

Retrofit 2050: Critical Challenges for Urban Transition

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Retrofit 2050

- Funded under EPSRC Sustainable Urban Environments
- October 2010 – September 2014
- 6 universities + non-academic partners



Vision

To deliver a 'step change' in current knowledge and capacity for a transition to urban sustainability, by **working with key stakeholders** to illuminate challenging but realistic **social & technological options** and pathways for **systemic retrofitting** of two core UK city regions (Greater Manchester and Cardiff/SE Wales) by 2050

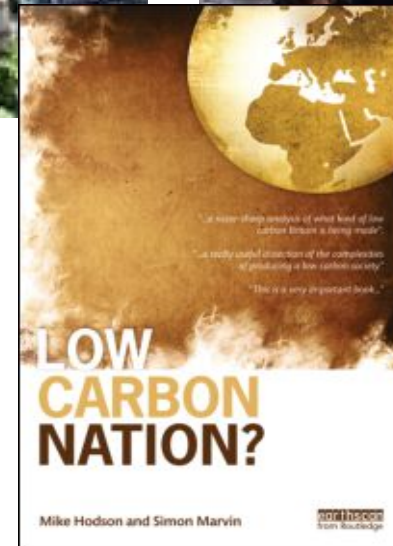
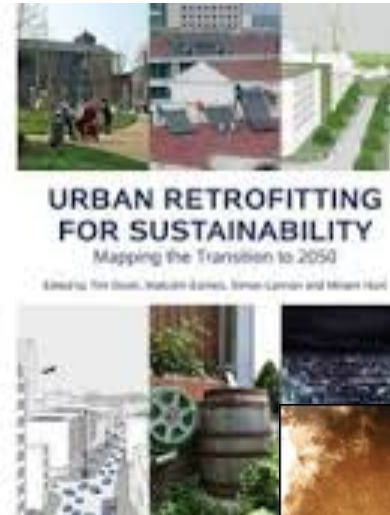


Project Objectives

- 1. Analyse through case studies, modelling and international comparison, the technical and social processes underpinning such transitions**
- 2. Identify and characterise prospective disruptive technologies and systems innovations which will underpin a transition to sustainability in the built environment**
- 3. Articulate and appraise regionally specific visions and prospective pathways for urban scale retrofitting of the built environment.**



Key Outputs



What does Retrofit mean?

- *To provide a component or feature that a system did not have it when first constructed.*
- Urban Retrofit “...**the directed alteration of fabric, form or systems in order to improve energy, water and waste efficiencies.**”
- **Focus = Existing stock + 1-2% replacement stock**



[http://
www.newlondonlandscape.org/
project/208/green-lung-retrofit](http://www.newlondonlandscape.org/project/208/green-lung-retrofit)

‘how’ do we collectively organise urban retrofit activities at scale to deliver significant environmental, social and economic benefits?



Our research reveals both:

- i) multiple and competing long-term visions of what a sustainable 'retrofit' city should look like;**
- ii) ii) radically differing framings of the urban retrofit agenda amongst many of the current actors involved.**



Eight critical factors for successful transition

- 1. An inclusive urban retrofit agenda**
- 2. Compelling retrofit city visions**
- 3. Improved modelling and decision support tools**
- 4. Institutional capacity, planning and governance**
- 5. Access to 'green' finance**
- 6. Effective partnerships**
- 7. Long term sharing of risks and benefits**
- 8. A whole systems perspective**



1. An inclusive urban retrofit agenda

National

Dominant *economic* policy framing (UK)
e.g. Green Deal

City/regional
scale

***Retrofit on
'Economic
rationale'***

*Greater
Manchester -
as leader in
retrofit
markets*

***Retrofit with
'Social
rationale'***

*Cardiff/SE
Wales - to
deliver
Sustainable
development*

***Retrofit in
'contextual
rationale'***

*Bottom up
initiatives - in
multiple local
communities*

Building

Routines of everyday life

1. An inclusive urban retrofit agenda

Need to reflexively reconcile competing framings though:

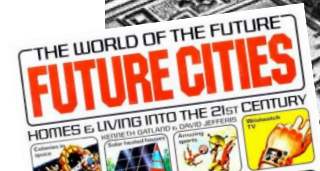
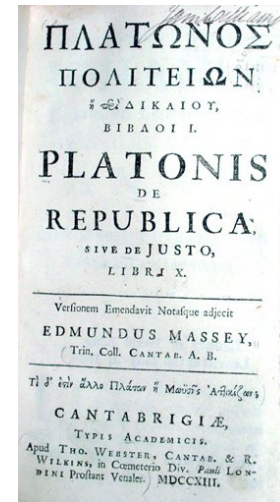
- consultation
- experimentation
- consensus building

to find ***solutions which work in specific local contexts***



2. Compelling retrofit city visions

- Sense of purpose
- Vitality and belief systems
- What sort of future do we want?
- Promote discussion and debate
- Mobilise resources around desired futures



Scenarios for urban sustainability: Retrofit 2050 Backcasting methodology

Phase 1

Development of Retrofit 2050 Visions

- UK National Urban Foresight Panel Workshops
- Foresight Expert Reviews
- Urban Retrofit Roadmaps

Retrofit City Futures: Visions
for Urban Sustainability

Phase 2

Analysis of unfolding regional context

- Regional case studies of urban retrofit governance (WP1)
- Desk-based reviews linking Retrofit 2050 visions with local context and drivers
- Scoping interviews -stakeholder expectations

Phase 3

Regional grounding and visualisation

- City Regional Futures: stakeholder workshops
 - Cardiff/SE Wales, 17 May 2013
 - Greater Manchester, 17 June 2013

Cardiff City- Region Futures

Retrofit 2050 City Futures

Smart-Networked City: A hub within a highly mobile and competitive globally networked society

Pervasive, information-rich virtual environments integrated with the physical world, driving efficiencies through automation with market oriented solutions.



Compact City: A site of intensive and efficient urban living

Urban land-use and infrastructure provision are optimised into dense urban settlement forms to reduce demand and improve use of energy and resources.



Self Reliant-Green City: A self-reliant bio-region, living in harmony with nature

A self-reliant system of circular metabolism, where resources are local, demand is constrained and the inputs and outputs of the city are connected (cradle to cradle).



Cardiff City-Regional Futures

Connected Cardiff

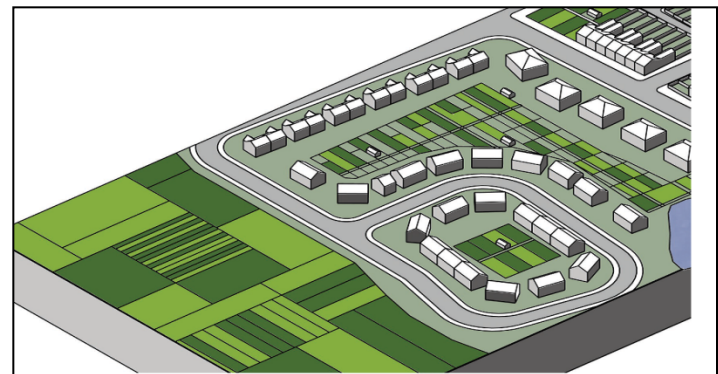
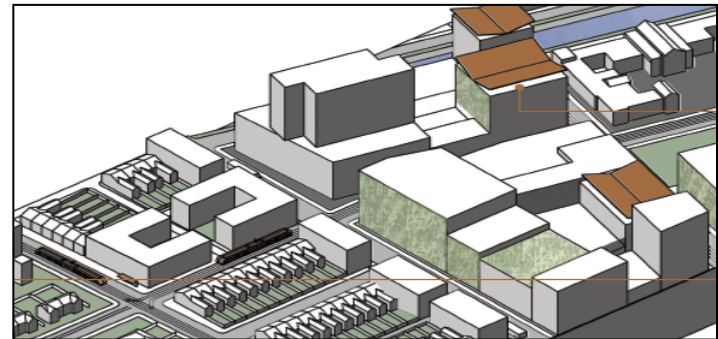
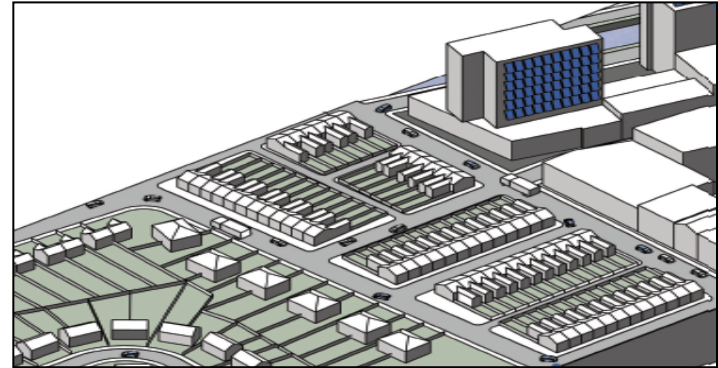
A city-region with a vibrant economy focused on green technological solutions. Investment in the 2010s and 2020s created stronger collaboration between the knowledge sector and commerce to create business clusters that are internationally competitive. Efficiency is a key policy goal, with all utilities overseen by a single body to consider resource management issues in the face of scarcity. Economic growth has underpinned investment in high quality housing, environments and social care services.

Compact Cardiff – Wilderness Valleys

A high density city-region made up of medium rise buildings based around boulevards and parks, with previously underused spaces now more densely populated. Distinctive ‘villages’ within the city ensure a culturally rich region, connected by electrified rail and shared electric cars, while the rural hinterland is returned to wilderness and used for food and biomass crops. Extensive investment in the 20s, 30s and 40s included rebuilding of urban centres to mixed use development and energy, water and waste networks fit for a compact city.

Orchard Cardiff City-Region

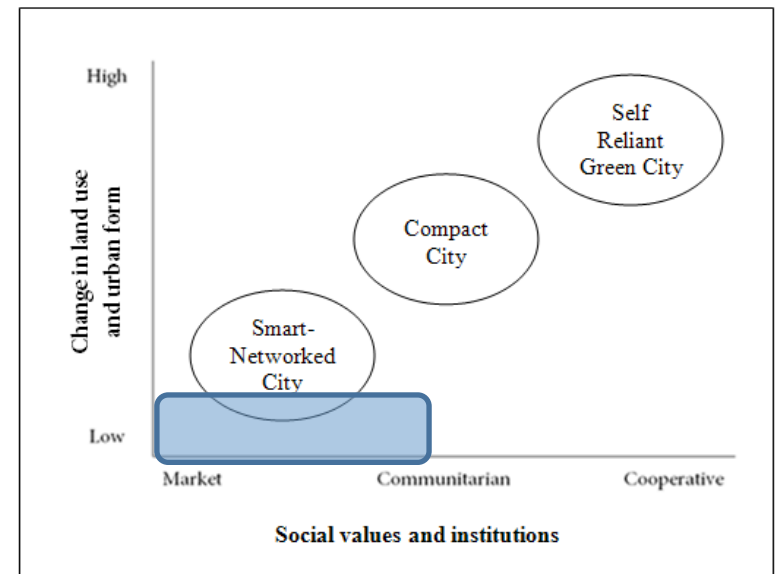
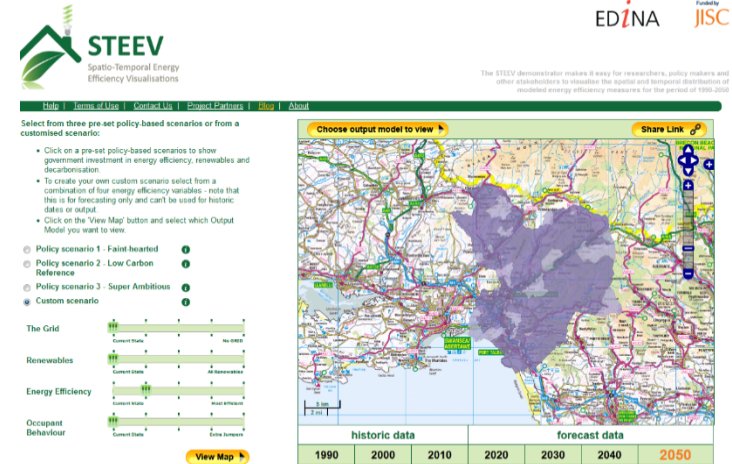
Sustainability is at the heart of every policy decision made in the city-region, with far greater dialogue between decision makers and communities. Planning decisions are much more connected to the needs of communities; academic research is focussed on useful, practical knowledge. Half of all food eaten is produced within the city-region, with arable land in public spaces offering high employment, and hydroponics towers visible across the city. Priority is given to local energy production produced by community schemes, delivered through efficient networks.



3. Improved modelling and decision-support tools

Need to recognise limitations of current top-down and bottom-up approaches to urban scale modelling:

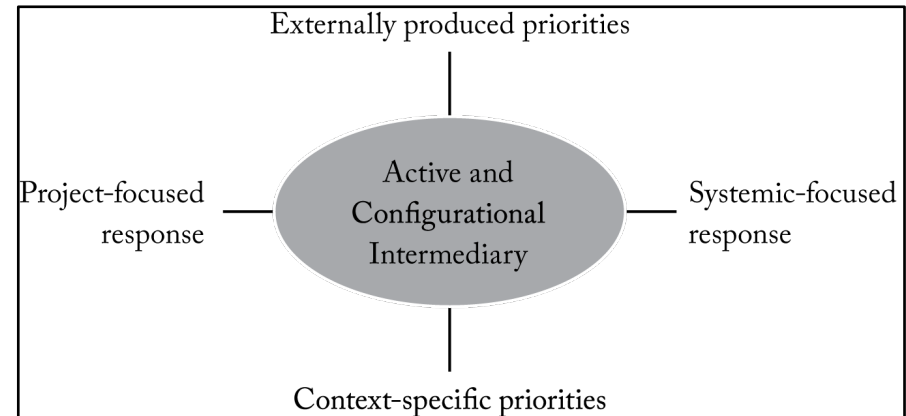
- Enhance user engagement and user relevance
- Emerging challenges of data rich cities
- Move beyond 'BAU' framings
- Use of more 'dynamic' approaches which acknowledge complexity



4. Institutional capacity, planning and governance

Failure to develop city scale governance systems with adaptive capacity for long term planning:

- Lack of integration
- Leadership
- Silo mentality
- Short-termism
- Capital vs. whole life costs
- Neglect of KT & best practice
- Etc



- ✓ Stronger role for regulation to drive uptake of retrofit
- ✓ Role for aggregating/intermediary body integrating multiple stakeholder interests at city level.

5. Access to 'green' finance

- Greater role for UK Green Investment Bank (GIB)
- City-wide financing
 - Competition-based policies?
 - City Deals (England)
 - Re-configuration of business rates (energy retrofit tax?)
 - Learning from US PACE Model?
 - Carbon Bonds/Social Impact Bonds?

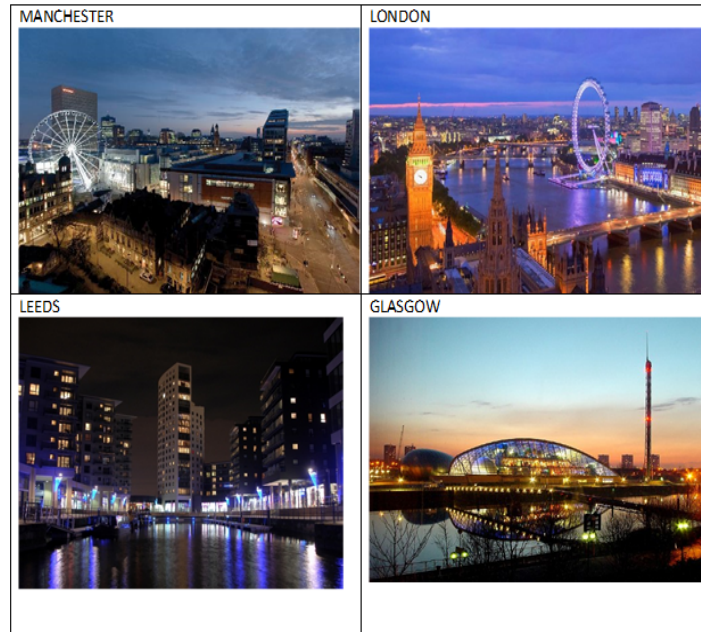


6. Effective partnerships

- Public private partnerships
- Linking back to scaling up responses
- Community buy-in
- Business buy-in
- ‘Sticky infrastructure’ to attract commercial players

- Energy Plan
- District Heating
- Economic Benefits
- Low carbon investment
- Mini-Stern
- City Deal & Green Deal

- District heating
- ‘Mini-Stern’
- Commercial Property Retrofit Scoping Study
- City Deal & Green Deal



- REFIT
- London Green Fund
- Energy Plan
- Decentralised Energy
- District Heating
- TSB Catapult (Future Cities)

- Sustainable Glasgow
- Smart grids
- District heating
- TSB Future City Demonstrator

7. Long term sharing of risks and benefits

- The current 'economic' policy framings of retrofit (e.g. the Green Deal's 'golden rule') concerned with creating private value from commercially 'cost effective' measures
- Inevitably focus on the 'low hanging fruit'
- But retrofit for deep decarbonisation will require long-term sharing of risks and collective benefits
- Need for innovative business models which 'recycle' savings for socially necessary investments.



8. A whole systems perspective

- System level innovations hold potential for deep cuts in carbon emissions
- Need to learn from international experience
- Financial and institutional barriers critical for UK
- ‘Sticky’ infrastructure (urban heat networks, etc.) key to binding large commercial property interests into city retrofit agendas

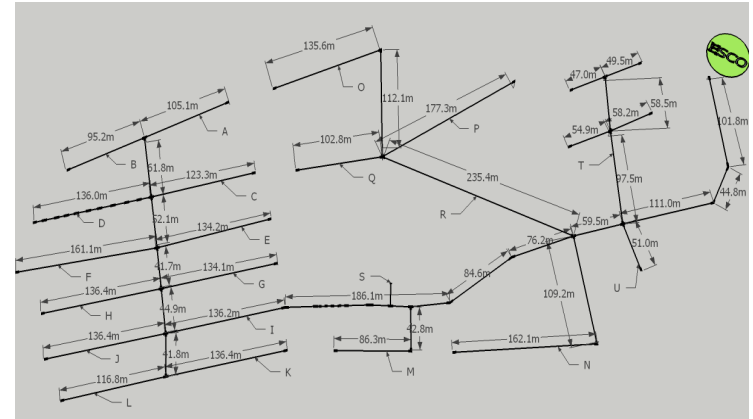


Figure: A Schematic view of a heat distribution network

In Summary: An Integrated Approach



www.retrofit2050.org.uk

