

Looking for the Green in the Green Paper: working towards an urban industrial strategy

GOODCHILD, Barry <<http://orcid.org/0000-0001-8572-3598>> and EADSON, William <<http://orcid.org/0000-0002-2158-7205>>

Available from Sheffield Hallam University Research Archive (SHURA) at:

<https://shura.shu.ac.uk/28204/>

This document is the Published Version [VoR]

Citation:

GOODCHILD, Barry and EADSON, William (2017). Looking for the Green in the Green Paper: working towards an urban industrial strategy. *People, Place and Policy Online*, 11 (2), 112-124. [Article]

Copyright and re-use policy

See <http://shura.shu.ac.uk/information.html>

Looking for the Green in the Green Paper: working towards an urban industrial strategy

Barry Goodchild and Will Eadson*
Sheffield Hallam University

Abstract

The UK government's 'Industrial Strategy' is a product of a Conservative party in power, coming to terms with a particular set of economic and political circumstances. In contrast, international bodies have commended long-term concepts of 'green growth' rather than conventional industrial development, whilst individual local authorities in the UK and elsewhere have been working towards economic regeneration policies that are both environmentally aware and also related directly to local communities. Taken together, the UK industrial strategy, the reports of international agencies and the efforts of individual local authorities raise the question as to the possible shape of a national strategy that reflects ideas of green growth and applies these ideas to processes of urban regeneration, urban development and planning. This paper gives a brief outline of such a strategy, suggesting that green growth must deal with towns and cities, both as causes of pollution, carbon emissions and resource consumption and as places where people should be able to enjoy a good quality of life.

Keywords: Industrial Strategy, Green Growth, Cities, Smart Cities, low carbon.

Introduction

After six years of an explicitly *laissez-faire* approach to the UK economy under the premiership of David Cameron from 2010-16, the UK Industrial Strategy Green Paper marks a return - in theory - to a more interventionist approach to balanced economic development in the UK. Unveiling the Green Paper, Prime Minister Theresa May made reference to this change, claiming that:

It will be underpinned by a new approach to government, not just stepping back but stepping up to a new, active role that backs business and ensures more people in all corners of the country share in the benefits of its success. (May, cited in BEIS, 2017)

Despite this rhetoric the Green Paper met with a lukewarm response in Parliament and elsewhere, with the overall approach and specific proposals seen as a continuation or evolution of existing programmes rather than significantly 'stepping up' government's role in industrial policy (House of Commons BEIS Select Committee, 2017). The Green Paper was then overtaken by a hastily called General Election, whose outcome will surely influence how government responds to the various criticisms and consultations made in connection to the Industrial Strategy. Indeed the

electorate's apparent rejection of the government's austerity plans and public enthusiasm for more interventionist investment in the economy and infrastructure suggest that industrial strategy might have greater prominence in the coming parliament.

This short article will not attempt to rehearse any of the conventional political or party political arguments in any detail. Instead, it seeks to analyse the Industrial Strategy from a particular viewpoint: that any future economic growth needs to be 'green' growth, and that this will need an explicitly urban focus. Clearly much work would be needed to provide such a focus. The national Industrial Strategy would have to be followed by a series of specialised studies which would include an urban strategy and a green strategy. Here we sketch out some modest alternatives that link the urban and the green and that are in principle achievable without fundamentally breaking existing political-ideological constraints.

Accordingly, the following sections explore the extent to which an industrial strategy might help to build the conditions for urban green growth in the UK. The account begins by exploring the concept of green growth. It then looks at the extent to which green growth is addressed in the draft strategy, before considering what an industrial strategy for urban green growth might look like. In doing so, we consider critical agendas relating to the urban built environment and planning, including the developmental possibilities of strategies to support 'smart' green urbanism, and finally the organisational conditions for a shift towards green growth.

Green Growth as a policy agenda

An industrial strategy is primarily about economic growth. There are arguments about whether growth is a worthwhile goal in itself and as part of this whether it has promoted human well-being and satisfaction with life (Scitovsky, 1976). There are also contrasting arguments about whether degrowth is achievable through voluntary means or is only likely to arise if imposed on individuals through the force of events in an unplanned economic crisis (Kallis, 2013; Sorman and Giampietro, 2013). If the latter, degrowth is hardly an attractive option. Here the aim is to judge the government's Industrial Strategy as a means of combining both growth and a commitment to ecological criteria. In particular, we consider whether the strategy keeps open the promise of green growth: *"a means to create jobs and economic growth while reducing costs and environmental impacts over the long run"* (Hammer et al., 2011: 8).

Green growth is not new. It is rooted in an earlier theoretical and political doctrine of ecological modernisation as well as in contemporary approaches to ecological transition management (Goodchild, 2017: 222-226). In their most dominant form, both ecological modernisation and transition management seek to uncouple economic growth from environmental degradation (in particular, carbon emissions) with an emphasis on technological advancement to achieve this uncoupling. Both ecological modernisation and transition management work on the premise of relatively strong steering from the state (Gibbs, 2000; Grin et al, 2010), and a green industrial strategy would be an important element of this.

Green growth is also rooted in ecological modernisation in another way. Acceptance of growth and of modernisation means harnessing technology for ecological purposes and improving the ecological qualities of big cities. It means accepting, in the words of the Organisation for Economic Cooperation and Development (OECD, 2013), the 'outsize' role of cities in the population structure, economic growth and also

environmental degradation of many countries. It does not mean a rejection of technology or a rejection of big cities in favour of small-scale settlements.

The notion of green growth has been promoted through the UN and EU as well as the OECD. Strategies to kickstart economic growth through 'green' stimuli were implemented to varying degrees in a number of countries following the economic crisis of 2008. For instance, green growth funding accounted for 51 per cent of the total stimulus package in Belgium, 40 per cent in China, 32 per cent in South Korea and 18 per cent in France (OECD, 2011). These packages were not homogeneous but each incorporated technology-focused R&D and infrastructure development, as well as skills and labour market restructuring. More fundamentally there is an understanding within international policy circles that any future economic growth is predicated on such growth not threatening the relatively benign environmental conditions that have allowed human societies to develop. The highly influential Stern report on the economics of climate change set this out in clear terms relating to the threat to world GDP, for instance (Stern, 2006). For some, a green growth paradigm also opens up the opportunities for more decentralised and democratic forms of economic organisation, which includes the organisation of material infrastructures such as energy networks. An urban green growth agenda would be well suited to a decentralised vision of the future in which towns and cities acquired additional powers and responsibilities as corporate agencies and took decisions in consultation with local institutional actors and communities.

Transformational green growth requires progressive economic restructuring. Existing patterns of economic organisation and activity will be disrupted: jobs will be lost in 'obsolete' and energy-intensive sectors, which will impact on particular groups of people in particular places. There will be a requirement to reskill the workforce, and an age of smart, automated urbanism will potentially reduce the need for human employees overall. Likewise, not all 'green' jobs are 'clean' jobs, nor are they necessarily well paid. For every job in R&D there are other manual jobs in recycling plants or rolling out domestic loft insulation (see Gregson et al., 2014). Those places that are able to capture the economic benefits of green growth will prosper but, just as previous rounds of economic restructuring have shown, others will potentially be disadvantaged: for instance, those with high concentrations of environmentally problematic industries, a poorly configured built environment and low levels of skilled employees / lack of access to green jobs. The possibility of loss and the likely existence of losers in turn implies the existence of counter measures to help people and places in need. Otherwise, the campaigns of the disadvantaged could block moves towards a green economy. Nevertheless, low carbon and environmental sectors are high growth sectors which have out-performed most other economic sectors in recent years (Bowen, Duffy and Frankhauser, 2016) and so for places that do successfully cultivate a comparative advantage in these areas there are clear short-term as well as long-term economic benefits.

Towards an industrial strategy for urban green growth

For all the emphasis on green growth in the reports of the OECD and other organisations, it is mostly significant by its absence in the government's Industrial Strategy and in mainstream party political debates. The urban dimension is also mostly absent, along with policy commitments that generally characterise an interest in cities - for example, a recognition of places rather than sectors, a commitment to decentralise decision-making, involving local authorities as key actors or a commitment to

evaluation and monitoring on green criteria such as land use consumption, air and water quality and energy consumption.

The Green Paper does make various indirect references to urban policy through the themes of building, housing and planning under the heading of 'upgrading infrastructure'. Investment in infrastructure is itself to be welcomed. However, the heading narrows the contribution of the strategy to big investment projects rather than the mass of small-scale investments that collectively determine the process of (green) urban development and regeneration and therefore the quality of life and productive capacity of our towns, cities and regions. The missing element in the Industrial Strategy is a recognition of the building stock, including housing, as a necessary aspect of green urban development, and of building and planning as significant economic activities in their own right. This includes failure to consider in detail ways in which the productivity and resource efficiency in construction and its allied economic activities might be enhanced. Equally missing is any recognition of the breadth of the policy agenda necessary to increase productivity and output in house building and housing repair works.

Taking building, housing and planning as the main focus, it is possible to lay down some of the initial principles of a green industrial strategy as it applies to cities and urban development, as set out in the following four sections.

Affordable energy and green growth

As is recognised in the Green Paper (p.90), limiting long-term energy costs, the promotion of energy efficiency and carbon reduction have to proceed together. Under the Climate Change Act, the government has committed to reduce carbon emissions by at least 80 per cent of 1990 levels by 2050. The National Carbon Reduction Plan (DECC, 2011) established to chart the realisation of that target states in relation to the building sector (mostly comprising consumption in the home): 'By 2050 the emissions footprint of our buildings will need to be almost zero' (ibid., p.30). The emissions target for building is very much more demanding than for transport, for example, though the modest character of the transport target itself deserves more consideration. Heating and hot water for buildings make up 40 per cent of energy use and 20 per cent of greenhouse gas emissions in the UK (CCC, 2016: 17). Buildings are therefore a crucial element of energy systems and deserve explicit treatment in programmes to improve national energy efficiency and competitiveness.

Limiting energy costs in buildings, whilst reducing carbon emissions, can only be achieved through a combination of technological innovation, investment in infrastructure, notably in heat networks, and improvements to the efficiency of the building stock. In this context, price signals are almost certainly necessary to incentivise private owners and consumers to invest. Price signals to encourage investment also avoid additional conversion costs in the future (IEA, 2013: 14-15). Price signals alone and private investment are not enough, however. New building needs to be regulated in a way that leads to a renewed effort to ensure compliance with zero carbon standards. In addition, public investment is necessary for places or forms of development where the private sector will not invest and to protect those living in fuel poverty.

Innovation in technology and design requires a consideration of the consumers' perspective and, in some cases, a simplification of heat controls, as Goodchild et al. (2014) have shown. Improving the efficiency of the existing stock also draws attention to retraining and reskilling in the building industry. There have been examples where

the detailed measurement of energy consumption after completion has revealed disappointing results compared to the designed and modelled energy standards (House of Commons, 2013). The disparity is commonly a result of poor workmanship, amongst other factors.

Any programme of technological innovation, investment in infrastructure and improvements to the building stock need to be co-ordinated at a local level. Local authorities, including in this context the city regional authorities and Local Enterprise Partnerships in England, are well placed to assess the viability of specific projects, to coordinate retrofit and to promote voluntary building codes. Many UK local authorities have initiated a variety of energy initiatives (Webb et al., 2016), a high profile example being Nottingham's *Robin Hood Energy* company which aims to provide low cost energy through investment in production, distribution and supply of low carbon energy. In the international literature, however, most cited examples come from other countries (Hammer et al., 2011: 54-57). UK local authorities have very limited funds and staffing resources and have a very large range of alternative pressures of which the promotion of energy efficiency is only one. Investment in the older, privately owned housing stock is a particular deficiency and needs to be encouraged, notably through a replacement for the now defunct 'Green Deal'.

On the other hand, local authorities in England have recently acquired a strengthened public health role and this new responsibility has led them to champion a wave of energy efficient retrofits to help savings in the NHS (see for example, CRESR, 2016). Government programmes such as the Fuel Poverty Health Booster Fund have provided a small amount of help for local authorities to implement these measures. The Green Paper does not mention fuel poverty, however; an obvious omission from the energy chapter. Even apart from the issues linked to fuel poverty, it would seem logical to encourage more wide-ranging energy-related action through increasing the responsibilities of local authorities and their funding, as argued for example by the Committee for Climate Change (CCC, 2016: 99). As well as improving the economic position of households in poverty, large-scale urban retrofit has economic benefits for places by (a) creating jobs and (b) reducing economic 'leakage' through energy bills, meaning that more money can potentially stay within local economies (Gouldson et al., 2011).

Green technology deployment and growth

The provision of low carbon, energy efficient heating technologies is not a field where British industry has led in the past. Most likely a domestic industry only evolves in response to long-term strategies, such as have been pursued in the Nordic countries, combining the use of 'green' standards and labelling, selective public procurement, investment and co-ordination at the local and national level (Norden, 2016). The Green Paper (p.90) mentions that the UK has 'strengths in areas in which Britain has a lead, such as nuclear decommissioning and offshore oil and gas'. Many countries have moved away from these areas in the recent past, either because of the financial risks involved for nuclear energy, or because of the need to move from oil to renewable sources. The strengths claimed for the UK look outdated. The plan also mentions that jobs have been created through offshore wind developments in the city of Hull. But there is no mention of an investment plan (or any sort of plan) to ensure that these or other sectors can be further stimulated. Similarly, the commitment to "review the case for a new research institution to act as a focal point for work on battery technology, energy storage and grid technology" (p.93) hardly tallies with the identification of these

technologies elsewhere in the Strategy as priorities for the future Industrial Strategy Challenge Fund.

There is an irony, here, however. Battery storage has been and is developing very rapidly by commercial interests, mostly stimulated by the potential for electric cars. The US firm 'Tesla' is the most striking example, a firm whose stock market value is now worth more than the Ford motor company (TechCrunch.com, 2017). The UK government has arrived at an area of technological innovation very late in the day, possibly too late.

Nevertheless, there are many emerging technologies in renewable energy, with potential for further development. Examples include smart grids, smart meters and the software, payment systems and institutional arrangements needed to tie these together. As was recognised in the government's 'Community Energy Strategy' (DECC, 2014), there are many examples of such initiatives. Even apart from the economic potential, it is in the UK's interests to encourage further innovation in this field, given its commitment to carbon reduction. Markets and technological innovation will also most certainly continue to operate at national and international levels, as for example in the development of solar pV panels and battery storage. However, the technologies can be applied locally in new forms of partnership and new employment opportunities.

The role of civil society is also important, as also recognised in the Community Energy Strategy. There is evidence that civil society actors can be particularly effective as trusted intermediaries in energy programmes aimed at individuals (Ambrose et al., 2015) and small businesses; and the opening up of energy markets to new business models potentially leads to more competitive markets but also has potential to improve local economies (Eadson and Foden, 2014). However, interventions focused on civil society need to be carefully calibrated – it is important that civil society is not simply taken as a vehicle for state-centred or market-centred goals: civil society organisations deliver different economic benefits and in ways that might require a broader understanding of economic activity/growth.

The physical planning framework for energy needs to be developed alongside civil society groups. Britain has a good international reputation for the quality of its consultancy in the field of sustainable urban planning and urban design. Many of the largest international planning consultancies have their headquarters in the UK (Rapoport and Hult, 2017). The involvement of UK consultants in urban planning and urban design provides, in turn, an opportunity for the use of other UK firms in other aspects of urban development, including construction, and can also be combined with the principles of open government and consultation.

The Green Paper emphasises infrastructure investment. A possible way forward might be to use infrastructure projects in the UK as a learning exercise and demonstration of the potential of UK technology and consultancy skills, including open access information technology, to reach the highest standards of liveability, sustainability and cost effectiveness in neighbourhoods, rather than just building schemes. The Olympic Village in London provides an example of what might be done. The promotion of model low carbon villages and neighbourhoods would also offer a spur to developers and designers to raise their standards and to householders to raise their expectations. It is important, however, to have many small exemplars, showing how combinations of existing and new technologies can be adapted to existing neighbourhoods of varied size, tenure and income.

Smart urbanism and smart construction

An urban agenda for green growth most likely requires embracing some principles of 'smart urbanism': *"the interweaving of information, surveillance, control and data acquisition technologies with different technologies of urban governance, infrastructure, services and experience"* (Luque-Ayala and Marvin, 2015: 75). Most large UK cities have begun to explore this agenda, but smart urbanism is absent from the Industrial Strategy. Amongst other priorities, the government should seek to promote innovation and the use of digital methods in spatial or land use planning. Improving the efficiency of the planning system receives no explicit mention in the Green Paper. The system involves substantial costs, however. To give a specific example: for housing development alone, the administrative and business costs of town planning in England have been estimated by Ball (2010) as about £3bn per year, with a further £3bn for the additional financing costs. The complexities of the planning system also impinge directly as a constraint on the promotion of productivity in the building industry. Given an emphasis on land acquisition and the enhancement of land value, house builders have had few incentives to improve productivity in either design or construction (Ball, 1999; Barker, 2004: 28). Equally, however, governments are unlikely to deregulate the planning system further, partly because it offers a means of environmental protection, partly because it helps stabilises local property markets, and partly because it is essential in the co-ordination of infrastructure investment, as is recognised in the Green Paper (Goodchild, 2017: 85-87).

In this context, a combination of information technology and open access data offers one of the few ways of promoting efficiency and, in addition, promoting democratic accountability. The task is not static, however. The demands of sustainability are making urban planning ever more complex, with a greater number of constraints operating on development in a single place. Sustainable cities are likely to be dense cities, denser than at present (OECD, 2012). Dense cities are inherently more complex to plan owing to their greater intensity of land use.

Local authorities and consultants already use an extensive range of software. Local authorities, most notably the largest authorities such as Greater London, Greater Manchester City Region, Birmingham and Sheffield have continued to innovate in the development of digital databases and other tools (Webb, 2016). The Government has also established FutureCitiesCatapult to promote the use of information technology in planning (<http://futurecities.catapult.org.uk/>). From these initiatives, it is possible to imagine new styles of planning that enable the incorporation of a greater wealth of information in a systematic manner and going from the detailed characteristics of specific sites to broader strategies covering future housing needs and the protection of green belts.

The different digital elements have not been put together, however. Likewise, the plan making process has not been integrated from a digital viewpoint from the stage of data collection to its synthesis in the form of plans and consultation exercises. Anyone applying for planning permission or considering the future of a community will quickly find that they have to collate a vast range of paper or rigid PDF documents from different sources and rely on consultations with planning staff who have many other commitments. Further, a gap exists between the limited digital exercises in planning and Building Information Modelling (BIM).

The number of stakeholders involved in urban development and in planning is very large. Some of these, for example property companies, are in competition with one another and do not share information for fear that this would disadvantage their business activities or lead to accusations of anti-competitive practices. Other

stakeholders, such as some consultancies, rely on semi-private data sources to maintain their business. To give a particular example, a small number of energy companies dominate the consultancy market for heat networks and require sources of data on heat demand that local authorities can find difficult to obtain (Ambrose et al., 2015).

The disparate character of stakeholders means that the potential of information technology in planning is unlikely to be realised by market processes or by piecemeal technological innovations as has happened for mobile 'apps'. At some point, a collective decision needs to be made about the overall shape of the digital platform and this will require both government guidance and government support to create the relevant systems. Relevant technologies are nevertheless understood in principle (Woolliscroft and Polovina, 2017) and applied in related fields of urban management (de Sède-Marceau et al., 2011) as well as business (Polovina et al., 2014).

The following provide examples of where government might facilitate the use of information technology in planning:

- A continued commitment to open up existing data sources held by a very wide range of public agencies.
- The use of consistent, national standards for spatial datasets that incorporate the range of available data, including data on private property boundaries.
- The establishment of a national framework for machine-readable planning documentation.
- Financial support to provide continued technical innovation in the development of integrated open-access information systems.

The priority is therefore a combination of applied research and institutional development in the application of digital technologies to the planning process in a way that can combine increased efficiency with no loss of democratic accountability.

At a sector level, stimulus is also required to ensure that the construction industry can move towards 'smart' methods that enable more economically and resource efficient construction. An earlier document 'Construction 2025' adopted a vision of 'A UK industry that leads the world in research and innovation, transformed by digital design, advanced materials and new technologies, fully embracing the transition to a digital economy and the rise of smart construction' (HM Government, 2013: 18).

UK industry may well have led the application of digital methods to construction. There is arguably less need for fundamental research in this area, compared to planning. However, a major issue is the general lack of adoption of technology by organisations, which explains, to some extent, why productivity in construction lags behind other industrial sectors. The technology is around and available, but not all companies embrace it owing to a lack of awareness, specialist knowledge, cost, training, commitment and so on. The large national companies representing about 5% of firms are able to tackle the largest construction projects, including the infrastructure works that feature in 'Building our Industrial Strategy'. These companies also lead the way in using IT, and many have internal IT departments to develop and service their own systems in supporting all parts of their organisations. The remaining firms, accounting for approximately 95 per cent, is made up of SMEs and many of these engage in repair and maintenance work as opposed to new build. For this group, the use of IT is extremely varied. Moreover, it is not clear whether the IT available is always suited to smaller firms or that innovation in large infrastructure will trickle down to the smaller builders.

The latest government initiative is the introduction of Building Information Modelling (<https://www.gov.uk/government/publications/building-information-modelling>). This is not just software, it is a process aimed at providing a collaborative environment for integrated project delivery. It allows all parties to a project - designers, consultants, contractors and others within the supply chain - to work together in a common data environment. Last year the government made it mandatory for organisations to adopt and use BIM in order work on government projects. Outside of government works, however, the use of BIM is somewhat patchy and has not grown in the past year (<http://www.bimplus.co.uk/people/bim-needs-reboot-aft5er-stagnation-lost-year/>).

There need to be support centres for professionals and organisations, where they can come, without sales pressure, to look at IT developments and software, and assess their potential. The overriding implication of the recent use of technology is for measures to support innovation in small firms and to increase IT proficiency in the workforce, for example through the content of the new Apprenticeships and other devices. Likewise, the introduction of new 'smart' energy saving technology will require increased IT skills on the part of the building industry. Innovation strategies in construction need to be paralleled by strategies for human resources and training, including retraining. Construction and repair is likely to become ever more complex and IT skills must be central to educational and training programmes. Job creation is a necessary aspect of any industrial strategy at both the national and local levels, and the promotion of well-paid, skilled jobs in the building industry is a necessary aspect of job creation strategies.

Ensuring that the right organisational infrastructure is in place to address challenges

Cities are multi-level phenomena both in terms of the systems that provide material services and also their governmental arrangements. The nation state has a critical role in creating the conditions for action. Equally, however, a diversity of flexible and sometimes ad hoc institutional arrangements, including private/public partnerships and operating at a variety of spatial levels, is, most likely, necessary and functional for a complex modern society such as the UK, as a means to promote both economic growth (Haughton et al., 2013) and a transition towards a more sustainable economy (Geels, 2005; Loorbach, 2010).

The shift towards flexible institutional arrangements, in turn, implies a shift towards flexible occupational arrangements amongst government staff, commonly cutting across established professional boundaries (Jeannot and Goodchild, 2011). The Green Paper might, in this context, make a reference to the changing character of work within government and the public services, both local and central and the way that the changing demands of the future might be better addressed. The Green Paper is, currently, silent on the issue. Building, housing and planning is itself a hybrid, multi-professional activity as was explained in the Egan review (ODPM, 2004) dealing with urban regeneration.

Flexibility of institutions means in turn a diversity of agencies and companies to meet the challenge of building the future city. The recently published Housing White Paper has sought to promote house building (DCLG, 2017). The use of non-traditional technologies will be part of any programme to raise completion rates. However, non-traditional building is commonly poorly suited to small awkward urban sites, the use of which has been a repeated theme in policy for many years, including the White Paper (ibid., p.21). In addition the White Paper emphasises the need to diversify the housing market, opening it to small firms (ibid., p.14), a substantial number of which

disappeared after the credit crisis of 2008 and have not reappeared since owing to the use of stringent lending criteria imposed by banks (Archer and Cole, 2014). The task in relation to housing is not just to build more homes, but more varied and higher quality homes that are nevertheless affordable and consume less energy. The task will have, moreover, to confront the varied abilities and interests of social housing and private developers and the varied economic circumstances of different regions. Social housing will almost certainly have to increase its output to meet targets. Rebuilding the physical and social infrastructure of UK cities is exceptionally ambitious and will require drive and support from government if it is to be achieved. For all these reasons, urban issues deserve a prominent place in the government's Industrial Strategy and of necessity raises issues linked to construction, housing and planning

Conclusions

Green growth is a difficult term because it is a blend of different ideas, brings together apparently antagonistic alternatives and is open to many interpretations. Any set of proposals, including those set out here in the briefest outline, are always vulnerable to attack for being either too radical or too impractical or not radical enough. The application of the concept, like many other policy concepts, depends on judgements about what is possible in any context.

The strength of 'green growth' at least as a broad concept is partly to insist that growth is not of itself desirable; growth has to serve environmental and human aims. In addition, the concept is useful in looking forward to a progressive change, a progressive greening of the economy. The UK's proposed Industrial Strategy, based in part on expertise in nuclear power and oil, is many years out of date. We need a fair industrial strategy, one that promotes social justice. But above all we need a forward-looking strategy that involves reflexive learning and evaluation, using explicit indicators of green growth; that uses technology to improve the quality of life in cities and to reduce carbon emissions. A concern with the 'urban' is a necessary aspect of any industrial strategy as it brings policy into contact with daily routines and with the places in which people live and work. It is a fundamental aspect of a green industrial strategy that seeks to minimise environmental impacts in the short and long term. The Industrial Strategy, in its initial published form, is repeatedly concerned with promoting export potential and this concern is likely to persist whatever government is in power. Any industrial strategy that succeeds in improving energy sustainability and the quality of life in town and cities will surely have ample export potential.

Acknowledgements

This paper is an amended version of a submission to the UK government's *Building Our Industrial Strategy* consultation exercise. The initial response on which this paper is based, was drawn up after discussion with Professor Peter Wells, Professor Paul Stephenson, Dr. Aimee Ambrose, Janet Gilbertson, Dr. Simon Polovina, Dr. Rebecca Sharpe and Dr. Elizabeth Uruchurtu, all of Sheffield Hallam University. The authors take full responsibility for the contents.

* Correspondence address: Dr Will Eadson, CRESR, Sheffield Hallam University, Unit 10, Science Park, Howard Street, Sheffield, S1 1WB. Email: w.eadson@shu.ac.uk

References

- Ambrose, A., Eadson, W., and Pinder, J (2015) *Evaluation of the Big Energy Savings Network*. London: DECC.
- Ambrose, A., Eadson, W., and Pinder, J (2015) *Low Carbon Pioneer Cities Heat Networks Project: a process evaluation*. London: DECC.
- Archer, T., and Cole, I. (2014) Still not plannable? Housing supply and the changing structure of the housebuilding industry in the UK in 'austere'times. *People, Place and Policy*, 8, 2, 93-108.
- Ball, M. (1999) Chasing a snail: Innovation and housebuilding firms' strategies. *Housing Studies*, 14, 1, 9-22.
- Ball, M. (2010) *Housing Supply and Planning Controls*. Titchfield: National Housing and Planning Advice Unit.
- Barker, K. (2004) *Delivering stability: securing our future housing needs: Review of Housing Supply - Final Report - Recommendations*. London: HM Treasury.
- BEIS (2017) *PM unveils plans for a modern Industrial Strategy fit for Global Britain*. London: BEIS.
- Bowen, A., Duffy, C. and Frankhauser, S. (2016) 'Green Growth' and the new Industrial Revolution. Grantham Research Institute on Climate Change and Environment.
- Committee on Climate Change (CCC) (2016) *Next steps for UK heat policy*. London: The CCC.
- Centre for Regional Economic and Social Research (CRESR) (2016) *Warm Homes Oldham final evaluation report*. Sheffield: Sheffield Hallam University.
- Department for Communities and Local Government (DCLG) (2017) *Fixing our broken housing market*. London: Crown Copyright, CM 9352.
- de Sède-Marceau, M.H., Moine, A. and Thiam, S. (2011) Le développement d'observatoires territoriaux, entre complexité et pragmatisme. *L'Espace géographique*, 40:2, 117-126.
- Department of Energy and Climate Change (DECC) (Corporate author) (2011) *The Carbon Plan: Delivering our low carbon future: Presented to Parliament pursuant to Sections 12 and 14 of the Climate Change Act 2008: Amended 2nd December 2011 from the version laid before Parliament on 1st December 2011*. London: Crown Copyright.
- Department of Energy and Climate Change (DECC) (Corporate author) (2014) *Community Energy Strategy: Full Report*. London: Crown Copyright.
- Eadson, W and Foden, M (2014) Critical perspectives on community energy policy. *People, Place and Policy*, 8, 3, 145-148.
- Geels, F.W. (2005) Processes and patterns in transitions and system innovations: Refining the co-evolutionary multi-level perspective. *Technological Forecasting and Social Change*, 72, 6, 681-96.
- Gibbs, D (2000) Ecological modernisation, regional economic development and regional development agencies. *Geoforum*, 31, 1, 9-19. Available at: [https://doi.org/10.1016/S0016-7185\(99\)00040-8](https://doi.org/10.1016/S0016-7185(99)00040-8)
- Goodchild, B. (2017) *Markets, Politics and the Environment: an introduction to planning theory*. New York and London: Routledge.
- Goodchild, B., O'Flaherty, F., and Ambrose, A. (2014) Inside the eco-home: Using video to understand the implications of innovative housing. *Housing, Theory and Society*, 31, 3, 334-352.
- Gouldson, A., Kerr, N., Kuylentierna, J., Topi, C., Dawkins, E. and Pearce, R. (2012) *The economics of low carbon cities: a Mini Stern Report for Leeds City Region*. Leeds: Centre for Low Carbon Futures.
- Gregson, N., Crang, M., Botticello, J., Calestani, M. and Krzywoszyńska, A. (2014) Doing the 'dirty work' of the green economy: Resource recovery and migrant labour in

- the EU. *European Urban and Regional Studies*, 23, 4. 541-555. Available at: <https://doi.org/10.1177/0969776414554489>
- Grin, J., Rotmans, J. and Schot, J. in collaboration with F Geels and D Loorbach (2010) *Transitions to Sustainable Development. New Directions in the Study of Long Term Transformative Change*. London: Routledge.
- Hammer, S., Kamal-Chaoui, L., Robert, A. and Plouin, M et al. (2011) *Cities and Green Growth: A Conceptual Framework*, OECD Regional Development Working Papers 2011/08, OECD Publishing. [online] Available at: <http://dx.doi.org/10.1787/5kg0tflmzx34-en>
- Haughton, G., Allmendinger, P. and Oosterlynck, S. (2013) Spaces of neoliberal experimentation: soft spaces, postpolitics, and neoliberal governmentality. *Environment and Planning A*, 45, 1, 217-3.
- HM Government (2013) *Construction 2025 Industrial Strategy: government and industry in partnership*. London: Crown Copyright.
- House of Commons Business, Energy and Industrial Strategy committee (2017) *Industrial Strategy: first review*. London: House of Commons. Available at: <https://www.publications.parliament.uk/pa/cm201617/cmselect/cmbeis/616/616.pdf>
- House of Commons Communities and Local Government Committee (2011) *Regeneration Sixth Report of Session 2010-12 Volume I: Report*, together with formal minutes, oral and written evidence HC 1014. London: The Stationery Office.
- House of Commons Environmental Audit Committee (collective author) (2013) *Eighth Report: Code for Sustainable Homes and the Housing Standards Review* HC192. London: House of Commons.
- International Energy Agency (IEA) (2013) *Transition to Sustainable Buildings: Strategies and Opportunities to 2050*. Paris: IEA/OECD.
- Jeannot, G. and Goodchild, B. (2011) 'Fuzzy jobs' and local partnerships: Case studies of urban and rural regeneration in France and England. *Public Administration*, 89, 3, 1110-1127.
- Kallis, G. (2013) Societal metabolism, working hours and degrowth: a comment on Sorman and Giampietro. *Journal of Cleaner Production*, 38, 94-98.
- Loorbach, D. (2010) Transition Management for Sustainable Development: A Prescriptive, Complexity-Based Governance Framework. *Governance: An International Journal of Policy, Administration, and Institutions*, 23, 1, 161-183.
- Luque-Ayala, A. and Marvin, S. (2015) Developing a critical understanding of smart urbanism? *Urban Studies*, 52, 12, 2105-2116. DOI: 10.1177/0042098015577319.
- Norden (collective author) (2016) *The Nordic Region – leading the way in green growth Outcomes of the Nordic prime ministers' green growth initiative 2011-2015*. Available at: <http://dx.doi.org/10.6027/ANP2016-774>
- Office of the Deputy Prime Minister (ODPM) (corporate author) (2004) *Skills for Sustainable Communities* (The Egan Review). London: ODPM.
- OECD (2011) *Towards green growth: A summary for policy makers*. Paris: OECD.
- OECD (2012) *Redefining "Urban": A New Way to Measure Metropolitan Areas*. Paris: OECD Publishing. DOI: 10.1787/9789264174108-en.
- OECD (2013) *Green Growth in Cities*. Paris: OECD Publishing. Available at: <http://dx.doi.org/10.1787/9789264195325-en>
- Polovina, S., von Rosing, M. and Laurier, W. (2014) Conceptual structures in LEADing and best enterprise practices, In: *International Conference on Conceptual Structures* (pp. 293-298). Springer International Publishing.
- Rapoport, E., and Hult, A. (2017) The travelling business of sustainable urbanism: International consultants as norm-setters. *Environment and Planning A*. DOI 0308518X16686069 [Accessed: March 2017].

p. 124. Looking for the Green in the Green Paper: working towards an urban industrial strategy

- Scitovsky, T. (1976) *The Joyless Economy*. Oxford: Oxford University Press.
- Sorman, A. H. and Giampietro, M. (2013) The energetic metabolism of societies and the degrowth paradigm: Analyzing biophysical constraints and realities. *Journal of Cleaner Production*, 38, 80-93.
- TechCrunch.com (2017) According the stock market Tesla is now worth more than Ford. *TechCrunch* [online]. Available at: <https://techcrunch.com/2017/04/03/according-to-the-stock-market-tesla-is-now-worth-more-than-ford/> [Accessed: 04/04/2017]
- Webb, J., Hawkey, D. and Tingey, M. (2016) Governing cities for sustainable energy: The UK case. *Cities*, 54, 28-35.
- Webb, S. (2016) *Future of Planning: State of the Art Innovations in Digital Planning*. London: Future Cities Catapult.
- Woolliscroft, T. and Polovina, S. (2017) Improving Healthcare through Human City Interaction. Proceedings of the 19th *International Conference on Enterprise Information Systems (ICEIS)*, SCITEPRESS, *In Press*.