

Chief Government Advisor for Transport



iBUILD co-investigator, Professor Phil Blythe (Newcastle University) has been appointed the Department of Transport's chief scientific advisor for the next three years, supporting transport secretary Patrick McLoughlin and his ministerial team. He will provide strategic advice on science, engineering and technology issues to ensure the country's transport system is robust enough to meet future challenges.

He said: "The Department for Transport has an exciting and challenging agenda for the delivery of new transport investment. I hope through my new role I will be able to advise on how we can bring the best of UK science, technology and engineering together to deliver these projects and achieve maximum benefit for the transport systems and economy in the UK."

Phil was recognised for his work in the areas of electronic tolling technology and smart payment systems. More recently his research has focused on electric vehicles and the development of supporting infrastructure. Working in collaboration with North East partners such as Nissan, Zero Carbon Futures and the local councils. This element of his research provides an iBUILD case study.

The 38 Deals?

Peter O'Brien Newcastle University

By midnight on Friday 4 September, 38 groupings of local authorities, cities, city regions and local enterprise partnerships in England had heeded George Osborne's call to submit proposals to HM Treasury for new 'Devolution Deals', which local areas hope will result in new powers, resources and flexibilities granted in return for governance reform and commitments by local actors to drive local economic growth, primarily through infrastructure investment and renewal.

So we can add the prospect of 38 'Devolution Deals' alongside 28 City Deals in England and Scotland, 4 further Deals for Greater Manchester, Sheffield, Leeds and Cornwall and 39 Local Growth Deals, which local enterprise partnerships are responsible for delivering; together making a grand total of 110 deals of some form or another. This gives added weight to the argument that we are now in a deal-making world in local and regional development. The sheer volume of deals, in a climate of austerity and significantly reduced institutional and individual resources and capacity, also begs questions about the efficiency and effectiveness of deal-making as a model of implementing decentralisation from the centre to local government.

The 2015 iBUILD Manifesto and Mid-term Review called for infrastructure planning, investment and delivery to be better aligned to city and city region strategies and economies. With City Deals and the potential new Devolution Deals containing strong infrastructure elements, it seems, at least on the face of it, that we are moving in the right direction. However, we should continue to ask whether earlier and more recent developments – through the 110 deals – signal a fundamental shift towards embedding a stronger and longer-term role for local authorities and cities to take greater control over their economies by planning, investing and managing local infrastructure assets and systems? Or are the different variants of Deals simply project and programme-led initiatives, which will last purely for the timescale that particular interventions remain functional?



There are three issues worth considering in the aftermath of the latest dash for devolution. First, with gaps still remaining around the levels of local fiscal autonomy that some cities and city regions want and what HM Treasury is prepared to give, local institutions are increasingly searching for new and innovative sources of investment for infrastructure and other capital-intensive activity. These efforts, however, continue to run up against the UK's highly-centralised political economy, system of governance and Central Government's deficit reduction strategy.

Second, the Chancellor of the Exchequer, George Osborne, and Secretary of State for Communities and Local Government, Greg Clark, both insist that 'substantial' devolution from the latest Deals will only be considered if city regions and others agree to introduce 'metro-wide' mayors. This means that localities are faced with the often difficult process of navigating through local sensitivities and concerns that fundamental reforms to local governance are being introduced without public consent or without a cast-iron guarantee of what Central Government will actually give in return for city regions agreeing to elected mayors.

Finally, with 38 new bids on the table, the capacity of Central Government and local institutions to negotiate and agree a large number of new deals will be severely stretched. Expect to see a handful of new Deals agreed in different stages, with the usual suspects ahead of the curve alongside one or two surprises, but equally there will be a large number of disappointed places in the short to medium-term. How Whitehall manages the prospect of initial large-scale 'gaps on the map' will be a real test of the Government's devolution strategy.

New iBUILD Team Members

Dr Eleni Iacovidou is a Research Fellow



at the School of Civil Engineering at the University of Leeds working on managing infrastructure systems to optimise re-use of components and materials (iBUILD) and on the optimisation of value for resource recovery from waste (NERC/ESRC – C-VORR). She is also the Core Research Fellow at Leeds on iBUILD.

She has extensive work and academic experience in environmental management processes and sustainability assessment (economic, environmental and social) with application on waste and resource management using a range of tools including MFA, MCA and CBA. She has previously worked at the Centre for Environmental Policy at Imperial College London facilitating the research collaboration with Veolia Environmental Services (VES) on waste and resources management. Prior to this role she worked at the Centre for Environmental Strategy at the University of Surrey on a European project on creating innovative sustainability pathways (CRISP) towards a sustainable future using back-casting and transition management approaches.

Foresight Future of Cities

The Government Office for Science has published a piece prepared by Phil Purnell and Katy Roelich on materials in the city as part of the Foresight: Future of Cities work. <https://www.gov.uk/government/publications/future-of-cities-what-will-cities-of-the-future-be-made-of>

Decentralised City Infrastructure: A Creative Opportunity

Ian Bartle, Chris Bouch, Chris Baker and Chris Rogers

Today, the dominant paradigm for most modern networked infrastructures is one of large-scale, centralised systems. This is the result of an evolutionary process: small-scale water, electricity and rail infrastructures growing, consolidating and standardising, with early choices locked-in and characterising the system to maturity. There is an argument, however, that this model is not best suited to the provision of infrastructure in today's cities; instead, a more decentralised approach is required that can respond quickly to the highly differentiated needs of modern businesses and consumers.

iBUILD carried out a study based on Digbeth, an area just south of the proposed site for Birmingham's HS2 Curzon Street Station. The City Council's 'Birmingham Curzon HS2: Master Plan for Growth', envisages Digbeth as a 'creative zone': growing the creative, media, digital and social enterprises that are already present. The Plan sketches out major pieces of infrastructure, such as a new Metro line; and, in conjunction with the Local Enterprise Partnership Investment Plan, suggests some 'top-down' approaches to infrastructure funding and delivery. This iBUILD study approaches the question of infrastructure provision from a different perspective: it identifies the factors that need to be in place to support development of decentralised infrastructure services; and investigates the extent to which those factors are present in Digbeth.

The study looks at three conceptual frameworks and areas of literature providing ideas: 'user-led innovation' - users of products and services increasingly able to innovate for themselves; 'participatory design' - a clear shift away from the centralised view of 'design for users', towards a more decentralised 'design with users' and, to an extent, 'design by users'; and, 'inverse in-

frastructures' – infrastructures displaying 'user-driven', 'self-organisation', 'decentralisation' and 'bottom-up' behaviours that are the opposite of the currently-dominant, centralised systems.

The research finds a number of factors to be key to successful provision of decentralised infrastructure:

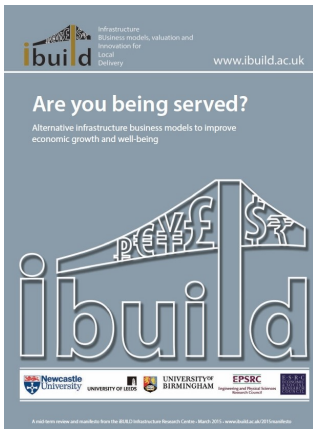
- the emergence of technologies that enable specific local requirements to be met by decentralised means;
- networks of individuals and professionals cemented in place by trust and strong communications;
- a policy framework conducive to new, smaller-scale infrastructure developments;
- incentives, such as better functionality of infrastructure and financial benefits to consumers; and,
- emerging decentralised infrastructures that are hybrid in nature, dependent on a variety of centralised and decentralised elements for success.

Additionally, research finds that creative zones, such as Digbeth, and the creative industries within them, have a number of factors governing their own success that align positively with the factors for decentralised provision of infrastructure. These include: the entrepreneurialism often associated with creative industries; trust and communication, built up as

part of existing, successful networks; and, well-targeted intervention by local authorities. Digbeth already exhibits a number of features that contribute positively to the development of decentralised infrastructure, including: a vibrant community with its own distinct identity; the presence of the Custard Factory and Fazeley Studios with their existing co-operative networks; and, the presence of policies and regulations that encourage decentralised infrastructure provision.



iBUILD Manifesto



In March we launched our mid-programme Manifesto of key findings to date. The manifesto draws upon the team's research to deliver a series of recommendations to unlock innovative business models for practitioners, local and national government. These include:

- 1: Have a broader, integrated appreciation of infrastructure;
- 2: Enable action at the local scale that connects with the national
- 3: Capture long-term value of every kind
- 4: Deliver more efficient planning, procurement and delivery
- 5: Accelerate the uptake of innovations through practical action and demonstration

The Manifesto and supporting evidence can be found at: <http://research.ncl.ac.uk/ibuild/2015manifesto/>. Alternatively if you would like a printed copy contact: Lynn.Patterson@newcastle.ac.uk

INCOSE, Seattle

Chris Bouch, iBUILD Research Fellow at the University of Birmingham, presented an iBUILD-themed paper at the recent International Symposium of the International Council for Systems Engineering (INCOSE) in Seattle, USA. The paper focuses on iBUILD's 'Business of Interdependence' work stream, and in particular an objective and repeatable methodology for identifying interdependencies around the treatment of municipal solid waste (MSW). Issues around MSW infrastructure of large sunk costs and long life-cycles mean development of new infrastructure will not start from a clean sheet of paper; a clear understanding of the existing system and its interdependencies will be required. The paper describes a process of reverse engineering to create a model of the existing system that acts as a basis for exploring new design opportunities; and as a framework for testing new solutions prior to committing to implementation. It also explores the feasibility of linking the system model created to the management accounts of MSW management organisations. The paper, co-written with MSW managers from Birmingham City Council, finds the reverse engineering methodology to be a promising approach for model development; and demonstrates the feasibility of linking the model to management accounts. It points out, however, that to extract the maximum benefit from this, MSW managers will need to improve alignment of management accounts with MSW processes.

LWEC Report Card for Infrastructure

iBUILD Director, Richard Dawson chaired a working group that produced the recently published, Living With Environmental Change Partnership's Climate Change Report Card for infrastructure. The card includes assessment of transport, water, energy, flood and coastal erosion management, waste and ICT. Available to download: <http://www.nerc.ac.uk/research/partnerships/lwec/products/report-cards/infrastructure/>

The following papers based on reviews completed for the Report Card have recently been published in a 'Climate Change' themed issue of Infrastructure Asset Management. They are currently freely available to download:

[Climate impacts on flood and coastal erosion infrastructure;](#)

[Climate change risks in electricity networks](#)

[Climate change impacts on UK port and navigation infrastructure](#)

[Weather and climate risks to road transport](#)

[The impact of climate-related environmental change on the UK solid waste sector](#)

New iBUILD Team Members



Mike Goodfellow-Smaith is an experienced international sustainable de-

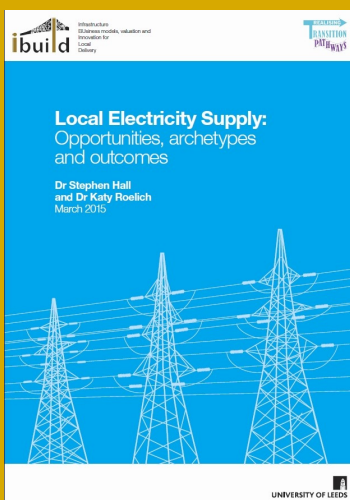
velopment practitioner, having worked extensively in the corporate sector. Mike has also been a Director of Forum for the Future, Director of Groundwork, Assistant Director of Yorkshire Forward Regional Development Agency, and has had similar roles with major engineering (Director of Products & Innovation, URS Corporation), rail sector (Sustainability Strategy Manager, Network Rail) and commercial businesses. Mike is joining the iBUILD team to concentrate on value capture modelling to enable sustainable finance and insurance product development for key infrastructure requirements. Study areas will include city sustainability comparisons that might demonstrate the capabilities and structures required to accelerate deployment of innovation in infrastructure investment across the world.

Nikolaos Kalyviotis is a Teaching Associate and a Doctor of Philosophy candi-



date in Civil Engineering of University of Birmingham. He is a Diplom (BSc & MSc) Civil Engineer of Aristotle University of Thessaloniki, Greece with Master Studies in Civil Engineering Structures at City University London. Additionally, he is holder of three Masters Degrees in Strategic Project Management: MSc from Heriot-Watt University Edinburgh, MSPM from Politecnico di Milano Italy, MBA from Umea University Sweden. Within iBUILD, Nikos will focus on infrastructure management and he will be working on the devise of a new business model for infrastructure interdependencies management in particular.

Local Electricity Supply: opportunities, archetypes and outcomes



This major study, by Stephen Hall and Katy Roelich (University of Leeds), shows how local electricity supply business models could be real alternative to the 'Big Six' and offer benefits to the wider energy system and consumers alike, but they face significant barriers and their potential is going untapped. In this report we identify a series of opportunities through which local electricity supply could transform the energy system and the policy and regulatory change necessary to enable this.

Urban Transformations Network



iBUILD is part of an ESRC network that showcases research projects that engage with the challenges and opportunities of an increasingly urban world - See more at: <http://www.urbantransformations.ox.ac.uk/>

Upcoming Events

iBUILD Stakeholder Event: 4 November 2015, Birmingham

Our next stakeholder event will take place on Wednesday 4 November at the International convention Centre, Birmingham. If you would like to attend please register at: <http://forms.ncl.ac.uk/view.php?id=8660>

ITRC Event: 15 October 2015, London

The Infrastructure Transitions Research Consortium (ITRC) will present their final outcomes and outputs from their research programme. Further details: <http://www.itrc.org.uk/the-future-of-national-infrastructure-outcomes-from-the-itrc/>

Recent Publications

Ford A; Barr S; James P; Dawson RJ 2015. A rapid GIS-based assessment tool for rapid estimation of transport accessibility applied to Greater London. ISPRS International Journal of Geo-Information, 4(1), 124-149. <http://dx.doi.org/10.3390/ijgi4010124>

Foxon TJ; Bale CSE; Busch J; Bush R; Hall S; Roelich K 2015. Low carbon infrastructure investment: extending business models for sustainability. Infrastructure Complexity, 2:4. <http://dx.doi.org/10.1186/s40551-015-0009-4>

Hall S; Roelich K. 2015. Local Electricity Supply: Opportunities, archetypes and outcomes. <http://research.ncl.ac.uk/ibuild/outputs/>

iBUILD 2015. Are you being served? Alternative infrastructure business models to improve economic growth and well-being, iBUILD manifesto and mid-term report. Newcastle University. ISBN 978-09928437-1-7. <http://research.ncl.ac.uk/ibuild/2015manifesto/>

ICIF, iBUILD. 2015. A Critique of Current Infrastructure Performance Indicators: Towards Best Practice. <http://research.ncl.ac.uk/ibuild/outputs/>

Kafourous, M.; Wang, C.; Piperopoulos, P.; Zhang, M. 2015. Academic collaborations and firm innovation performance in China: The role of region-specific institutions. Research Policy, 44(3), 803-817. <http://dx.doi.org/10.1016/j.respol.2014.11.002>

Khoury M, Bullock S, Fu G, and Dawson RJ 2015. Improving measures of topological robustness in networks of networks and suggestion of a novel way to counter both failure propagation and isolation. J. Infrastructure Complexity, 2(1), 1-20. <http://dx.doi.org/10.1186/s40551-015-0004-9>

O'Brien P, Pike A 2015. The governance of local infrastructure funding and financing. Infrastructure Complexity, 2:3. <http://dx.doi.org/10.1186/s40551-015-0007-6>

Roelich K; Knoeri C; Steinberger JK; Varga L; Blythe PT; Butler D; Gupta R; Harrison GP; Martin C; Purnell P 2015. Towards resource-efficient and service-oriented integrated infrastructure operation. Technological Forecasting and Social Change, 92, 40-52. <http://dx.doi.org/10.1016/j.techfore.2014.11.008>

Sayers PB; Walsh CL; Dawson RJ 2015. The impacts of climate change on flood and coastal erosion infrastructure. Proc. J. Infrastructure Asset Management 2 (2), 69-83. <http://dx.doi.org/10.1680/iasma.14.00040>

Wang S; Wang S; Smith P. 2015. Quantifying impacts of onshore wind farms on ecosystem services at local and global scales. Renewable and Sustainable Energy Reviews, 52, 1424-1428. <http://dx.doi.org/10.1016/j.rser.2015.08.019>

About iBUILD

iBUILD is developing new business models to improve the delivery of infrastructure systems and the services they provide. These new business models will better exploit the technical and market opportunities that emerge from the increased interdependence of modern infrastructure systems. iBUILD focuses on infrastructure at the scale of neighbourhoods, towns and cities where infrastructure is most dense and interdependencies between infrastructures, economies and society are most profound. As cities, local authorities and local enterprise partnerships are given more powers for infrastructure delivery and to raise finances it is crucial to develop robust new business models that develop infrastructure related business and growth locally - to the benefit of the nation.

For further information about the iBUILD programme visit our website: www.ibuild.ac.uk