

Making old industrial cities sustainable

*examples and challenges
from NewcastleGateshead*

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Overview

- Sustainability and “sustainable urbanism”
- Achieving sustainability in old industrial cities
- Newcastle: already the most sustainable of the UK’s twenty largest cities
- Sustaining the momentum: 1Plan, the role of Newcastle University and the Urban Laboratory
- “Public stimulus” or “public partnership”?
- Challenging questions

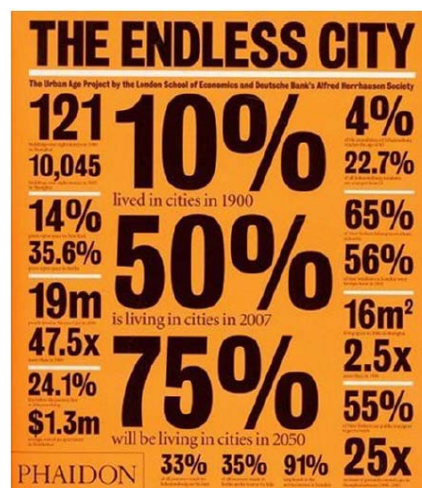
Sustainability – the Newcastle Definition:

“Enough, for all, forever”

- “enough”
 - implies economic sufficiency (but *not* excess ...)
- “for all”
 - Must be understood to evoke both social justice *and* the needs of non-human beings
- “forever”
 - Demands recognition of the finite nature of natural resources; implies pursuit of *inter-generational justice*

Sustainability in the city ...

- More and more of the world’s population is living in cities, and this process is not about to reverse
- Most of the future growth of urban population will be in *existing* cities
- We will definitely need models of urbanisation that are more sustainable
 - not just in what happens within the cities themselves, but taking full account of their wider *ecological footprints* (which are often abroad)

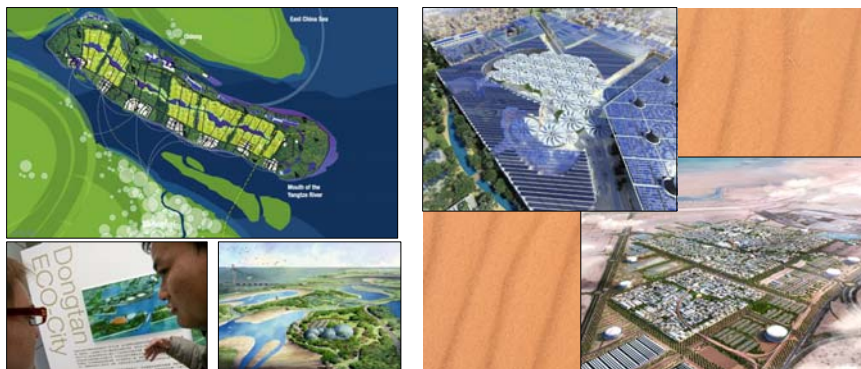


Sustainable urbanism

- Contrasting definitions:
 - **“Walkable and transit-served urbanism integrated with high performance buildings and high-performance infrastructure”** (Farr 2007)
 - This definition focuses on *form* rather than process
 - **“Application of public health and societal ethics in places”** (Adhya, Plowright & Stevens, 2010)
 - Focuses on *process*, implicitly encompassing issues of form, policy, economy and technology, albeit it is not very specific about environmental issues

Sustainable cities ... ?

- “Greenfield” (or “clean sand”) is relatively easy ...



東灘 **Dongtan**: Chongming Island, Yangtze Delta, China - first of several “Eco-cities” planned for formerly completely rural islands

مصدر **Masdar City**: Abu Dhabi, United Arab Emirates - “the world's first zero carbon, zero waste, car-free city”; 6 km² new-build in the desert

Achieving sustainability in old industrial cities

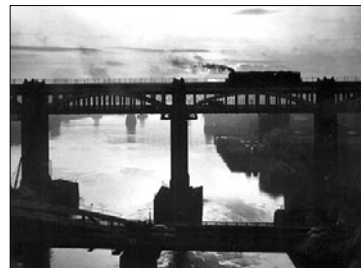
- Given that most future growth in urban populations will be in *existing* cities, new-build eco-cities are essentially large-scale vanity projects (“eco-bling”)
- The real challenge is retrofitting sustainability in old industrial cities, which have large inheritances of low-performance infrastructure (for transport, energy, water, waste etc)



The original “old industrial city”



“Iron & Coal”, William Bell Scott (1811-1890)



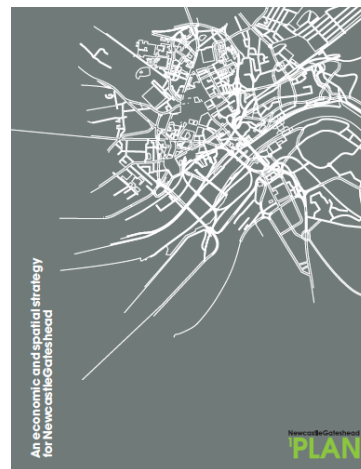
120 years on: Newcastle is already the most sustainable of the UK's 20 largest cities

- 'Forum for the Future' league tables
- Newcastle 1st place:
 - Nov 2009
 - Nov 2010



Sustaining the momentum: The 1Plan

- 1Plan sets forth a 20-year vision for NewcastleGateshead to become a great northern European city, transforming the urban core through programme of **sustainable urbanism**
- This demands substantial expansion of the science and engineering based knowledge economy in NewcastleGateshead, drawing substantially on the skills development and talent attraction activities of Newcastle University



NewcastleGateshead 1Plan
 Economic & Spatial Strategy

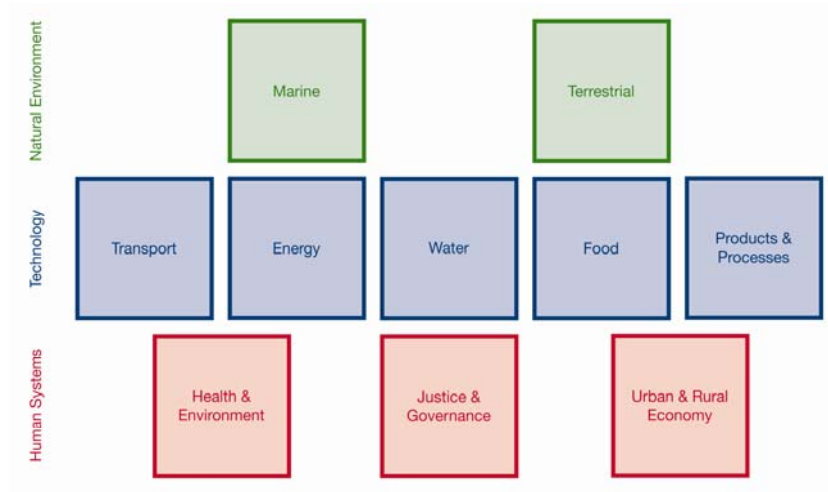
Sustaining the momentum: The role of Newcastle University

- Newcastle University is crucial to delivery of the 1Plan
 - The University has designated NIREs to coordinate its contribution
- The University is partnering with the City Council in Newcastle Science City
 - Academic and civic counterparts are working closely on issues amenable to their expertise

Newcastle Institute for Research on Sustainability (NIREs)

- Launched in October 2010 to draw together the expertise of hundreds of researchers from all three Faculties in pursuit of the University's commitment to *Sustainability* as one of its three institution-wide "societal challenge themes"
- More of a "movement" than an organisational unit:
 - No formal "membership", other than by enthusiasm
 - Only a modest central support team, rather than a large stand-alone group of researchers
- Focus on ten specific themes in which we have genuine internationally-leading capabilities

NIReS - Themes



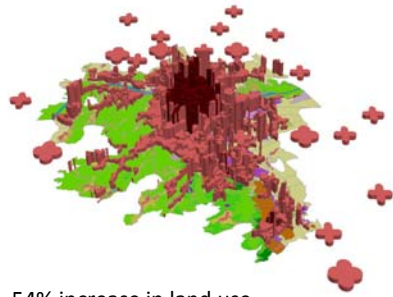
Examples of Newcastle University's urban sustainability research in action

Acknowledgements

Dr Stephanie Glendinning
Prof Simin Davoudi
Dr Richard Dawson
Prof Jim Hall
Dr Carlos Calderón
Prof Tom Wagner
Prof Phil Blythe
Prof Keith Scott

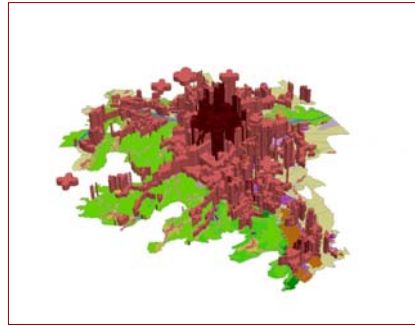
EU FP7 project SUME: Sustainable Urban Metabolism for Europe

“Business as usual” scenario



54% increase in land use
67% reduction in energy for space heating

Resource-efficient scenario



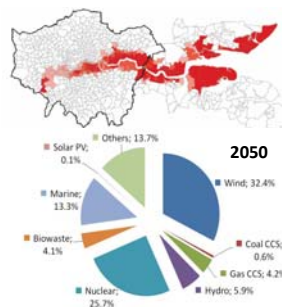
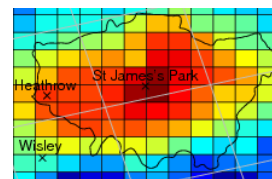
14% increase in land use
81% reduction in energy for space heating

Example: Vienna 2050



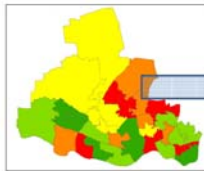
How can cities grow whilst reducing emissions and vulnerability?

- Innovative approaches to adaptation and mitigation need evidence-based *integrated assessment* of cities
- Cities are centres of innovation, where many issues are best addressed but Local Govt can rarely address all these issues
- Today's decisions will alter our vulnerability and emissions for years to come
 - We must be wary of 'lock-in' from taking easy options today
 - Substantial infrastructure changes need very long lead times
- No “magic bullet”; must resolve some important tensions:
 - Socio-economic *vs.* climate risks
 - Demand reduction *vs.* supply increase
 - Mitigation, adaptation, resource use, living density etc.
- Spatial planning plays a central role in mediating vulnerability and emissions



Newcastle CarbonRouteMap

Urban Energy and CO₂ Emissions Analysis



Area-based approaches:
Spatially disaggregated
energy demand scenarios



Spatially-referenced area-based tools
for economic and carbon appraisal of
retrofit options ought to be available
to local authorities (LAs) to make the
economic case on a methodologically
rigorous basis

Geospatial databases at building level
coupled with:

- Urban energy optimisation tool kit: SynCity
- House Energy Model: to help target retrofit interventions over time

Electric vehicles

- Nissan, Smith and other companies in the NE are in the forefront of manufacture
- NewcastleGateshead Councils are pursuing out-of-town road freight concentration, with city centre delivery only by electric vans
- Newcastle University is centrally involved in:
 - monitoring trials of electric vehicles in NewcastleGateshead
 - Development of new, light, tank-free lithium battery engine systems, taking oxygen direct from the air by filtration (instead of storage in onboard tanks)



Offshore Wind

- Dogger Bank lies 100km due east of Tynemouth
- Major investments in assembly, manufacture and development of offshore support facilities on the Tyne
- Newcastle University in the forefront of innovation in design of marine structures, turbine gears and seabed HVDC transmission technologies
- Partnership working with NaREC and other NE Universities through ERNEE



UK's first offshore wind turbines, Blyth, Northumberland

From urban squalor to urban laboratory ...

1970s.....

2010.....

2050



Newcastle 'greenest' British city

Newcastle upon Tyne has been named as Britain's greenest city in a think tank's annual study.

Forum for the Future looked at the sustainability of the 20 biggest cities, measuring factors such as air quality, wildlife and quality of life.

As well as greenest city, Newcastle was the overall most sustainable, beating 2008 winner Bristol into second.

Newcastle was praised for emerging from its industrial past to go green.

Urban Laboratory:

- Evidence-based planning
- Public Engagement
- Partnerships
- Conscious exemplars
- International networks and informed design and practice



NewcastleGateshead as an Urban Laboratory

- *“Act local, think global”*: Newcastle University researchers are working closely with civic partners to develop innovative approaches to achieve sustainability in old industrial cities – developed here, but applicable in most old industrial cities
- The 20-acre ‘Science Central’ redevelopment site is the “beachhead” for this process – on it we will develop state-of-the-art research facilities, shared with industry, alongside sustainable affordable homes
- The wider urban laboratory will radiate sustainable urbanism throughout the conurbation, re-developing NewcastleGateshead as a global exemplar
- *It’s not just about technology*: just as important are mechanisms for increasing participation in decision-making
- *It’s not just about the city either*: we must address the interactions with the rural North and the wider world from which we draw resources

Science Central – co-locating with industry on a sustainable site

Efficient Use of Energy



Ecologically friendly



Science Central – sustainable features



Education for Sustainable Development: nurturing civil society through transformative learning

- addressing low educational aspiration through partnership working
- promoting awareness of international and inter-cultural dimensions of life
- promoting inter-generational understanding and maintenance of shared values

*Experiencing the
rainforest in
Newcastle – the
University's
Botanical
Gardens at
Moorbank*



“Public stimulus” or “public partnership”?

- There is no doubt that public investment can help “de-risk” innovative developments and make them more attractive for private investors: e.g. Sage Gateshead, Eastgate, etc etc
- Nevertheless, little of what has been achieved so far in the NE is solely down to direct public stimulus funding – leverage of private investment has been a large multiple of this
- Far more important has been public partnership, resulting in alignment of the spending of different partners which would in any case have been incurred
- Perpetuation and expansion of partnership working is the key to realising the 1Plan

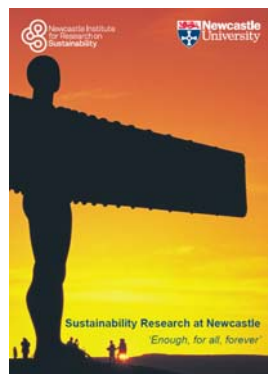
“Public stimulus” or “public partnership”?

- More generically, the more sustainable options tend to be cheaper when whole life-cycle costs are taken into account, but can appear more expensive where one party pays for capex and another for opex – especially where private investors seek unreasonably short payback periods
- Traditionally, this problem has been solved by trying to get the public purse to pay for the perceived “sustainability mark-up” in capex, allowing others to reap disproportionate benefits in reduced opex,
- Maximising sustainability requires a more “grown-up” approach to project funding

Challenging questions

- Enough?: Is it realistic to aspire to prioritising development on the basis of *sufficiency* rather than the habitual pursuit of *excess*?
- For all?: Given the particular severity of the cuts in the North East, will this eliminate the scope for public spend to lever-in high rates of private investment to the levels previously achieved in NewcastleGateshead?
- Forever?: Can we move to whole life-cycle basis when deciding on appropriate ratios of capex / opex spending in infrastructure development?

Thank you



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“Enough, for all, forever”