging</p>

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staff, both academic and non-academic, and students, in the development of a shared research culture aimed towards expanding academic networks and partnerships and increasing impact.

Activities include:

- The appointment of a College Business Manager in support of income generation and partnership working.
- The appointment of a College Research Manager to provide support in developing research bids and in linking with the University's Research & Enterprise Office to identify opportunities for research impact.
- Staff support through targeted development funds and training opportunities in bid writing etc., provided by the Research & Enterprise Office.
- The placing of PhD students with industrial partners.
- The inclusion of impact plans as part of annual research review.
- Externalising of research through the establishment of the University's on line repository.

Evidence of relationships & interactions: Sustainable Architecture has built up a considerable portfolio of KTPs in the post 2008 period. These have enabled the Centre to engage with a range of stakeholders in both private and public sectors, as well as the third sector. The KTP with Hill Holt Wood Social Enterprise was rated as 'outstanding' in 2007 and won the KTP National Award for Best Application for Management or Social Science in 2009. This ongoing award-winning work has formed the foundation for several new projects now underway. Since the original KTP was completed, the Centre, led by Prof. Sodagar, has created the design of the Woodland Sustainable Community Building. The building was realised precisely because Hill Holt Wood were able to build on the success of the KTP to attract additional funding of £257,000 from Waste Recycling Environmental Limited (WREN) and Lincolnshire Enterprise. Its design was generated through a design competition within the School. Construction started in 2008 and was completed in 2010. This award-winning project has had considerable impact, discussed in detail within the case study. Other KTPs undertaken by the Group include working with Simons Group Ltd, JH Walters LLP, Road Safety Marking Associations, Lincolnshire Community Foundation, Longhurst Group and NPS Humber Ltd. In addition, the Centre has conducted an array of other Technology Strategy Board (TSB) and Sustainable Construction iNET externally funded research projects in association with industrial partners, details of which may be found in the Environment Template.

The results of impact: Carbon4CAST, the innovative carbon management tool arising from research in collaboration with NPS Ltd (Sodagar), employs a three-phase approach to help large organisations establish strategy plans, identify energy saving priorities, and optimise spending. The KTP Partnership was graded 'Outstanding', the highest rating possible, by a panel of independent assessors. Carbon4CAST is being used to accurately predict the current and future emissions for Hull City Council's building portfolio (around 700 buildings). Carbon4CAST was showcased in the Innovation Future Zone at Ecobuild in March 2013 alongside other industry-leading inventions, and received the Innovation Awards sponsored by the Modern Built Environment Knowledge Transfer Network, a network of government organisations that brings together the latest developments in the built environment. It was also exhibited at the INSITE 13 Conference and Exhibition, in October 2013, at Building Research Establishment (BRE), and is now being utilised to improve the environmental performance of large organisations. NPS is currently involved in negotiations with Chinese central and local governments for the utilisation of Carbon4CAST to forecast and manage carbon reduction targets in China.

In 2010 Watt (Living Cities Group) jointly curated the major regional touring exhibition, "Fifty buildings 50 years", that celebrated modern architecture's contribution to the East Midlands. This, and the supporting guidebook, edited by Watt, was supported by Heritage Lottery funding and Ibstock Bricks and developed in conjunction with the RIBA's East Midland Office. The exhibition visited 16 venues including Nottingham Contemporary and the National Centre for Craft and Design. Additional visits to four Country Shows and two shopping centres ensured that it reached a non-specialist audience. Watt has won AHRC funding to support a collaborative doctoral award in partnership with NPS Humber Ltd to develop participatory social learning frameworks for reducing energy consumption in residential properties.

c. Strategy and plans

Future plans: The staff base of the School has undergone significant change in the last 5 years reframing and strengthening our core research themes and expertise base. New appointments have afforded an opportunity to review existing research groupings to establish a clearer focus and

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build on new and established networks of knowledge. This will enable us:

- Expand into areas of potential new research with direct impact: sustainable architecture and urban design practice, heritage and architecture, people-centred design and design for health and wellbeing.
- Increase the number of funding applications by ensuring that all staff are supported to engage in bid writing, peer review and impact generation activities, to grow research income by £100k per year.
- Formalise the mentoring process for new staff to provide optimum support for new and early career researchers.
- Maintain existing levels of KTPs and map out opportunities for new partnerships in our key areas of research focus.
- Develop a wider portfolio of interdisciplinary cross-College research and external collaborations.
- Increase the research student base through new externally-funded studentships, in addition to those supported by the institutional bursary scheme and a new institutional small KTP scheme, PiKT.

Developing strategy: Impact is now a standing item at the Research Centre's committee meetings, where investment and support for research development are united. The Centre will consult with its Research Groupings in annual planning of impact activity and share findings via the lecture programme; technology, sustainability, design and theory. Senior academics have distinct leadership roles within coherent discipline-specific groupings, contribute to the review and refinement of the annual strategy, and can address how the plans are better adopted at grass roots level. This will be achieved by inclusion of impact in the review of the Research Centre and its Groupings, who will be required to devise new plans in the review cycle where dissemination, beneficiary groups and impacts are evidenced. The increased and target capacity that has been built to raise impact in the last five years is now in a strong position to share best practice across the College. Future support is assured through investment at College (College Research Development Fund) and institutional level (Impact Generation Award).

d. Relationship to case studies

The identification and realisation of the impact demonstrated in the two impact case studies are consistent with our impact strategy, particularly in terms of extending our reach beyond academia, and seeking significant applications of our underpinning research.

The first case study: 'Putting research into practice' investigates the total potentials of sustainable buildings by adopting a holistic approach to sustainability. It has been widely used as an exemplar case study for education and replication, hence its impact is wide ranging, influencing changes to professional practice and increased public awareness. The work not only demonstrated the potential of sustainable architecture but also enabled the establishment of Design Hill Holt Wood, a design practice specializing in eco-design, which has gone on to successfully retrofit a number of empty homes, through an Empty Homes Fund, to high environmental standards, suitable for multiple occupancy.

The second case study: Design and development of carbon reduction management frameworks and tools, describes the development of methodologies and assessment tools for carbon foot printing and reduction within buildings. The Carbon Lifecycle Evaluation Assimilation Framework developed for the Simons Group included investigating existing methodologies and systems for estimating the "carbon footprint" of buildings, working with clients, material suppliers and subcontractors to assemble a database related to appropriate processes and products. It developed relevant methodologies and software systems to inform the design of new building proposals with minimum carbon footprint. This has resulted in the Simons Group winning prestigious contracts developing low carbon energy efficient buildings.

The award winning Carbon4Cast carbon assessment saving toolkit helps large organisations with multiple sites to manage their carbon reduction targets. In addition, it improves the financial viability of buildings, resulting in wider use and community engagement. Its impacts have broader consequences, e.g. through improving organisations' abilities to respond and to deliver climate change mitigation programmes resulting in safeguarding the environment.