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The role of individuals in policy change: the case of UK low energy housing

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Abstract

The paper examines the role of individuals in the policy process drawing on research into a number of individuals active in UK low energy housing during the 1990s. Kingdon's notion of a policy entrepreneur is critically assessed. Policy entrepreneurs are conceived of as working very closely with government trying to influence the day-to-day operations of the policy process. Here I broaden this definition, suggesting that individuals active outside of government circles can also have a significant impact on processes of policy change. Concepts from science and technology studies, including actor-network theory and innovation niches, are used to explore the relationship between low energy housing entrepreneurs, the housing they built, and policy change. Sociotechnical approaches are helpful in thinking both about the potential for individuals operating outside of the policy arena to influence policy, as well as the agency of materials such as low energy housing. The policy influence of the entrepreneurs is judged to be twofold: in reframing policy discourse, and in providing a model for new low energy housing. In conclusion, the importance of attending to the local embeddedness of the entrepreneurs is discussed.

Keywords

Policy entrepreneur; low energy housing; policy change; science and technology studies

Introduction

The main aim of the paper is to explore ideas about the role of individuals in processes of policy change. A number of individuals who played a central role in developing pioneering low energy housing in the UK during the 1990s are analysed, including Nick Martin at the Hockerton Housing Project, Robert and Brenda Vale at the Autonomous House, Stephen Wright, Director of Gusto Homes who built Millennium Green, and Bill Dunster, Chief Architect of the BedZed housing development (BRECSU, 2000; 2002; Dansie, 2002; Energy Saving Trust, 2004; Lowenstein, 2001a; Vale and Vale, 2000). I explore the role of these individuals in creating spaces for change outside of policy circles where they have tested and demonstrated new ideas and technologies that have subsequently been taken up within UK policy. In particular I examine how these individuals have used materials (low energy housing) to effect change. These five individuals have been selected for analysis because of how the UK government has used the low energy housing they built as a model or template for solutions to climate change in the housing sector. Further, housing developments such as BedZed and Hockerton have become an integral part of UK policy discourse about the response of the housing sector to climate change (Lovell, 2004; 2007b). Pioneering low energy housing is defined here as single dwellings or developments which significantly exceed the energy efficiency requirements of the UK building regulations, i.e. that go beyond compliance (see ODPM, 2006), and that have an explicit objective of acting as a ‘test bed’ or demonstration project for developing low or zero carbon solutions. Such dwellings typically incorporate a mixture of passive low energy design, a well-insulated energy efficient building structure, and the use of renewable energy technologies (see for instance BedZed and Hockerton BRECSU, 2002; Energy Saving Trust, 2003).

The paper draws principally on theories about policy change and the role of individuals in the policy process – in particular Kingdon’s notion of a ‘policy entrepreneur’ (Kingdon, 2003). Concepts from science and technology studies about processes of sociotechnical change are also explored (Berkhout, 2002; Graham and Marvin, 2001; Guy and Shove, 2000; Hughes, 1983) for they are helpful in thinking both about the role of entrepreneurs operating outside of the policy arena, as well as the agency of materials such as low energy housing in driving policy change. The paper thereby builds on ideas emerging from political science about the role of best practice demonstration projects, in particular on the approach of Bulkeley (2006) in seeing the demonstration of best practice as a discursive process, whereby policy learning and change occurs through “argumentative struggles between competing frames or discourses..” (pp.1030) and demonstrations become part of influential discursive storylines (after Hajer, 1995). I concentrate especially here on the *origins* of low energy housing and its *materiality*. Table One introduces the individuals –termed ‘entrepreneurs’ - and the low energy housing developments they played a critical role in initiating and building during the 1990s and turn of the century, notably BedZed, Hockerton, Millennium Green and the Autonomous House. BedZed in South London is perhaps the most well-known of these housing developments and the largest, with over eighty homes. Built by the architect Bill Dunster, BedZed has won or been shortlisted for several sustainable housing and architectural awards, including the prestigious Stirling Prize for Architecture in 2003 and the World Habitat Awards in 2002 (Bioregional, 2008). BedZed is described as “... the brainchild of the architect Bill Dunster..” (Glancey, 2001) and is very much his idea, which he developed after designing and building his own zero carbon family home. Dunster describes BedZed as his “...pet project” which “he had been working on in his spare time....” (Bill Dunster quoted in Pearson, 1999: 30).

The other three low energy housing entrepreneurs are all based in close proximity near the town of Newark in the East Midlands, UK. Brenda and Robert Vale – well-known British green architects practising since the 1970s – designed and commissioned their detached family home in the early 1990s. It is self-sufficient or ‘autonomous’ in energy and water resources (Vale and Vale, 2000). The Vales’ had a long-term professional and personal interest in sustainable housing and describe their motivations for building the house as follows: “We had written a book in 1975 called *The Autonomous House*, so we had been thinking about it a long time...the idea of doing it, of demonstrating that you could service a house from renewable resources is something that had been with us since we were students.” (Interview, May 2004). The builder for the Autonomous House was Nick Martin, who was inspired by the Vales’ to subsequently develop and build the Hockerton Housing Project nearby, comprising five terraced earth-sheltered homes, again described as “... the brainchild of Nick Martin...” (Vale, 2001). The Millennium Green development, built by a small private housebuilding company set up by Stephen Wright, is a more unusual example of a private sector low energy housing development, comprising approximately twenty detached homes. Stephen Wright deliberately set out to take some of the ideas and technologies pioneered by Nick Martin and the Vales’ and “make them mainstream” (Interview, August 2002). Stephen was a finalist in the 2001 Building Magazine Entrepreneur of the Year competition and won the Parcellforce Worldwide Small Business Awards in 2000 for his work on low energy housing (Gusto, 2004; Pearson, 2000).

The type of policy change assessed here is diverse, ranging from broad shifts in policy discourse, to modifications of energy building regulations and the publication of government best practice guidance, as well as the introduction of specific policies and programmes at national and local levels. Whilst it can be difficult to attribute specific low energy housing

Name	Low energy housing activities
Brenda and Robert Vale Architects	<ul style="list-style-type: none"> • Both trained as architects at Cambridge University in the 1970s; strong emphasis of the course on sustainable design; • Influential book published in 1975 'The Autonomous House', updated and republished in 2000 as 'The New Autonomous House' (Vale and Vale, 1980; 2000). • Designed, commissioned and lived in the Autonomous House (i.e. not connected to mains utility services) in the village of Southwell, Newark and Sherwood; completed in 1993. • The Autonomous House is self-sufficient in energy and water. It has a traditional design and is masonry-built.
Nick Martin Builder	<ul style="list-style-type: none"> • Built the Vales' Autonomous House in the early 1990s; • Nick owned the land at Hockerton, and was inspired by the Vales to build the Hockerton earth-sheltered housing development, comprising five terraced houses, completed in 1998. • Robert and Brenda Vale were the architects for the project. • The houses at Hockerton are very well-insulated and have a passive solar design, such that there is no need for central heating. There is also a two small wind turbines, heat pumps and PV panels.
Stephen Wright Builder, Director of the company Gusto Homes	<ul style="list-style-type: none"> • The Millennium Green low energy development, comprising twenty-five detached homes, was completed in 2001; • It is a relatively unusual example of a low energy private sector housing development; • Energy features of Millennium Green include: very high thermal specification (three times the level of the UK 1995 building regulations); Mechanical heat recovery ventilation; High-specification glazing. • Gusto Homes has built three further developments in the East Midlands which have similar sustainability features to Millennium Green; • Several awards: Building Magazine - Entrepreneur of the Year finalist 2001; Daily Express - House Builder of the Year 2000 Certificate winner; Parcelforce Worldwide - Small Business Awards 2000; Nottingham Property Guide - New Homes Award for Environmental Awareness 2001
Bill Dunster Architect	<ul style="list-style-type: none"> • BedZed is located in Sutton, south London. It comprises eighty-two homes completed in the year 2000: nearly half of the homes were sold on the private market, and the remainder is social housing. • BedZed is short for 'Beddington Zero Energy Development': energy demand has been reduced by passive solar design, and through incorporating high levels of thermal insulation in the building structure • Several awards: Housing Design Award for sustainability, from the Royal Institute of British Architects (2001); Civic Trust sustainability award (2004); Office of the Deputy Prime Minister Award for sustainable communities – BedZED was short listed (2003); Stirling Prize – BedZED was short listed (2003); winner of RIBA Journal sustainability award (2003). • Bill Dunster built his own zero energy house 'Hope House' in nearby Surrey. • Since completing BedZed he has set up a business called 'Zedfactory Ltd.' aimed at developing and building energy efficient and sustainable buildings. • BedZed was a joint initiative between the Peabody Trust (a Housing Association), the environmental consultancy BioRegional Development Group, and Sutton Borough Council.

Table 1: UK low energy housing entrepreneurs active in the 1990s

policy changes to the work of the entrepreneurs (in large part due to their inspirational and discursive role, discussed below), there are nevertheless some examples. For instance, it is explored how the entrepreneurs' activities have acted as a model for a number of national government programmes aimed at encouraging one-off low energy housing developments, such as *Eco-Towns* (Communities and Local Government, 2008). At a local government

level the work of low energy housing entrepreneurs can be more easily directly attributed to specific policies. For example, Robert and Brenda Vale draw a strong connection between their building of The Autonomous House and the subsequent policy of their local authority - Newark and Sherwood District Council - to develop one hundred 'autonomous' low energy homes in the region (Energy Saving Trust, 2004; Vale and Vale, 2004).

The paper is based on the findings of a three year ESRC-funded doctoral research project and subsequent ESRC postdoctoral fellowship examining policy change and innovation in low energy housing in the UK during the 1990s. The research concentrated on how and why low energy technologies have been adopted by pioneers. A mix of research techniques was employed including over seventy semi-structured interviews, focus groups, documentary analysis, attendance at key policy meetings and conferences, technical tours of low energy housing developments, and two large-scale surveys.

The paper is structured as follows. First, ideas about the role of individuals in policy change are critically assessed, most notably Kingdon's concept of the policy entrepreneur. It is observed that this literature has a rather narrow focus on individuals operating within the policy arena, and also on the agency of humans rather than things, objects and technologies. Wider ideas about entrepreneurs in business, science, community and environmental spheres are therefore considered. Second, the relationship between low energy housing entrepreneurs and the housing they built is explored in more detail using science and technology studies concepts about actor-networks and innovation niches. Third, the role these individuals and their housing have played in processes of UK policy change is assessed. Their influence is judged to be twofold: in reframing policy discourse, and in providing a model for new housing developments.

Policy change and the role of individuals

Analysis in this section concentrates on ideas about the role of individuals in processes of policy change. Three points are made which are addressed in turn below: first, that most policy theories are about policy change taking place via networks of people rather than individuals; second, the small literature on policy entrepreneurs remains centred on individuals active in, and primarily focused on, the policy arena, despite a notable shift in theory and practice over the last few decades towards devolved government and looser modes of governance involving non-state actors (see for example Beck, 1994; Bulkeley and Mol, 2003; Okereke et al., 2008; Sending and Neumann, 2006); and third, that ideas about how policy entrepreneurs operate are people-focused, and hence relations policy entrepreneurs might form with technologies and materials are neglected.

Policy change is typically viewed as taking place via networks of actors rather than individuals. It is the policy network as a whole that is seen as influential - groups of people who act together in a sector to bring about change (Daugbjerg, 1998; Marsh and Rhodes, 1992; Richardson, 2000; Smith, 1997) - rather than the individuals within it. Thus a focus on the individual, particularly people who are conceived of as periodically playing a critical role in policy change, sits somewhat uncomfortably with widely-regarded and popular policy network theories such as advocacy coalition theory (Sabatier and Jenkins Smith, 1993) and policy network analysis (Rhodes and Marsh, 1992). Discussing individuals is viewed as atheoretical, or journalistic, as Kingdon (2003: 182) remarks:

“When trying to understand change, social scientists are inclined to look at structural changes, while journalists are inclined to emphasise the right person in the right place at the right time.”

Indeed, because of this tension, research focusing explicitly on individuals within processes of policy change remains relatively rare. The scholar arguably most attentive to the role of individuals is the American political scientist John Kingdon. Kingdon first coined the term 'policy entrepreneur' to describe people who are "... [willing] to invest their resources - time, energy, reputation, and sometimes money - in the hope of a future return." (Kingdon, 2003: 122). The return in this instance is policy change, and this is the main distinction between policy entrepreneurs and the more traditional notion of a business entrepreneur seeking a monetary return (see Bolton and Thompson, 2004; Swedberg, 2000). A number of authors have subsequently drawn on Kingdon's work to explore how individuals generate new ideas and catalyse change within national and local government (see for example Bartlett and Dibben, 2002; Etzkowitz and Gulbrandsen, 1999; Howard, 2001; Laffan, 1997; Lieberman, 2002).

Policy entrepreneurs are seen most active and effective in situations of policy flux and uncertainty (Howard, 2001; Kingdon, 2003; Schneider and Teske, 1992; Zerbinati and Souitaris, 2005). Kingdon's research focuses on how issues get onto the policy agenda, i.e. the earliest stages of policy change, and this is where he sees entrepreneurs as adept at 'coupling' the typically disparate streams of problems, policies and politics that comprise the policy arena. Howard (2001: 58) likewise describes how "policy entrepreneurs emerge to satisfy a 'demand' for policy change" in situations where there is "...little agreement on how to understand and define the policy problem.." (2001: 59). In these conditions of uncertainty and risk there is seen to be a strong element of chance in whether policy entrepreneurs are successful in putting forward new ideas and policy proposals. Kingdon explains the unpredictability of the process using an analogy of the "policy window", which opens

unpredictably and only for short intervals. Policy entrepreneurs therefore need to “... lie in wait – for a window to open” (Kingdon, 2003: 181). Policy entrepreneurs are conceived of as having little if any power to open the window themselves (Howard, 2001; Kingdon, 2003; Lieberman, 2002) and in this sense are portrayed as surprisingly passive actors.

According to Kingdon (2003: 180-81) policy entrepreneurs have three qualities which explain their success in driving policy change: a claim to a hearing – based on expertise, being in a position of authority, or an ability to speak for others; political connections, and persistence. A key challenge for policy entrepreneurs is to find ways to make their ideas stable and to survive in the messy ‘primeval soup’ of the early stages of policy change, as Kingdon explains (ibid. 2003: 124) “...the key to understanding the process is knowing the conditions under which ideas survive”. This point is returned to later in the paper in discussion of the materiality of policy change; for one of the ways low energy housing entrepreneurs have given their ideas longevity is by translating them into durable entities, i.e. housing.

Kingdon (2003) defines the physical location of policy entrepreneurs quite loosely as “... in or out of government, in elected or appointed positions, in interest groups or research organisations”. But in practice the examples he gives of specific entrepreneurs, and his descriptions of what they do, are all government-centred. For instance, he explains the motivations of policy entrepreneurs to effect change as “... they enjoy being at or near the seat of power, they enjoy being part of the action. They make calls, have lunch, write memos, and draft proposals...” (2003: 123). So policy entrepreneurs are positioned within government or very close to operations of government and are very involved in the detailed mechanisms of policy change: lobbying, political negotiations, drafting legislation etc.

(Howard, 2001; Lieberman, 2002; Zerbinati and Souitaris, 2005). This leads me onto the second point I wish to raise here, which is that the notion of policy entrepreneurship does not reflect increasingly mainstream ideas in political science about the opening up of government and a shift from state-based government to looser hybrid networks of governance involving a range of non-state actors (Beck, 1994; Bulkeley and Mol, 2003; Sending and Neumann, 2006). Notably Beck (1994: 22) pinpoints individuals as increasingly active within this emerging 'sub-political' realm, he comments: "Sub-politics is distinguished from 'politics' first, in that, agents outside the political or corporatist systems are allowed to appear on the stage of social design... and second, in that not only social and collective agents but individuals as well compete with the latter and each other for the emerging shaping power of the political". The governance literature is large, and it is not appropriate to go into detail here, but it suggests there is value in considering concepts of entrepreneurship outside of government - in corporate, community, scientific and environmental spheres - where entrepreneurs active in innovation and change have the potential to influence the policy process even though it may not be their primary objective. There is a long-standing and large literature from business and management studies about entrepreneurs in corporations (see Bolton and Thompson, 2004 for an overview). But there is also a growing body of literature originating from several disciplines about entrepreneurs whose main motivation is not monetary profit, including social entrepreneurs (Leadbeater, 1997), eco- or environmental entrepreneurs (Beveridge and Guy, 2005; Isaak, 2000), innovator-entrepreneurs (Hughes, 1986; Latour, 1984) as well as policy entrepreneurs (Howard, 2001; Kingdon, 1995; Lieberman, 2002) (see Table Two).

Characteristic	Type of Entrepreneur				
	Corporate/Business	Social/community	Environmental	Policy	Inventor
Role	Independent business person; corporate executives	Local public figures; individuals working within non-profit organisations	Varied: local public figures; independent business person; corporate executives	In government (politician or civil servant), or on the fringes of government	Independent research institutes
Main activities	<ul style="list-style-type: none"> • Building financial wealth and capital • Creating and growing businesses 	<ul style="list-style-type: none"> • Attempting to resolve community problems • Building social capital • Developing something of value to local communities or society 	<ul style="list-style-type: none"> • Sustaining environmental resources • Building environmental & social capital 	<ul style="list-style-type: none"> • Driving policy change • Developing new policy ideas 	<ul style="list-style-type: none"> • Developing and testing new technologies
Personal characteristics	<ul style="list-style-type: none"> • Ambitious • Aspirational • Creative and innovative • Good networkers • Ability to spot and exploit opportunities • Good at managing risk 	<ul style="list-style-type: none"> • Commitment to a cause • Strong social values • Not seeking financial rewards • Charismatic leader 	<ul style="list-style-type: none"> • Commitment to a cause • Strong environmental values • Not usually seeking financial rewards • Charismatic leader 	<ul style="list-style-type: none"> • Creative and innovative • Good networkers • Ability to spot and exploit opportunities • Not seeking financial rewards • Commitment to a cause • Often strong social values 	<ul style="list-style-type: none"> • Creative and innovative • Intelligent • Good networkers • Ability to spot and exploit opportunities • Technical and scientific skills and knowledge
Examples	Richard Branson	Tony McGann (housing regeneration)	Dale Vince (wind energy company, UK)	<i>[typically not named]</i>	Thomas Edison (electricity industry)
Academic discipline	Business studies/management	Business studies/management; political science	Business studies/management; political science	Political science; public administration	Science and technology studies
Key references	(Bolton and Thompson, 2004)	(Austin et al., 2006; Leadbeater, 1997)	(Beveridge and Guy, 2005) (Schaper, 2002)	(Howard, 2001; Kingdon, 2003)	(Hughes, 1983, 1986; Law, 1987)

Table 2: Comparison of different types of entrepreneur

The science and technology studies (STS) conceptualisation of entrepreneurs is perhaps most relevant to case of UK low energy housing because of the close association between low energy housing entrepreneurs and the housing they have built, the entrepreneurs' technical skills as builders or architects, and the location of their activities largely outside of mainstream policy circles. Socio-technical change theories position entrepreneurial individuals as driving innovation from outside of government policy circles, typically within small-scale innovation niches (Hughes, 1987; Rip and Kemp, 1998; Schot et al., 1994; Smith, 2004; Szejnwald Brown et al., 2003). STS scholars have tended to be quite open to the idea of particular individuals and inventors (termed 'heterogeneous engineers' by Law (1987)) having a strong influence on processes of change (see for instance analysis of Thomas Edison in the early development of the electric power industry (Hughes, 1983; 1987) and Louis Pasteur in the development of milk pasteurisation (Latour, 1984)). Indeed, much of the early work of key STS scholars such as Bruno Latour, Thomas Hughes and John Law focused on individuals. However, they were subsequently criticised for glamourising 'heroic individuals' (Rip and Kemp, 1998: 362), and it is notable how subsequent STS research has only rarely positioned individuals as the central driver of change, demonstrating the same tension between individuals and networks as in political science. For example, Callon's seminal paper on actor-network theory conceived a group of three researchers at St Brieuc Bay as the main actor (Callon, 1986), and other scholars have variously portrayed actor-networks as centred on non-humans such as computer software programmes (Higgins and Kitto, 2004), door hinges and car seat belts (Latour, 1992) or organisations and institutions such as landlord associations and medical screening programmes (Carr and Cowan, 2008; Singleton and Michael, 1993).

Which brings us to another insight from STS approaches – and the third point I wish to make here – which is the way materials are incorporated into theories of innovation and change. It is notable that to date policy entrepreneurs have been defined solely in terms of the *people* they work with to help achieve their aims (see for example Howard, 2001; Lieberman, 2002). This is in keeping with wider theories of policy change which remain primarily focused on human-human interactions and not on the physical substance of policy (materials, technologies etc.). What has been overlooked is how materials, such as low energy housing, can be used by entrepreneurs to effect change. So, despite some recent work exploring the materiality of policy change (Bulkeley et al., 2007; Evans et al., 1999; Lovell, 2007a), policy theory as a whole remains underdeveloped in this respect. It is especially a limitation when considering change in a policy sector such as low energy housing, which necessarily involves dealing with new objects and technologies, including building materials, wind turbines, solar panels, bricks, pipes and wires. It is useful therefore to draw on ideas from science and technology studies not just in relation to the location of entrepreneurs outside of policy circles, but also regarding their sociotechnical relations. As Murdoch explains, STS approaches are:

"... highly critical of studies which are concerned only with social relations; [they] argue that such relations count for little unless they are held together by durable and resilient materials."
(Murdoch, 1998: 360).

STS ideas about the materiality of change are particularly relevant in thinking about how new ideas become durable and stable in the early ‘messy’ stages of policy change identified by Kingdon. Ensuring the stability of new ideas and encouraging their uptake are debates common to literatures on policy and technology change (Dudley and Richardson, 1998; Pinch

and Bijker, 1984; Richardson, 2000; Rip and Kemp, 1998; Sabatier and Jenkins Smith, 1993), but the overlaps are not often acknowledged. It is notable for instance how ideas about the role of best practice in policy change are fundamentally about material change; they are to do with translating ideas into physical reality, i.e. tangible and visible entities (Bulkeley, 2006; Sanderson, 2002; Seyfang and Smith, 2006), and it is suggested that this work could more explicitly recognise these material aspects of the policy process. How technologies and objects emerge and subsequently become enrolled in policy processes is not well conceptualised in mainstream theories of policy change (Dolowitz and Marsh, 2000; Hajer, 1995; Marsh and Rhodes, 1992; Sabatier, 1988), and this is where ideas from STS about actor-networks and innovation niches potentially add value. These are turned to next, with a closer examination of the relationship between the entrepreneurs and the housing they built.

Conceptualising the relationship between low energy housing entrepreneurs and their housing

Sociotechnical approaches help further our understanding of why the low energy housing entrepreneurs might have concentrated on building housing as a way of creating opportunities for further innovation and change. Actor-network theory for instance conceives of processes of change as inherently fragile, relying on relations between different elements being constantly looked after and maintained (Callon, 1986; Graham and Marvin, 2001; Singleton and Michael, 1993). Building new actor-networks is seen as prone to failure, or only partial or temporary success, and it is for this reason that durable materials are crucial in providing stability. Durable materials such as housing play a crucial role, therefore, in stabilising and lending credibility to novel ideas, as Latour (1991: 111) explains "...whenever we discover a stable social relation, it is the introduction of some non-humans that accounts for this relative durability", and Murdoch (1998: 360) further clarifies "Materials solidify social relations and

allow these relations to endure through space and time.” The potential for materials to have agency in processes of change is illustrated, for example, by comments from Robert Vale about why they built the Autonomous House:

“I think having examples is good because it shows that it can be done and that it does work.”

“We just wanted to do it to show that it could be done, that it was a reasonable thing to do... to convince the sceptics as it were.”

(Interview, Robert Vale, May 2004).

He thereby hints at how, with the rise of low carbon discourse in the UK housing sector (Lovell, 2004; Toke, 2000), it has become increasingly important not just to participate in discourse, but to have actual material evidence of low carbon *practice* in order to promote new ideas and gain support. For example, Brenda Vale comments that building homes like the Autonomous House “... is a way of helping policy change because you can actually see the buildings and you can see that you can do it, and therefore you can legislate to have more insulation because it is based on facts and not on ideas. I think that is important.”

(Interview, Brenda Vale, May 2004).

These findings echo the ideas of Shapin and Schaeffer (1985) about the role of scientific experimentation being primarily social, as a means of demonstrating new ideas to others - ‘generating facts’ - and gaining acceptance for them. The entrepreneurs all place a strong emphasis on the visibility of their low energy housing, and the important role of site visits in effecting change:

“everyone who visits the site is convinced”

(Interview, Nick Martin, March 2003)

“Hockerton have actually organised tours, because so many people wanted to come and see how you can do these things.”

(Interview, Brenda Vale, May 2004).

Interesting issues are raised here about the agency of housing itself in creating opportunities for change through catalysing a shift in ways of thinking about environmental problems such as climate change in relation to housing. In conceptualising the role of this demonstration and diffusion of ideas there are useful parallels with the STS concept of innovation niches, defined as a small scale learning spaces for new technologies, which comprise either a single experiment or project, or a cluster of several experiments (Kemp et al., 1998; Rip and Kemp, 1998; Schot et al., 1994; Smith, 2003; Weber, 2003; Wiskerke, 2003). Niches emerge in response to the momentum or inertia of well-established socio-technical regimes, which makes radical change difficult to effect. The idea of an innovation niche is particularly relevant to discussion of UK low energy housing because niches are typically driven by actors who are relatively independent of the incumbent regime (see for example Seyfang and Smith’s (2006) discussion of grassroots community action as innovation niches). The positioning of entrepreneurs within innovation niches operating at the fringes of mainstream practices bears strong parallels with the case of the UK low energy housing entrepreneurs. For example, Nick Martin from the Hockerton Housing Project describes how the process of building low energy housing encouraged a shift in opinion about their work from the fringes of society towards more mainstream acceptance:

“as soon as we started actually building, people started getting interested...as soon as we had the first concrete slab down

Interviewer: Why?

Because it showed that we were serious – we weren’t wacky”

(Interview, Nick Martin, March 2003)

Thus according to Martin, he and others at Hockerton gained credibility and authority by translating their ideas into material form. It lent their ideas and values some stability and longevity, thereby gaining the potential for influence in the messy ‘primeval soup’ of the early stages of policy change (Kingdon, 2003: 124). There is a recognition too that through building housing the entrepreneurs gain a voice; the authority and credibility to speak, or a ‘claim to hearing’ as Kingdon (2003: 180) describes it. As a sustainable housing manager working to encourage sustainability within the social housing sector explains:

“...if you can talk to somebody, face to face or down the phone... and you can say that you’ve done it [built sustainable housing] then that’s brilliant. *That is who everybody wants to talk to.*”

(Interview, Sustainable housing manager, July 2002)

In these comments there is a recognition of the power of knowledge and expertise (Flyvbjerg, 1998; Radaelli, 1995). It is evident that there is a very close *sociotechnical* relationship between the entrepreneurs and the housing they designed and built, such that it becomes difficult, and perhaps misleading, to separate the two. As Kirsch (1995: 531) reminds us: “...whilst technology is a thoroughly social construction, society is a technological

construction as well". The entrepreneurs see building the housing as much a political activity as a technical one: they are politically astute and aware. By setting an example through building low energy housing and living a low energy lifestyle the entrepreneurs believe they will establish credibility for their solutions to environmental problems and encourage others to adopt them. The entrepreneurs have typically had a wide focus, concentrating their efforts where they perceive there to be a greatest chance of significant change – a combination of government, the private sector housebuilders and the general public - as Brenda Vale explains:

“You've asked that key question which is how can we persuade people to do more? And I think it is a combination of persuading individuals and persuading government.”

(Interview, Brenda Vale, May 2004).

Likewise the manager at a government-sponsored housing design and sustainability institute summarises the impact of Bill Dunster and BedZed on the housebuilding industry as follows:

“... it is only through seeing examples like BedZed that housebuilders sit up and think, well yes, that is a possibility, it is increasing market share, they are selling quickly... *It is actually only through the pioneers that people learn from them and decide to take risks.*”

(Interview, Sustainability and design manager, June 2003).

He thereby explicitly links entrepreneurial individuals with the reduction of risk for private sector housebuilders. Bill Dunster himself explains that a strong motivation for building Bedzed was influencing housebuilders:

“But even after completing BedZed, the house building companies are doing exactly the same thing. In a way, that is what is most depressing. *What we’ve tried to show is there is no excuse for them not doing it.*”

(Bill Dunster, quoted in Lowenstein, 2001a: 17).

The focus on private sector housebuilders in part reflects their powerful position in the UK in relation to government: private sector housebuilders build over ninety percent of new housing in the UK (Barker, 2003: 62), and it is therefore an area of policy where national government is constrained. The Royal Institute of British Architects (RIBA) likewise positions BedZed as being of prime importance in driving change in the housebuilding industry. In its press release about BedZed winning the RIBA Journal Sustainability Award it describes BedZed as:

“... far more than simply a demonstration project for the sustainability message; *it is a powerful incentive for the housing industry to change its way of thinking and building.*”

(RIBA, 2003).

Although the STS definition of an innovation niche is technology-focused (Rip and Kemp, 1998; Schot et al., 1994; Szejnwald Brown et al., 2003), it is evident from this discussion that niches are not only about the demonstration of specific technologies and prototypes, for it is within niches that new policies and practices are implemented and conflicts can be voiced; conditions that are amenable to learning and change, whether in corporate, public or policy arenas. It is to a detailed assessment of the influence of low energy housing entrepreneurs and their housing on policy that I now turn.

The relationship between the low energy housing entrepreneurs and policy change

UK climate change policy was not well developed with respect to housing during the 1990s; it was a period of policy flux and uncertainty and there was relatively little firm government action to address the issue of climate change (Collier, 1997; Lovell et al., 2008; O'Riordan and Rowbotham, 1996). Ironically, the very 'dash for gas' that led the UK to provide international leadership on the issue of climate change with the United Nations Framework Convention on Climate Change, signed in Rio de Janeiro in 1992, provided little impetus for more radical domestic action during the 1990s. With emissions of greenhouse gases falling relative to 1990 levels, there was limited appetite for engaging in additional policies and measures. There were some new initiatives aimed at developing new-build low energy housing, notably attempts to reform the energy building regulations in 1995 (Energy Saving Trust, 2000; Olivier, 2001) as well as the development of the voluntary sustainable housing labelling scheme *EcoHomes* (BRE, 2001), but overall it was a period of little policy change and few resources for developing low energy housing. So, in keeping with assumptions about policy entrepreneurs being most active in situations of policy uncertainty and constrained resources, there does appear to have been an inverse relationship between government action and the level of low energy entrepreneurship. There is evidence of the entrepreneurs' frustration with a lack of government action and this acting as an impetus for them to demonstrate what could be done, as Smith (2004: 7) summarises "it was really a practical attitude, and an impatience to get on and build eco-houses, and learn from the experience, that characterised the early green building movement." A case study of the Hockerton Housing project describes its origins in similar terms:

“Nick Martin gathered together a group of people that wanted to do more than wring their hands about the state of the environment; they wanted to try to make a significant contribution in their own lifetimes.” (Vale, 2001: 6).

So the low energy housing entrepreneurs were influenced by government, albeit in a rather unusual way, i.e. through an *absence* of policy, rather than a strong policy framework. This inverse relationship between the entrepreneurs and government is directly alluded to by a regional government energy manager in his description of events in the East Midlands where Hockerton, the Autonomous House and Millennium Green are all located:

“But the nature of national legislation is that it moves at the speed of the slowest which means that the kind of innovation you see in sustainable housing in the East Midlands would take another twenty-five years from a national driver point of view to happen. *Whereas this happened here because individuals have encouraged it*, like the Vales’ house. The Vales built that house and that encouraged Nick Martin to go on and design Hockerton. Gusto Construction who are just a little bit up the road, got to know them, understood it, and realised that there was a niche in the market and took that forward. *There is no policy driver that has taken that forward, it has been individuals.*” (Interview, Regional government energy manager, December 2002).

As noted, in building low energy housing the entrepreneurs sought to have influence in many arenas, including public and corporate. But although not specifically focused on government they nevertheless had a significant influence on UK policy, and it is this policy influence that I wish to consider in more depth. Two distinct types of policy influence are identified: first, on housing and climate policy discourse - the housing built by the entrepreneurs has played a

key role in processes of discursive reframing; and second, in a more direct way the government has developed policies that attempt to replicate the low energy housing developments built by the entrepreneurs. It is significant that the government has engaged primarily with the material product or outcome of the entrepreneurs' activities – i.e. the housing – rather than with the entrepreneurs themselves. Indeed, the role of the entrepreneurs and the wider sociotechnical context in which the housing was developed has been largely absent from these government interpretations. This important point is returned to below. Before doing so, the two types of policy influence – discourse, and as a model - are explored.

The low energy housing built by the entrepreneurs – particularly BedZed and Hockerton – has become an ‘emblem’ (after Hajer, 1995) of what it is possible to achieve and has been heavily promoted as best practice case studies by government and other policy actors (BRECSU, 2000; 2003; TCPA and WWF, 2003). Table Three gives examples of government policy documents and speeches which refer to BedZed.

Policy document	Reference to BedZed
Speech by Energy Minister Brian Wilson, Feb 2002 (DTI, 2003b).	“Demonstrations such as the developments .. at BedZed ...prove that the technologies are available to deliver practical systems.”
Royal Commission on Environmental Pollution 22 nd Report: “Energy – Our Changing Climate”	Has a case study box devoted to BedZed and describes it as: “the most ambitious low energy housing development in the UK to date..” (RCEP, 2000: 105).
Government Energy Efficiency Best Practice Programme – General Information Report no. 89	“...BedZed represent[s] state-of-the-art for sustainable housing in the UK.” (BRECSU, 2002: 3).
UK 2003: the Official Yearbook of the United Kingdom of Great Britain and Northern Ireland (The Stationery Office, 2003).	Double page picture spread (pp.298-299).
Environment Agency report – ‘Our Urban Future’ September 2002 (www.environment-agency.gov.uk)	BedZed is cited as an example of a solution to climate change.
The Housing Corporation (2004).	It is used as a model case study for Registered Social Landlords “... to show how sustainable development can be achieved.”

Table 3: Examples of UK policy documents citing BedZed

It is suggested that housing developments built by the entrepreneurs have played a vital role in reframing policy debates towards a focus on positive 'zero carbon' solutions. The low energy housing is firmly positioned as a 'good news story'. For instance ninety-nine percent of the media articles written about BedZed have been complementary, as have all but two of the nearly four hundred articles written about Hockerton in the period 1995-2004 (Lovell, 2005). The low energy housing is not, therefore, in this instance a subject of detailed technical learning, its role is more akin to what Rose (1991) terms 'inspirational learning' – a source of ideas and a way of provoking shifts in policy debate and discursive 'reframing'. A discursive frame is "... a perspective from which an amorphous, ill-defined, problematic situation can be made sense of and acted on" (Rein and Schon, 1993: 146). Low energy housing developments such as BedZed and Hockerton have helped structure and orientate policy discourse in this way, focusing on achieving zero carbon solutions. For example, a report by Town and Country Planning Association (TCPA) and the UK Worldwide Fund for Nature (WWF-UK) describes the value of existing low energy housing developments in discursive terms as part of a 'campaign' for policy change:

"There is now a good deal of experience from a number of pioneering developments on how [energy building] standards can be raised successfully, and what the design implications might be. The purpose of this report is to bring together this accumulated experience *so that it can be used in developing an effective campaign* for adopting higher environmental standards of house design and community wellbeing as the norm throughout the house building industry."

(TCPA and WWF, 2003: 4).

Likewise the Vales, in a report commissioned by the former government-owned Building Research Establishment, similarly describe the role of existing low energy housing projects (including the Autonomous House and Hockerton) as being most important in changing policy debates:

“It should be noted that the building standards discussed in this Report are substantially higher than those required by current Building Regulations and have not been widely replicated in practice even among practitioners working in this field. They should, therefore, not be interpreted as firm recommendations. Rather they should be treated as a basis for *advancing the debate* on how to respond to the need for sustainability in future housing developments.” (BRECSU, 1996: 1, emphasis added).

In interview too the Vales refer to the impact building the Autonomous House had on the framing of policy debate. They explain how building it: “...changed the discussion from 'oh no that isn't possible', to 'oh no I wouldn't do it that way'. It moved the discussion on, because it suddenly demonstrated that you could do an autonomous house, and if you were a different person you might do it differently, but it could certainly be done.” (Interview, Robert Vale, May 2004). These findings echo those of Bulkeley (2006: 1039) who in her analysis of the role of best practice in urban sustainability discusses how “Rather than using best practice as a source of general or technical expertise, practitioners engaged with it as a source of inspiration, recognition and legitimation for particular interpretations about... urban sustainability...”. Smith, in his discussion of low energy housing as innovation niches, similarly concludes that “In practice, green niches are likely only to be a source of debatable ideas for mainstream sustainable development, *not a model for mainstream transformations.*” (Smith, 2004:21, emphasis in original). Smith’s distinction between green niches as a ‘source

of debateable ideas’ and a ‘model for mainstream transformations’ is an important one. However, I would suggest in the case of UK low energy housing the policy influence of the housing built by the entrepreneurs encompasses both these areas, i.e. discourse and as a model. For, since the late 1990s, in addition to the shifts in discourse outlined above, there has also been the emergence of a number of government ‘replication policies’, based on the assumption that the low energy housing developed by the entrepreneurs can serve a model or template for new housing (see Table Four).

Name of grant/programme	Date	Details
Millennium Communities Programme	1997-present day	Seven communities are being developed as examples of housing best practice – including environmental sustainability, e.g. the Greenwich Millennium Village. (see English Partnerships, 2003).
EcoHomes	2000-2007	Environmental rating scheme aimed at new-build housing. Award given at a development-level (i.e. not for individual dwellings) – from Pass to Excellent. Seven environmental categories; most points given for energy features (BRE, 2001).
Community Renewables Initiative	2002-present day	Local communities bid for funding for renewable energy projects. Funding from DTI. (see The Countryside Agency, 2004)
Community Energy Programme (CHP)	2002-2007	For combined heat and power and district heating technologies only. (see Energy Saving Trust and The Carbon Trust, 2001)
Clear Skies	2003-2005	Capital grants for household and community renewable projects. (see BRE, 2003)
DTI's Low Carbon Buildings Programme (LCBP).	2006	Designed to replace Clear Skies and the PV demonstration programme. Minimum energy efficiency measures must be undertaken in order to qualify for a renewable energy grant – aims at a more holistic low energy approach than previous government programmes. (see Low Carbon Buildings Programme, 2006)
Eco-Towns	2007+	Series of new zero carbon eco-towns to be built in UK – up to 10 by 2020. Shortlist of 15 sites recently announced by government (Communities and Local Government, 2008).

Table 4: UK government *replication policies* promoting the development of new low energy housing developments.

The replication policy approach embodies an instrumental or rational notion of learning (Bennett and Howlett, 1992; Dolowitz and Marsh, 2000). For example, a TCPA report assessing the viability of building several new ‘eco-towns’ in the UK describes how it will “... consider a number of examples from the UK and overseas [including BedZed] *from which experience may be gained to assist in the design and implementation of eco-towns...* our purpose is to seek the environmental, economic and social factors that make these places successful, understand the lessons to be learned *and assess their transferability.*” (TCPA and Lock, 2007: 13, emphasis added). Similarly the Minister of State for Housing describes how a shift to zero carbon housing will “...be supported by a long term strategy which combines changes to the regulations with fiscal incentives, *and by demonstrating how it can be done.*” (quote from Yvette Cooper, Minister of State for Housing in TCPA and Lock, 2007: 6, emphasis added). The policy challenge involved in this second type of policy interpretation is about ‘mainstreaming’ low energy housing by replicating and reproducing the demonstration projects in variety of different contexts across the UK (see for example Clark, 2000; Lowenstein, 2001b; TCPA and WWF, 2003). For instance, the introduction to a report by the Building and Social Housing Foundation (BSHF) entitled “Sustainable Housing Solutions: transferring good practice from the margins to the mainstream.” encapsulates well this ambition:

“The knowledge and technology are widely available to produce housing that is environmentally, financially and social sustainable. Many excellent examples have been developed *but for the most part they remain as isolated demonstration projects.*” (BSHF, 2002: 7).

It is assumed that existing low energy housing can be disassociated from its local context and replicated elsewhere, akin to Latour's idea of an 'immutable mobile': objects that can be transferred across time and space without losing their form and function (Latour, 1991; Law and Mol, 2001; Singleton and Michael, 1993). However, there is a problem in the government's approach in that it has focused on the material end product of the entrepreneurs' work – the housing – rather than the process of building it, and the close ties between the low energy housing entrepreneurs and the housing have thereby been neglected. So a difficulty with both types of interpretation of the low energy housing niches by government – the direct replication, and the incorporation into policy discourse – is a lack of attention to the origins of the housing, in particular the exceptional nature of the individuals involved. As discussed, the housing was developed outside of the national policy arena and it was only subsequently that government actively tried to associate itself with these niches. The housing was integrated into policy in a retrospective top-down way, which helps explain why it has been essentially taken out of or dissociated from its local sociotechnical context. Attention to the context in which the housing emerged is vital in understanding how it was possible to successfully build the low energy housing. The low energy housing entrepreneurs analysed here have been active in specific localities. It is notable for instance how the entrepreneurs based in the East Midlands have worked closely together and drawn inspiration from each others' achievements (Lovell, 2007b). The Vales' Autonomous House, the Hockerton Housing Project, and Gusto's Millennium Green development are all located within a radius of approximately ten kilometres within the Newark and Sherwood District Council area in the East Midlands region, and this spatial proximity has facilitated learning between them. Excerpts from interviews with the entrepreneurs demonstrate the importance of the other entrepreneurs (and their housing) in creating further opportunities for change.

The Vales, for example, position themselves and the Autonomous House as influential in encouraging Stephen Wright at Gusto Homes to take action:

“There was a developer in Newark and Sherwood who was trying to pick up some of the ideas – Gusto. I'm not saying that wouldn't have happened, but I think it made it much easier because there was the Autonomous House there, and there was also this interest in Newark and Sherwood itself to do these kind of things.

Interviewer: So having those examples, having the Autonomous House locally was quite influential do you think?

Yes, it was terribly important.”

(Interview, Brenda Vale, May 2004).

Stephen Wright in turn recognises the influence of both the Vales and the Autonomous House and Nick Martin and Hockerton in developing his ideas:

“We've got the Hockerton houses that are close, we've got the Autonomous House – so there are a few things happening in the area. So I think that when I started to see what a few people were doing... it made me think how can we take all their ideas and put them into mainstream housing.”

(Interview, Stephen Wright, August 2002).

Attention to the local embeddedness of low energy housing entrepreneurs also highlights the links between entrepreneurs and government at a local level. It has been argued that the low energy housing entrepreneurs have not been active directly within the policy arena, but a focus on the locality shows the situation is not so straightforward: in some instances the

entrepreneurs have had close supportive relationships with local government. Local government has played a facilitating role in both the Newark and Sherwood District – where Hockerton, the Autonomous House and Millennium Green are located - and also Sutton Borough Council, where BedZed is located. Sutton Borough Council set an important new precedent in planning procedure by awarding the development contract to the BedZed team, despite not being the highest bidder (BRECSU, 2002). In a similar way Newark and Sherwood District Council developed Supplementary Planning Guidance on wind energy in direct response to problems at Hockerton regarding installation of a wind turbine (Hockerton Housing Project, 2003). There are also local government policies to encourage new low energy housing in Newark and Sherwood, most notably a target for one hundred ‘net zero CO2 dwellings to be built within the District (Energy Saving Trust, 2004: 7). Further, Newark and Sherwood has ‘Beacon Council’ status for its work on tackling fuel poverty. The energy manager at the council, who was central in achieving the Beacon Council status, has also assisted the entrepreneurs, providing them with technical information and helping to make connections between them (Interviews: the Vales, Stephen Wright). These findings demonstrate how at a local level the positioning of entrepreneurs inside or outside of the policy arena is less clear cut; the situation is fluid, with individuals active in driving change across a range of sectors.

Summary and conclusions

The paper has considered how individuals effect change in the policy process, drawing on the case of a number of entrepreneurial individuals active in building UK low energy housing during the 1990s. It has focused in particular on the material dimensions of their activities: the entrepreneurs have a close sociotechnical relationship with the low energy dwellings they built, such that it does not make sense to separate the two in analysis. The paper has

advocated a wider conceptualisation of policy entrepreneurs: including individuals who have used technologies and materials to effect change, and people who are active in driving innovation and change in a variety of arenas, not just government and policy. The value of theories of policy change and entrepreneurship engaging more directly with ideas from science and technology studies – such as actor-networks and innovation niches – has been demonstrated. It is highlighted how best practice demonstrations such as the low energy housing built by the entrepreneurs have become part of policy discourse and helped to reframe it towards a focus on zero-carbon solutions. The housing has also been used as a basis for the development of ‘replication policies’ aimed at reproducing or ‘mainstreaming’ the housing across the UK. But in abstracting the housing from its local context the government has overlooked the crucial role of the entrepreneurs. It is assumed that the housing built by the entrepreneurs can be easily transferred to other contexts, but as one experienced low energy project developer in the East Midlands cautions:

“we know the processes you need to go through. It doesn’t necessarily work to try and impose solutions on communities, they don’t like it. It has got to organically grow.”

(Interview, Low energy project developer, August 2002).

Beveridge and Guy echo these comments in their assessment of UK environmental entrepreneurs, urging "...we should understand that innovation is something that emerges through the interactions of a wide range of actors: it is something that is 'constructed', enabled and made real through constant negotiation in *specific contexts*... (2005: 674, emphasis added); thereby suggesting that greater attention needs to be directed both at the fragility of processes of sociotechnical change and their local embeddedness. There is a need to

recognise the inseparability of the housing and the entrepreneurs, drawing on sociotechnical approaches such as actor-network theory and niche management.

It is hoped that this paper opens up analysis of policy entrepreneurship to individuals active outside of the policy arena who nevertheless have a significant influence on policy. Criticism might, however, be directed at stretching the concept of policy entrepreneurship this far. Indeed, the difficulty of making a direct connection between the work of the entrepreneurs and specific instances of low energy housing policy change perhaps reinforces this view. Further, the entrepreneurs themselves also show a degree of ambivalence about the effectiveness of policy change in driving low energy housing (as opposed to, for example, directly engaging with private sector housebuilders and members of the public). Whilst recognising these concerns, I suggest that a broadening of the concept of policy entrepreneurship brings it more up to date with contemporary theories of governance – especially those regarding environmental governance – which see an enhanced role for non-state actors in processes of change and innovation (Bulkeley and Betsill, 2003; Newell, 2000; Okereke et al., 2008; Sending and Neumann, 2006). Moreover, the attention to the materiality of entrepreneurial activities and strategies also opens new avenues of research and potentially valuable new applications of the idea of policy entrepreneurship, for instance in considering the close connections between entrepreneurs and demonstration projects, and the potential for non-human objects to have agency in processes of policy change.

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