

## Is the Issue of Climate Change too Big for Spatial Planning?

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INTERFACE

## Is the Issue of Climate Change too Big for Spatial Planning?

Concerns about the nature, pace and implications of climate change have been the subject of academic and scientific debate for many years. However, it is intriguing, even in the few months since we first commissioned the articles for this issue of *Interface*, how quickly discussion has moved on. Climate change is now not just a matter for debate over middle-class dinner tables, world summits of the eco-conscious and, perhaps, even (junior) government ministers or conferences of anorak clad scientists, who spend much of their lives dodging frostbite in the world's polar regions. It has become an issue about which it is virtually impossible to listen to any of the broadcast media without hearing mention or to pick up a newspaper or magazine without encountering an image of a receding glacier or the cracked and baked soil of a once fast flowing river bed. Images of the plight of (cuddly) famished polar bears clearly make good copy, but it is symptomatic of the transition of debate about climate change from the scientific and academic to the popular. It is also a reflection of changing assumptions about the timescale within which the implications of climate change will have demonstrable impacts; that is to say in the life time of *our* generation not for unspecified generations sometime in the future. Consequently, it is notable in the UK how often the words of the British government's chief scientific adviser, Sir David King, that climate change represents a bigger challenge to the world than global terrorism, have been quoted recently. So climate change is a significant issue, and according to some possibly the most important issue currently facing the world, but what if anything does this have to do with spatial planning? The purpose of this *Interface* is to explore precisely this question: to seek to understand the nature of the spatial implications of climate change and to explore the constraints and opportunities for action.

Climate change, like perhaps global poverty, can feel like an issue that is too big to handle either personally or for that matter collectively as a spatial planning community. The sense of 'What can I do in the face of such an enormous challenge?' brings with it both a feeling of impotence and a tendency to place one's head resolutely in the metaphorical sand. However, Rittel & Webber (1973) eloquently reminded us that the problems with which planning is concerned are 'wicked' in nature. They are complex, multifaceted and dynamic. Given such an analysis of planning problems, climate change might seem nothing out of the ordinary for planners. Hence it is important to remember the lessons from policy analysis. Taken as a whole the implications of climate change can appear bewildering and insurmountable, but the art of effective policy making is dependent on how the problem, or series of problems, is defined. As many of the following contributions indicate, action on climate change is first dependent on problem definition. Moreover, those involved in policy making need to be ever vigilant of whose definition dominates, what assumptions lie behind such definitions and to what extent problem definition constrains the scope for action or the extent of the options and possibilities considered. There may just be more scope for action than appears possible at first glance. Certainly the following contributions suggest this to be the case, even if they

simultaneously warn of difficult and uncomfortable challenges that will have to be confronted by governments, societies, planners, communities and individuals across the globe.

The issue consists of a lead article by Harriett Bulkeley followed by four commentaries. All the contributors have considerable experience of the field of climate change and spatial planning, either as researchers or practitioners. Bulkeley's article provides great clarity and insight into the issues raised by climate change for planners in the context of the British policy environment. She cogently sets out the dimensions of the debate, in turn outlining how planning (potentially) has a role in minimizing both the causes and consequences of climate change. However, she also highlights how lessons from policy development in the area of sustainable development suggest there is frequently a gap between policy rhetoric and outcomes on the ground. More particularly, how planning becomes a mechanism not for action and change but rather a site of contestation between a dominant agenda of economic growth and a less powerful discourse of environmental concern; that is between different conceptions of the public good (see Owens & Cowell, 2002). Bulkeley concludes that this process of contestation plays a vital role in determining how the spatial problems associated with climate change become defined and hence inscribed on cities and countryside. The article emphasizes that it matters how the planning community responds and manages these processes and it includes examples of planning authorities which have shown that it is possible to move from rhetoric to action.

Bulkeley's conclusions are resoundingly endorsed in the first commentary by Roger Levett, a British planning consultant specializing in environmental concerns. Levett notes the tensions and contradictions within British planning policy, and through the example of car use seeks to explore how a vicious circle can be converted into a virtuous circle. He does not assume that this will be easy and underlies this point by emphasizing that it requires societies to ask of themselves fundamental questions about the nature of contemporary human well-being.

The three commentaries that follow draw on experience and research in Canada, the Netherlands and Denmark in order to shed further light on the key concerns and evolving planning practices in relation to climate change. Pamela Robinson highlights some real successes by Canadian municipalities and of growing citizen action in relation to recycling and domestic energy efficiency. However, she sees the real challenge to be one of linking concern with the reduction of greenhouse gas emissions to debate about urban form, more especially of confronting the aspiration of suburban living. Robinson sees citizen engagement and education as having a central role to play in this regard and describes an innovative project being undertaken in the Georgia Basin.

In contrast, Jochem de Vries cautions the planning community not to set their ambitions too high. His commentary draws on experience in the Netherlands, where he sees concern with mitigation to be more pressing and also offering greater potential for achievement than trying to adapt behaviour so as to diminish the causes of climate change. In the context of a country where 35 per cent of the land is below sea level such priorities are perhaps not surprising. De Vries indicates awareness in the Netherlands that the traditional technological fixes, of for example heightening the dikes, will not provide adequate protection and that water management needs to be better integrated into spatial planning. Overall he sees the need for clear definition of the problems raised by climate change and of the need to devise policies that encourage environmentally sensitive development, not 'no' development.

Finally, Kirsten Halsnæs points to the relative inadequacy of much of the data about climate change at the local or even regional scales. Based on her work in Denmark she

regards it as important that planning responses are found which achieve simultaneously both economic and environmental goals. While some of the earlier contributors question whether such actions could be realized without compromising the ability to combat climate change, Halsnæs regards such an approach as the only practicable option.

Together the articles in this *Interface* outline the issues and critical debates climate change raises for spatial planning. They also provide a rich array of examples of what can be done if individuals and societies have a commitment to act and make a difference.

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# A Changing Climate for Spatial Planning

HARRIET BULKELEY

## Introduction

Climate change is difficult to avoid. The almost daily accounts of weather events, scientific evidence, international negotiations and technical innovations linked to the issue of global climatic change dominate the reporting of environmental issues in the media. At the same time, the enormity of the issue and the scale of action required suggest that the possibility, and responsibility, for action lie far beyond the mundane routines of everyday practice. In this context, spatial planning might seem to have both everything to do with climate protection—reducing the impacts of climate change and addressing its root causes—and at the same time little to offer in terms of pragmatic solutions. The recognition of the local to global nature and consequences of climate change has led to an increasing interest in responses at multiple levels of the political system and in different policy arenas. Municipal governments are pledging action to address the problem in places as far apart as Denver, Newcastle, Johannesburg and Mexico City and transnational networks are emerging through which to share best practice and mobilize political and financial support. At the same time, regional authorities, in particular the US states and Canadian provinces, are seeking to act on climate change, sometimes in the absence of political support or incentives at higher levels of authority. Climate protection is becoming a political and policy issue that is not just confined to the vagaries of international diplomacy and national government targets, but is taking shape regionally and locally.

The same is true in the UK. Since 2000, over 100 local authorities have signed the 'Nottingham Declaration' on climate change, committing themselves to addressing the

Correspondence Address: Harriet Bulkeley, Department of Geography, Durham University, South Road, Durham DH1 3LE, UK. . Email: h.a.bulkeley@durham.ac.uk

causes and consequences of climate change, and many have been involved in the issue for over a decade through their own initiatives and membership of transnational networks such as the Cities for Climate Protection programme and Energie-Cities. While national government action on the issue has tended to focus on emissions from the industrial sector, through, for example, the Climate Change Levy and emissions trading programmes, most of UK emissions fall within the domestic and transport sectors, over which, to date, little action has been taken and within which spatial planning has a key role to play. Likewise, the predicted impacts of climate change—of storms, flood events, sea level rise, and changes in biodiversity—are issues about which spatial planning decisions can effect vulnerability and resilience to change. However, despite the increased rhetoric about the importance of addressing climate protection at local and regional levels, questions remain as to how this rhetoric is being translated in the realities of spatial planning policy. The first section of this article outlines how planning and climate protection policy have evolved over the past decade, before considering recent changes which appear to open up greater possibilities for including climate protection in spatial planning. In the second section, the focus turns to how spatial planning might be able to deliver climate protection in three key areas: energy supply, energy demand, and addressing the impacts of climate change. Addressing such issues is not without its challenges, and the third section of the article considers three critical issues that are emerging as the agenda of addressing climate protection becomes a reality. In conclusion, the argument is made that the climate for spatial planning is changing, but there remain significant hurdles to achieving change on the ground.

### **Sustainable Development, Climate Change and Spatial Planning in the UK**

For more than a decade, spatial planning has been seen as playing a critical role in determining and delivering sustainable development. Throughout the 1990s, revisions to Planning Policy Guidance on the scope and intent of the land-use planning system, transport planning, regional planning and housing, to name just a few, took place and a new approach to planning which addressed environmental concerns in the 'widest sense' was developed and endorsed at national and local levels (Bruff & Wood, 2000; Bulkeley & Betsill, 2003; Healey & Shaw, 1994; Owens, 1994; Owens & Cowell, 2002). However, despite the inclusion of sustainable development as a policy principle within planning policy at national and local levels, Owens & Cowell (2002, pp. 24–25) argue that "there was still, by the end of the 1990s, a sense of implementation deficit". Within this context, and given its relatively esoteric nature, the integration of climate change concerns remained rhetorical at best. Indeed, many of the principles which had begun to creep into land use and transport planning during the 1990s, e.g. mixed use development, reducing the need to travel and better (environmental) design, had the potential to reduce emissions of greenhouse gases, and were often justified in these terms. Equally, the evolving UK Climate Change Programme placed emphasis on the role of spatial planning in delivering emissions reductions through such means (DETR, 2000a). However, there was limited evidence that policies and measures related to energy conservation were being integrated into the majority of strategic planning documents or development control decisions (Bruff & Wood, 2000; Counsell, 1998). While individual local governments across the UK, including, for example, Leicester, Newcastle and Kirklees (Bulkeley & Betsill, 2003; Bulkeley & Kern, 2004), were developing climate change strategies, and seeking to integrate climate change considerations into land-use planning strategies and decisions, progress was slow and limited to some specific sites (Bulkeley & Betsill, 2005). The

'implementation deficit', which had dogged progress with respect to sustainable development, appeared to be at least as significant when it came to joining up the aspirations that spatial policy could provide a means of addressing climate change with the realities on the ground.

Recent changes to the nature of spatial planning, coupled with the development of climate change policy, have, however, led to some significant shifts. Since coming into office in 1997, the Labour administration has been committed to a target of reducing the emissions of carbon dioxide, the most significant greenhouse gas, by 20 per cent below 1990 levels by 2010. Although the UK appears on target to meet its official Kyoto target of reducing all greenhouse gases by 12.5 per cent by 2008–2012, current estimates suggest that emissions of carbon dioxide will only be reduced by 14 per cent by 2010 (DEFRA, 2005). Despite this, in the 2003 Energy White Paper (DTI, 2003), the government committed itself to the further aspirational target of a reduction of carbon dioxide of 60 per cent below 1990 levels by 2050. In the new strategy for sustainable development, *Securing the Future* (DEFRA, 2005), climate change is considered to be 'the greatest threat' and is placed squarely at the heart of the strategy and its twin core principles of respecting environmental limits and creating a strong, just and healthy society. *Securing the Future* goes on to argue that:

The land-use planning system provides the key framework for managing development and the use of our land in ways which take into account the sustainable use of our natural resources; for example, by promoting or encouraging the use of renewable energy in new developments and reducing the use of non-renewable resources (and emissions) by locating development where it can be accessed by means other than private car. (DEFRA, 2005, pp. 88–89)

With the passing of the Planning and Compulsory Purchase Act 2004, there is now a duty on planning bodies and authorities to ensure that regional and local plans are prepared with a view to contributing to sustainable development. The new Planning Policy Statement 1 (PPS1), which provides the framework for spatial planning in the UK, states that "development plans should ensure that sustainable development is pursued in an integrated manner, in line with the principles for sustainable development set out in the UK strategy" (ODPM, 2005a, p.13 (i)). This implies that regional bodies and local authorities will have to give attention, and priority, to those issues and principles at the heart of the new UK strategy, including climate protection. More explicitly, PPS1 states that:

Regional planning bodies and local planning authorities should *ensure* that development plans contribute to global sustainability by addressing the causes and potential impacts of climate change—through policies which reduce energy use, reduce emissions (for example, by encouraging patterns of development which reduce the need to travel by private car, or reduce the impact of moving freight), promote the development of renewable energy resources, and take climate change impacts into account in the location and design of development. (ODPM, 2005a, p. 13 (ii), emphasis added)

While previous planning guidance suggested, for example, that the potential for regions to mitigate climate change or their vulnerability to impacts should be 'considered' (PPG11, in ODPM, 2004), or that planners should "promote the energy efficiency of new housing where possible" (DETR, 2000b, p. 3), the language of PPS1 is clearer; planning bodies and



authorities need to *ensure* that both the causes and impacts of climate change are addressed.

Given the (fortunate) coincidence of the development of a longer-term vision and increased political weight on the issue of climate change with reforms to the spatial planning system, there is a real opportunity, and indeed some would say requirement, to change the policy footing of climate change within spatial strategy. There is also emerging evidence that, at the level of policy principle and rhetoric at least, this is taking place. The recently drafted Regional Spatial Strategy for the South East of England, for example, sets a target for the region of a 20 per cent reduction in emissions of carbon dioxide on 1990 levels by 2010, rising to 25 per cent by 2015, with a further target for 2026 to be set. It goes on to state that: “mitigation, through reducing greenhouse gas emissions, will primarily be addressed through greater resource efficiency” and that “adaptation to risks and opportunities will be achieved by: guiding strategic development to locations offering greater protection from impacts such as flooding, erosion, storms, water shortages and subsidence” amongst other measures (SEERA, 2005). In the Yorkshire and Humberside Regional Climate Change Strategy, the draft RSS policy commitment to climate change is also outlined, so that it is expected that policies and proposals are included in development and transport plans, as well as investment programs to “help reduce the Region’s greenhouse gas emissions by at least 20 per cent below 1990 levels by 2010, and by at least 25 per cent below 1990 levels by 2015” while also taking “into account the land-use implications of the predicted impacts of climate change on their area” (GOYH, 2005, p. 10).

Each of these examples shows that the ambitious rhetoric of using spatial planning as a means of driving down emissions of greenhouse gases and as a necessity for combating the impacts of climate change has been adopted in at least some areas of the UK. This raises very real questions about how spatial planning can indeed be enrolled to these ends and whether it can deliver real changes on the ground.

### **Putting Climate Protection into Planning Practice**

There is then a growing sense that spatial planning not only has an important role in addressing the causes and impacts of climate change, but that it is increasingly required to do so. However, these broad policy pronouncements are light on detailed recommendations about just how such actions should be pursued and achieved. *The Planning Response to Climate Change: Advice on Better Practice* suggests that responses to climate change include action in relation to the built environment, infrastructure, locational decisions and rural environments and land use, which range from considerations of orientation for passive solar gain, sustainable urban drainage, and accessibility to flood plain risk, biodiversity and water resources (ODPM, 2004, pp. 29–31). No doubt all of these issues can be considered, but there is a real danger that in making climate protection the all encompassing issue at the heart of sustainable development the urgency of addressing the issue will be diluted and a focus on the ways in which spatial planning can have the most impact will be lost. There are three critical areas of spatial planning within which the rhetoric of addressing climate change has already been established and there is significant potential for action—energy supply, energy demand and adaptation—which could provide the focus for policy development and implementation.

*Changing Energy Supply*

Shifting the balance of energy supply away from a dominance of fossil fuels towards other sources of energy is a critical aspect of mitigating climate change. The Energy White Paper (DTI, 2003) emphasized the need to develop renewable energy technologies, re-iterating the target that 10 per cent of electricity should be generated from renewables by 2010, with the aspiration of achieving a rate of 20 per cent by 2020.<sup>1</sup> The Energy White Paper called for the planning system to be 'streamlined and simplified' and for the ODPM to revise PPS22 in order that the inclusion of renewables (and energy efficiency) in developments could be taken into account in the planning process (DTI, 2003, p. 4.3). The revised Planning Policy Statement 22 (PPS22) on Renewables takes the ambitions of the Energy White Paper to heart and states that:

Regional spatial strategies and local development documents should contain policies designed to promote and encourage, rather than restrict, the development of renewable energy resources. (ODPM, 2005b, p. 1.2)

And further, that:

The wider environmental and economic benefits of all proposals for renewable energy projects, whatever their scale, are material considerations that should be given significant weight in determining whether proposals should be granted planning permission. (ODPM, 2005b, p. 1.4)

To ensure that this proactive approach to planning for renewables is undertaken, Regional Spatial Strategies are to include a target for the minimum amount of renewable energy generation for the region, to be monitored and increased as capacity is generated, and which "where appropriate ... may be disaggregated into subregional targets" (ODPM, 2005b, pp. 2–5). Regional and local planning authorities are then charged not only with encouraging the development of renewable energy, but also with meeting specific targets for the creation of new renewable energy capacity. One means through which this could be achieved is through the inclusion of on-site renewables in new residential, commercial and industrial developments, and PPS22 makes provision that local planning authorities can require a percentage of the energy to be used in such developments to come from on-site generation, provided it is both suitable and does not "place an undue burden on developers, for example, by specifying that all energy to be used in a development should come from on-site renewable generation" (ODPM, 2005b, p. 8).

However, these requirements are not so novel. The London Borough of Merton has required developments of over 1000 m<sup>2</sup> to incorporate renewable energy generation of at least 10 per cent of predicted energy requirements, and is seeking to include a policy in their Local Development Framework which would extend this to new build and conversion projects of over 500 m<sup>2</sup> (FoE, 2005a, p. 7). In London's Energy Strategy, the Mayor seeks to use his planning powers to improve the amount of renewable energy generated in the city by requiring applications referable to him to incorporate renewable energy technologies, and expecting major developments to generate at least ten per cent of their energy needs from renewable sources (Mayor of London, 2004). However, such targets have not become widespread, and there is evidence of a lack of intention on the part of local planning authorities to pursue such an approach in their Local Development Frameworks (FoE, 2005a, p. 7). This is, perhaps, unsurprising. While the need to materially consider renewable energy generation and capacity through spatial planning has clearly made its way into national policy frameworks, there continue to be competing



demands on the planning system, not least securing economic regeneration and development, which may be seen to run counter to requiring developers to reconsider how energy is provided for new (and existing) developments. At the same time, the planning system has traditionally been geared towards control or prevention, rather than proactive planning in which some forms of development can be promoted over others, and, not least with an issue which causes much local controversy, the extent to which planning practitioners will wish to be perceived as 'taking sides' in the debate over renewables remains to be seen.

### *Managing Energy Demand*

While changes to energy supply constitute an important means of addressing emissions of greenhouse gases, such initiatives will make little headway in the face of ever increasing demands for energy use. The impact of planning on the form and design of urban areas and consequently on energy use has attracted sustained attention over the past decade. Clearly, while the location, density and design of development alone cannot reduce energy use in urban areas, how developments are designed and planned will have a significant impact on future emissions of greenhouse gases (Bulkeley & Betsill, 2003). Spatial planning was seen to have two key roles to play in shaping energy demand, first, through the design of new developments, second, through policies on location and access. In terms of the form and design of new developments, policies which promoted energy efficiency, passive solar gain and the use of brownfield sites, to name but a few, were frequently couched in terms of their potential impact on climate change. One early pioneer in the UK in seeking to integrate climate change concerns with land-use planning was Newcastle City Council, who commissioned a study in 1992 on the potential for addressing climate change in the urban environment and which included in their 1998 Unitary Development Plan policies to encourage developers to improve the energy efficiency rating of new buildings above national standards and incorporate passive solar design (NCC, 1998, pp. 44–45), and subsequently developed supplementary guidance notes which encourage energy efficiency (NCC, 2000). As guidance such as PPG3, on housing, was revised to include the suggestion that planning authorities should "promote the energy efficiency of new housing where possible" (DETR, 2000b, p. 3), such strategies and supplementary planning guidance began to become more widespread across UK local authorities.

However, despite these innovations during the 1990s, the role of spatial planning in managing energy demand in the built environment is limited, as standards of building design are controlled by national building regulations. Nonetheless, shifts in the underpinning framework of spatial planning, notably the statutory duty to address sustainability and PPS1 with its requirement for planning authorities to address climate change, suggest that, at least for those planning authorities which wish to do so, there is now greater scope to move beyond the current provisions of the Building Regulations. Likewise, the introduction of the Code for Sustainable Buildings in early 2006 appears to set the precedent that Building Regulations, however much they may have recently been improved, are still not delivering sustainable buildings and provide planning authorities with further justification for requiring higher standards from development.

In terms of the second key means through which spatial planning can affect demand for energy, the location of development and policies on access, a variety of policy guidance produced through the 1990s have encouraged the planning system to facilitate the use of inner-city sites, promote mixed use and reduce the need to travel by car while promoting alternatives such as public transport, cycling and walking. Reinforcing these shifts, early

guidance on the development of Local Transport Plans directed local planning authorities to engage more explicitly with climate change:

At the moment local authorities tend to address climate change under the wider banner of Local Agenda 21. We will expect authorities to consider what more might be achieved through action on local transport. LTPs should, therefore, have as one of their objectives, the aim of contributing to reducing the forecast growth in CO<sub>2</sub> emissions from transport. (DETR, 2000a, p. 71)

However, in the most recent guidance, issued in 2004, the goal of addressing climate change, is removed and instead climate change is included as one of a range of optional 'quality of life' indicators which local transport planning authorities can choose to include. Rather than seeking to move beyond Local Agenda 21 and provide a more focused arena for action, LTPs are now required to complement action taking place elsewhere, albeit that there is still (however softly spoken) at least some recommendation that such policies should demonstrate the potential for emissions reductions:

LTPs should take account of the UK's CO<sub>2</sub> targets and should complement the wider aims of Local Agenda 21. The Department is however also keen for authorities to lead by example and demonstrate through LTPs how wider local transport policies would contribute to the achievement of CO<sub>2</sub> targets. (DfT, 2004, para. 95)

In both these areas of potential influence, the role of spatial planning in managing, or indeed reducing, demand for energy has been undermined by the persistent undertow in the planning system that it should seek to meet predicted demand for growth (of housing, traffic volumes and so on), and the seemingly inextricable links drawn between economic development, the growth of the built environment and increased mobility.

#### *Adapting to the Impacts of Climate Change*

One final means through which spatial planning is involved in climate protection is in terms of developing resilience to the predicted impacts of climate change. In a recent study of how different sectors were responding to the future risks of climate change, it was found that, while threats of flooding and water supply issues were commonly mentioned by respondents from the land-use planning sector, "surprisingly, few local authority respondents identified specific planning implications for the location of development" (SEEDA, 2004, p. 15). There is little evidence of how far the provisions of PSS1, that planning authorities should ensure that the potential impacts of climate change are addressed, are already being put into practice at regional and local levels in the UK. On the one hand, the SCOPE study suggests that action on climate protection has been primarily directed at mitigating the causes of the problem (SEEDA, 2004, p. 15), while on the other hand Friends of the Earth lament that at both the regional and local level planners have been too occupied with the impacts of climate change to worry about the root causes of the issue (FoE, 2005a, 2005b). Certainly, the UK Climate Impacts Programme has made significant steps in developing partnerships at a regional level and seeking to make relevant information available to local authorities, and regional climate change strategies including the issues of adaptation exist for all regions in England. However, given a lack of empirical evidence and the flux in the planning system at the current time, there is uncertainty as to how such considerations are being integrated into new regional spatial strategies and local development frameworks, and whether such

policies are being prioritized at the expense of addressing those issues of mitigation discussed above.

Nonetheless, what is clear is that the headline issue of flood risk, and the uncertainty surrounding future climatic change, is being taken into account. A recent report by the Environment Agency found that “almost all LPA development plans now include flood risk statements or policies, and the newer plans are beginning to reflect the content of PPG25” (EA, 2004, p. 3). Planning Policy Guidance 25 (PPG25), on Flood Risk, was approved in 2001 and makes it clear that the “the susceptibility of land to flooding is a material planning consideration” and that planning authorities should “consider how a changing climate is expected to affect the risk of flooding over the lifetime of developments” (DETR, 2001). Nonetheless, although the ODPM maintains that the number of applications which go ahead against the advice of the Environment Agency has halved since the introduction of PPG25 (ODPM, 2005c), a significant number of developments—22.5 per cent of those applications to which the Environment Agency had objections on flood risk grounds in 2004 (EA, 2004)—continue to be built in ‘at risk’ areas, suggesting that at least in a good number of locations factors other than flood risk are driving the development process. In recognition of this, revisions to PPG25 are due to take place in the near future. In other areas of vulnerability, including biodiversity, infrastructure and water supply, national policy guidance is more fragmented and less clearly set out in relation to spatial planning. The recent advice on best practice, *The Planning Response to Climate Change*, illustrates that while some planning bodies are taking account of the risks of climate change across a diverse spectrum of issues, much is still to be done. It recommends, for example, that “planning bodies at local and regional level are advised to adopt the precautionary principle in formulating policies which allow for change and uncertainty in the supply of water, and which promote water efficient development” (ODPM, 2004, p. 48). While issues of energy supply and conservation have to date been weakly developed within planning policy, those surrounding water are notable by their absence in most cases, and in seeking to address both the causes and consequences of climate change are likely to become ever more pressing.

### Critical Challenges

The coincidence of changes to the spatial planning system, the reworking of the UK’s sustainable development strategy and the development of energy and climate change policy provide a significant opportunity for acting on climate protection locally and regionally. The broad aims of climate protection are being translated into planning policy in the areas of changing energy supply, managing energy demand and addressing the impacts of climate change. However, to date the integration of climate protection with spatial planning seems to have taken place mainly at the level of rhetoric and principle, and there are real challenges in translating these good intentions into practice. While there are, of course, questions about whether there is sufficient expertise and interest within spatial planning communities to address climate protection, the issues reach beyond these practical matters. Rather, the challenges arise because planning does not provide a conduit through which pre-existing concepts are transferred from policy principles into practice, but is an arena in which the meaning of sustainability is constructed and contested (Owens & Cowell, 2002).

### *Time and Tide*

There is some irony in the argument that one critical challenge within spatial planning is both the need to develop longer time horizons within which to take into consideration issues of climate protection, and the need to act swiftly to put such strategies in place. It could, with some justification, be argued that spatial planning is one area of public policy within which long time horizons are considered as a matter of course. However, recent guidance on the development of Regional Spatial Strategies, with a 15–20 year vision, suggests that this may not be adequate for considering adaptation to climate change, where there may be a “need to look beyond the end of this period . . . since some relevant forecasting horizons are longer term” (ODPM, 2005d, para.1.4). Whether spatial planning, in practice, can take such futures into account is doubtful. A recent survey of approaches to adapting to climate change found that “even though planning authorities, especially at the strategic level, are engaged in longer-term planning, they appear to be constrained by shorter term political horizons when it comes to climate change” (SEEDA, 2004, p. 15). Unfortunately, these shorter-term political considerations do not appear to be leading to a rapid transfer of new policy principles into planning practice. Although recent reforms to the planning system are intended to speed up decision making (with attendant problems which are discussed further below), plan making and development decisions remain relatively slow, rooted in ‘business as usual’, and constrained by competing agendas about the nature and purpose of (sustainable) development.

### *Enabling or Enforcing?*

In this context of the contested process of development, the second critical challenge lies in whether the framework established through the range of strategies and policies discussed above is as strong as it is long. While there are obviously an increasing number of statements and goals supporting the development of climate protection within spatial planning, there is less specific guidance as to how this should be operationalized, what does, and does not count, as a material consideration for the planning process, and what the new language of taking account of climate change really means. For example, a recent report by the Sustainable Buildings Task Group argued that there was still a lack of clarity as to whether PPS1 provided a sufficient basis for the delivery of sustainable development:

PPS1 will be a crucial tool in delivering this duty but we believe it needs to be much clearer about the extent to which the planning system can *require* more sustainable building practices in support of the new sustainable development duty, as opposed to merely *encouraging* or *promoting* them. (SBTG, 2004, p. 19)

Without a more robust vocabulary, and clearer specification of what is included and excluded by a serious engagement with climate protection, it is unclear whether the majority of planning practitioners will be willing or able to embrace this new agenda. Given the contested nature of many of the issues raised by taking practical action for climate protection—be that concerning the energy efficiency standards of new buildings, or the development of renewable energy capacity—and the multiple interests invoked, there remains a “fundamental dislocation between competing interpretations of what it means for development to be sustainable” (Owens & Cowell, 2002, p. 25) which is not removed by invoking motherhood and apple pie statements about climate change. If, as I have suggested above, climate protection can now be thought of as a material consideration for spatial planning, this does not mean that other such considerations such as the need to provide decent housing, to protect landscapes and, of course, promote

economic development, disappear from view. Equally, given the wide-ranging nature of the issue, there may be multiple, and conflicting, 'climate protection' considerations at play in any one setting. Rather than providing a blueprint, the appearance of climate protection on the spatial planning horizon may serve to bring tensions between the economic, social and environmental dimensions of sustainable development to light (Bulkeley & Betsill, 2005).

### *Backyards and Brickbats*

Nowhere are such tensions perhaps more apparent than in 'backyards' up and down the country. Addressing climate change is placing an assortment of unwanted land uses firmly back on the planning agenda, and in the process splitting the environmental movement. On the one hand, some environmental groups, notably Greenpeace and Friends of the Earth, support the development of renewable energy, including on-shore wind farms, while other (usually more local) environmental groups oppose such developments. As a further energy review gets underway, and the issue of replacing the UK's nuclear energy capacity moves into the debating ring, committed environmentalists, such as George Monbiot, are asking whether there is really an alternative (Monbiot, 2005). In the context of bitter disputes, real issues arise as to whether the planning system can mediate and deliver an approach which protects the climate, but not at any cost. One solution has been to seek other technical fixes, hence the resource ploughed into off-shore wind and the growing interest in micro-generation, bringing renewable energy back to the urban environments in which it is primarily used. Another has been a set of political and policy solutions, wrought through reform to the planning system, which seeks to overcome local challenges to the national interest by allowing the Secretary of State to determine whether such projects should go ahead. In the context of renewables, for example, the intention is clear:

Planning policies that rule out or place constraints on the development of all, or specific types of, renewable energy technologies should not be included in regional spatial strategies or local development documents without sufficient reasoned justification. The government may intervene in the plan making process where it considers that the constraints being proposed by local authorities are too great or have been poorly justified. (ODPM, 2005b, 1.3)

Such approaches fit the dominant storyline of siting controversies which poses national need against (irrational) local objections, viewing "conflict over siting essentially as a problem of policy implementation; universal goods have somehow to be reconciled with the particularities of individual locations" (Owens, 2004, p. 105). However, as Owens (2004) goes on to argue, what is often voiced in local brickbats are "divergent conceptions of what that public good should entail" (2004, p. 110). As questions are re-iterated at the local level through multiple protests about the nature of development pursued, at least in part, for climate protection ends, broader questions about the mainly technical and economic fixes suggested for the climate change problem may be raised. Rather than framing the debate between different forms of energy supply in terms of how the looming 'energy gap' may be filled, such conflicts may lead to questions as to where this 'gap' comes from and how else it might be resolved. However, the challenge for spatial planning is that it has few answers to such fundamental questions which do not lead down a path of demand reduction—for housing, for energy, for mobility—which is seen as antithetical to the economic development it is charged with promoting.



## Conclusions

In sum, the climate for spatial planning is changing. Climate protection considerations are central to the new strategy for sustainable development and the planning framework that is charged with delivering this agenda. The gradual accumulation of planning guidance across a range of arenas, including housing, regional planning, transport, flooding and renewables, to name just the most obvious examples, provides a significant basis upon which to build regional and local strategies. There is evidence that regional bodies and local authorities are beginning to integrate climate protection into these strategies, at the rhetorical level at least. However, in seeking to put climate protection into practice, spatial planning faces some key challenges that it alone cannot resolve but with which it must engage. First, the need to shift the time horizons of political decision making into the future, yet act quickly. Second, the imperative to create a more robust and specific language which can be used to promote climate protection in the face of competing demands on the planning system. Finally, the requirement to find a means of dealing with the controversies that arise from seeking to resolve a collective problem in specific places. The critical issue at stake here is one of recognizing that such concerns may reflect a broader critique of the inadequacy of the ways in which we are trying to address climate change and, indeed, of how we are defining the problem.

## Note

1. The recent launch of a further review of energy policy places the nuclear energy firmly on the agenda, an issue to which I return later in the paper.

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## COMMENTARY

# Planning for Climate Change: Reality Time?

ROGER LEVETT

Taking time out to write this from advising various bodies on building climate change into their plans, I find the picture Harriet Bulkeley paints familiar and true. As one example,

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our very rough estimate (subject to caveats too multiple and elaborate to list here) is that the climate change policies in the current draft of the Regional Spatial Strategy (RSS) for the South West of England, which already go about as far as possible in the current planning regime, might reduce carbon dioxide emissions per person by around 4 per cent a year by 2026. But trunk road expansion policies in the same draft RSS could easily cancel all this out, and the South West's share of the government's proposed expansion of air travel would make a nonsense of all this hard work by increasing climate change impacts by about 10 times this amount (SWRA, 2006).

In this piece I offer a systemic explanation for why, as Bulkeley points out, despite so many earnest statements of principle and aspiration, planning is failing to cut greenhouse gas emissions. This implies a need for a different kind of planning, which would entail the slaughter of herds of sacred cows. I end by arguing that the climate debate is now moving so fast that the hitherto unthinkable may rapidly become acceptable.

### Searching for a Virtuous Circle

Consider what happens when, for whatever reason, someone decides to make a journey by car instead of bus. This will slightly worsen the bus service, by subtracting a bit of ticket revenue and by adding a bit of congestion. This will tip more people on the margin into choosing to drive instead of taking the bus. This will further worsen the bus service, encouraging still more people to desert it . . . and so on. This is a *positive feedback loop*: a set of causal steps that have the overall effect of amplifying the original change.

Each of these changes has further knock-on effects. Figure 1 attempts to capture these relationships.

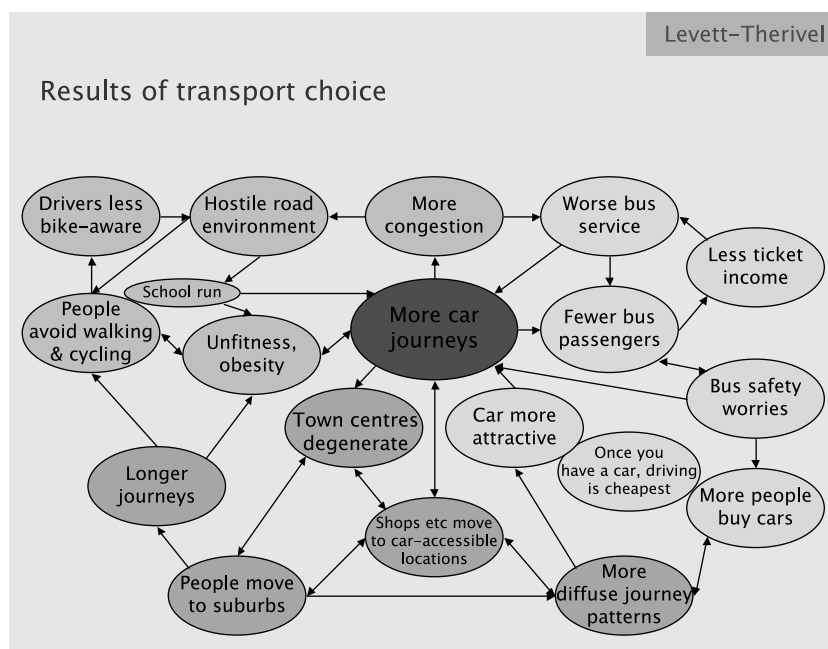


Figure 1. Transport choice: a vicious circle. Source: Levett-Therivel.

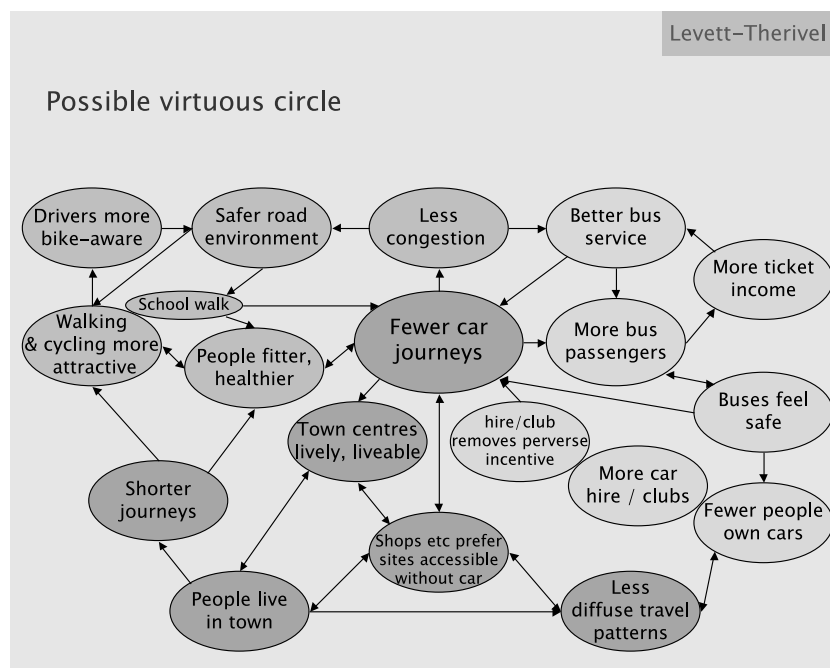
Figure 1 shows how, over time, one decision to drive instead of taking the bus can propagate and amplify through the urban system, triggering cascades of further decisions, each of them perfectly sensible and rational for the people concerned, but whose cumulative results nobody wanted: degraded inner-city areas with concentrations of disadvantage, middle-class flight to suburbs, people without access to cars increasingly disadvantaged and excluded, everyone (including car owners) having to travel further and more vexatiously, ever greater dependence on cars and petrol burning, and healthy exercise taken out of lives.

Various policies now try to oppose these effects, but they are only slowing trends in the wrong direction, because intervention at any one point in the web of connections is limited and neutralised by all the other feedback loops left working. Since the early 1990s land-use plans have sought to direct development to locations near users and public transport. This has certainly prevented a great deal of out of town development and urban decay that would otherwise have happened. But it has only obstructed the trend, not reversed it. This is because developers of housing, shopping, leisure or offices are well aware that the customers and visitors they want, that is, the wealthier ones, want to come by car, so if planners push them too hard towards locations with restricted parking or road access, they will simply take their ball away. A recent example: during a sustainability appraisal of a regeneration plan for a derelict edge of centre area of an English city, I challenged the amount of car parking planned for what was intended to be a highly sustainable science park. The planners' reply was that plenty of parking was top of the 'shopping list' for the types of businesses the development hoped to attract. Restricting it would not strike a blow for sustainable transport, but just jeopardise the viability of the whole project. This kind of thing is happening all the time.

On the positive side this development, like many others, is designed to be easy to access by bus. Considerable funding is going in to improving public transport all around the UK. However, because amenities have already been allowed to disperse out of town centres to a fragmented rag-bag of locations, most people's life routines now depend on making complicated criss-cross patterns of journeys at very specific times to get from one commitment to the next. These are impossible to service by public transport because there are far too few people wanting to travel between each pair of points to support a service frequent enough to come near to matching what the car can offer, so most journeys involve long waits and/or multiple changes. The only people who avail themselves of the 'expansion of transport choice' being so expensively bought are in fact those who have no choice: the halt, the lame, the poor, the blind, the drunk, the banned, and the very young and very old who cannot impose on their parents or children to play chauffeur: those who are excluded from the 'great car economy', and therefore also excluded from the opportunities and satisfactions others take for granted, as they spend maybe between 30 and 90 minutes waiting for two sparse and poorly connecting buses to make a journey which takes 10 minutes by car. While this is the reality, serious restrictions on car use are politically impossible.

'It doesn't have to be like this'. Many continental cities already approximate to the mirror image of Figure 2, where all the feedback loops reinforce virtuous rather than vicious circles.

Our challenge for sustainability is to replace the vicious with the virtuous pattern. The easiest place to do this is new settlements where the anti-sustainable patterns are not already established. But even here, it will take a much more ambitious, proactive and pervasive kind of planning than we currently have.



**Figure 2.** Transport choice: a virtuous circle. *Source:* Levett-Therivel.

One element of this would be requirements for all major trip generators to be in urban centres where they can both anchor and benefit from the second element, radial public transport from residential areas to centres, good enough to make driving unnecessary for most people most of the time. This would make politically acceptable a third element, stringent restrictions on keeping and using cars in the urban area (with car clubs to provide for occasional driving without needing to own a car). A fourth would be for all schools, hospitals and other public services to be required to reach uniformly high minimum standards, so very few users would have any motivation to 'choose' other than the closest one.

It would also be possible to 'flip' existing settlements into this pattern given sufficient political will and 'staying power' to enact and enforce a co-ordinated package of fairly coercive reforms which would only yield their benefits after some years of unpopularity and disruption.

This so totally contradicts current political orthodoxy about the virtues of extending individual choice, superiority of market mechanisms and hostility to intervention that it may seem fantasy even to suggest it. But this is where things may be changing. There is a growing body of research (for example Levett *et al.*, 2003) which suggests that choice can create more problems than it solves, and that a less mobile and lower carbon society could increase human well-being (for example Local Government Association, 2005).

Most significantly, as Sara Parkin put it, "the earth is doing its own canvassing". It is now difficult to open a serious newspaper without reading more evidence for the reality, graveness and urgency of climate threats. It is now clear the risk of unstoppable catastrophic climate change will rise sharply if we do not globally make drastic reductions within years rather than decades.

This terrifying cloud has one silver lining: it cuts through the pretexts for inaction. Unless high-emitting countries which have politically grasped the issue actually achieve significant cuts within a very few years, there will be scant chance of persuading the US, the current 'rogue state', and China and India, the biggest future threats, to change course in time. We cannot achieve significant cuts in the UK unless we stop emissions from *any* sector from rising significantly, and achieve radical improvements in at least *some* sectors.

This means we can set aside all the elaborate arguments about the precise apportionment of responsibility for emission reductions between countries and sectors, trajectories of change and so on that have provided diversion for elegant diplomatic and academic gatherings for the last few years, and apply one brutally simple decision rule: if any plan, programme, decision or project results in a net increase in greenhouse gas emissions, it is unsustainable, period. True, there is much more to sustainability than carbon, but tackling carbon is a prerequisite for all the rest. It is like crossing a desert: if you are not carrying enough water, it soon is not going to matter very much whether you have packed enough good books to read.

As I write, the South West Regional Assembly is considering adding policies to reduce climate change that it knows greatly exceed current Regional Spatial Strategy powers, and challenging central government to object. These could increase the current draft's 4 per cent carbon dioxide saving to around 30 per cent per person per year by 2026, on course for the government's aspiration of 60 per cent by 2050. This is still short of the major cut within a decade which the latest evidence suggests is necessary, while it is not clear whether elected members will go through with this challenge. But the fact they are even considering it, when only a few months ago another regional assembly chose instead to bury similar recommendations, gives hope.

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# Canadian Municipal Response to Climate Change: Measurable Progress and Persistent Challenges for Planners

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Canada was an early leader in the call to reduce greenhouse gas emissions as the host of the Toronto Conference in 1988. Local government in Canada recognized the importance

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of climate change, with Vancouver and Toronto developing early response plans. Now, in 2006, local government in Canada is the only level of government that can claim any real progress in terms of emissions reductions. Of the approximately 4000 municipalities in Canada, 129 are actively pursuing emissions reductions strategies (see Robinson & Gore, 2005). In the lead article for this edition of *Interface*, Harriet Bulkeley spotlights British municipalities' 'implementation deficit' resulting from a gap between planning goals and implementation with regard to greenhouse gas emissions. Her research and discussion on the British experience begs the question: are Canadian municipalities also suffering from an implementation deficit?

This commentary will begin with a short introduction to the legislative authority of Canadian municipalities in Canada and then review Canadian municipal response to climate change thus far. Following this, the applicability of the implementation deficit concept is evaluated. The article concludes with discussion about the importance of spatial planners engaging the public in future climate change response.

In Canada, municipal governments are 'creatures of the province' who fall under the jurisdiction of provincial governments that define, supervise and regulate which powers municipalities will receive and which activities they will engage in. Generally speaking, in Canada, municipalities:

- exert at least partial control over land use through zoning and official plan documents;
- issue building permits and development approvals;
- control parking supply and prices;
- are responsible for roads and public transit;
- oversee parks and recreation services; and
- play a regulatory and management role in power and gas utilities (Federation of Canadian Municipalities, 2006).

This 'to-do' list of municipal functions, when viewed through the lens of climate change response suggests that despite being at the mercy of provincial governments, municipalities have clear potential to contribute to greenhouse gas reduction. More specifically, using 1990 emissions data it is estimated that Canadian municipalities have direct control, indirect control or influence over approximately 52 per cent of domestic emissions.

There are 129 Canadian municipalities registered with the Federation of Canadian Municipalities (FCM) and ICLEI "Partners for Climate Protection" (PCP) program. This program advocates for a five-milestone process to help direct municipal response (see Table 1). This group of 'action municipalities' includes all of Canada's largest cities and every province and territory.

Canadian municipal success in greenhouse gas reduction has come from the development and implementation of emission reduction projects that include: landfill gas capture, building energy retrofits, deep lake cooling, green procurement, water conservation initiatives, waste reduction efforts, conversion to renewable energy sources and anti-idling bylaws. Further success is anticipated from projects funded by FCM's Green Municipal Funds, a program designed to stimulate investment in municipal infrastructure that reduces environmental impact including decreasing greenhouse gas emissions (see <http://www.sustainablecommunities.ca/GMF/>). GHG reduction success has come from the completion of discreet projects. What remains elusive is progress in tackling the larger, more systemic causes of greenhouse gas emissions, largely urban sprawl. It is Canada's nationwide inability to limit urban sprawl which signals the presence of an 'implementation deficit'.



**Table 1.** Tracking progress of the 129 Registered Participants in the PCP Program

Milestones	Completed	In progress
1: Creating a greenhouse gas emissions inventory and forecast	46	13
2: Setting an emissions reductions plan	27	9
3: Developing a local action plan	16	15
4: Implementing the local action plan or a set of activities	4	11
5: Monitoring progress and reporting results	2	1

Source: Federation of Canadian Municipalities (2006)

In a recent study of the uptake and implementation of smart growth principles in Canada, Tomalty & Alexander (2005), p. 1 reveal that there is:

a large gap between the stated growth management policies found in planning documents of the six [large Canadian metropolitan regions] and accomplishments on the ground. While major progress has been made in terms of language and policy goals, performance is lagging behind considerably.

This research is particularly insightful because of its countrywide view of growth management and its effort to track the gap between policy goals and implementation from 1990–2005.

There is a very strong base of collective knowledge about how to curb sprawl in Canada. Local, provincial, and federal governments together with a plethora of civil society groups have produced a wide range of prescriptive policy and ‘how-to’ handbooks that clearly describe the spatial planning steps needed. Common recommendations include: mixed land use, transit-supportive development, brownfield remediation and the use of more compact form (e.g. New Urbanist style designs, urban infill). Hence, the implementation deficit arises from struggling to implement this knowledge.

Specific communities in Canada have achieved success in planning, designing and building new projects whose urban form is more compact and thus increases the potential for GHG emissions reductions. Some examples of these projects include: Benny Hill Farm (Quebec), South East False Creek (Vancouver, BC), the Dockside Lands Project (Victoria, BC) and Cornell (Markham, ON). While the success of the projects is a source of limited optimism, these pockets of excellence have not yet been widely reproduced across Canada.

Combating sprawl is a political priority in urban regions across Canada with different cities, regions and provinces achieving varying degrees of success (Tomalty & Alexander, 2005). In the case of Ontario, the provincial government recently introduced a new series of Provincial Policy Statements (2005) that seek to buttress local government’s capacity to halt sprawl through new compact forms of development. One important addition is a new section on ‘Air Quality and Energy’ that now requires all municipalities to develop land-use planning policies that are *consistent*<sup>2</sup> with the policy goals articulated by the Province.<sup>3</sup> These new Policy Statements provide land-use planners at the provincial, regional and local levels in Ontario with a new policy arsenal to combat sprawl. However, these policy statements only apply to new Official Plans while older, existing plans, are not required to comply. Thus, as municipalities update their Official (comprehensive land use) Plans, they will slowly come ‘on-line’ with the new policies.

Tomalty & Alexander (2005) point to the absence of political will, the absence of policy frameworks allowing for planning innovation, a lack of interest on behalf of the

development community in non-traditional designs, the financial impacts of municipal taxation and development charges and consumer preference for low density urban development as barriers to the implementation of growth management policies. Similarly, Robinson & Gore's (2005) research into barriers to Canadian municipal response to climate change also revealed a lack of political will and the absence of recognition that climate change was an issue to which local government should respond as barriers faced by municipalities without any climate change action efforts underway.

These research projects point to larger, more systemic barriers to Canadian municipal response to climate change that will be faced by municipal planners' efforts to reduce greenhouse gas emissions. The foremost challenge land-use planners face in Canada with regard to making a meaningful contribution to greenhouse gas reduction is to find the right alchemy of financial tools, intergovernmental harmony, appropriately positioned public policy and a more active and engaged polity and civil society that will limit urban sprawl. Canadian planning's long-standing tradition of regional planning and the paired use of comprehensive plans with implementing zoning bylaws suggest that more success in combating sprawl should have been achieved. Berke & Manta Conroy (2004), Parkinson & Roseland (2002) and Portney (2002) all suggest that the presence of a strong planning framework is a necessary prerequisite to implementing sustainable development principles, among which climate change is often cited. However, the ongoing encroachment of low density, automobile dependent, single land-use development into the countryside in Canada reminds us that a strong policy framework is not sufficient and that a more integrated series of policy and program responses are required.

The lack of political will, the risk averse nature of the Canadian development community, and consumer preference for more consumptive forms of land development point to a lack of civic engagement in the climate change issue in Canada. Much of government effort, at all three levels, to engage citizens in the climate change issue has simply come in the form of challenging the individual to 'do their share'. For example, the federal government's most publicized recent effort has been to urge Canadians to take the 'One Tonne Challenge' (<http://www.climatechange.gc.ca/onetonne/english/index.asp>). Initiatives promoted through the challenge include driving less, draft-proofing homes and turning down the temperature on the hot water heater. Many ENGOs in Canada have developed creative public education material around climate change issues promoting similar individual actions. Notably absent from civic-engagement-education activities are efforts to challenge people to consider how the (sub)urban form of their community and how their choice of housing location affects their contribution to climate change. These efforts, in general, begin with the assumption that you will continue to live where you currently reside and there is an absence of discussion encouraging citizens to broaden the scope of their future housing choices to include factors that could reduce their contribution to global climate change.

In order for the climate change-land-use planning link to be strong, planning scholars and practitioners need to find new ways to engage citizens in productive discussions about growth management and intensification and their link with local air quality and climate change. Planners know well that increased densities can lead to better services, amenities, transit access, municipal services costs and greenhouse gas emissions, yet in Canada these positive outcomes of intensification have yet to be communicated to the public in a manner that convinces them to support and seek more compact communities. Two examples of more progressive citizen-engagement education initiatives that might prove of interest to spatial planners worldwide are worth highlighting.

The first is the City of Calgary's ImagineCalgary initiative. ImagineCalgary is currently experimenting with the development of a 100-year plan that both expands the timeframes for planning and includes a wide-spread citizen involvement process (<http://www.imaginecalgary.ca/>). As Bulkeley notes, we need longer timeframes and quicker actions. Planners in Canada have been comfortably working with their communities on the development and implementation of 25-year comprehensive plans. However, from planners' engagement with environmental change has come the recognition that these timeframes are not sufficient to respond to the challenges that global climate change, among other issues, present. ImagineCalgary's experiment in longer-term planning horizons, therefore, is an important step.

Second, from 1999–2004, the Sustainable Development Research Institute (SDRI) at the University of British Columbia, in partnership with a wide range of government, business and civil society groups, conducted the Georgia Basin Futures Project. Under the leadership of Dr. John Robinson, this project sought to combine "expert knowledge and considered public opinion to explore pathways to sustainability" (<http://www.basinfutures.net/>). The project developed GB-QUEST, an interactive 'game' that presented citizens with the range of important decisions impacting the future of their home, the Georgia Basin ecosystem, over a 40-year time horizon. The QUEST citizen-engagement tool has now evolved, through the work of EnvisionTools ([www.envisiontools.com](http://www.envisiontools.com)), into a series of MetroQUEST decision-making tools. These tools are being used by municipalities internationally to engage citizens in discussions about their community's future including issues related to climate change. Tools like QUEST provide an opportunity for planners to engage the public in a different way that allows citizens to see the connections between their choices and preferences and the short and long-term impacts on their community. In light of the Canadian municipal emphasis on improving local air quality as a driver for many greenhouse gas emissions reducing policies and activities, tools like QUEST have potential to help citizens see these connections. How influential these new tools are in influencing public and private choices will be important to investigate in the future.

## Conclusions

Forging an explicit and effective link between urban form and emissions reduction is the next frontier for Canadian municipal response to climate change. Important and real emissions reductions have been achieved by Canadian communities through projects such as landfill gas capture and building energy retrofits. However, planners in these Canadian municipalities continue to wrestle with the challenges of urban growth management.

What are the future prospects? Ongoing provincial and local government efforts to introduce stronger laws and guidelines to combat sprawl suggest planners are slowly acquiring a stronger policy framework upon which to rely. However, recent changes in federal government leadership in Canada introduce tremendous uncertainty about commitments to Kyoto and emission reduction efforts.<sup>4</sup> Nonetheless, this uncertainty does not signal that municipalities should adopt a 'go-slow' or 'wait and see' approach to GHG reductions. Indeed, local GHG reductions thus far have come in the absence of significant federal or provincial government leadership so it is conceivable that municipalities will carry on regardless of the leadership priorities at the federal level. In this regard, municipal planners have a tremendous opportunity and role to play. Canadian planners should strive to build new social and political capital in support of growth management efforts so that the foundation for future emissions reductions is strong rather than low density and automobile dependent.

### Note

1. Direct control over emissions comes from the municipal governments' use of fuels and electricity in its operations, methane gas capture, greening activities and urban forestry. Indirect control over emissions comes from institutions and enterprises over which the municipality has indirect control through directorships, funding, shared facilities, etc. Influence over emissions results from activities that are at least partly controlled or influenced by municipal government laws, taxes, or regulation (Municipalities Issue Table, 1998).
2. Under the former, widely considered weaker Provincial Policy Statements, there was no direction provided about air-quality or energy issues. Even if there had been, municipalities were only required to 'have regard' for the policies, rather than now having to be 'consistent' with the new policies.
3. This emphasis on improving local air quality, rather greenhouse gas emissions reductions, as a driver for behaviour and policy change is a common approach in Canada.
4. In January 2006, Canada elected a minority Conservative government under the leadership of Stephen Harper. In the 2004 election, Harper made many public statements about his commitment to withdrawing Canada's support of the Kyoto Protocol. As of 11 February 2006, neither he nor his party have made any public statements about this issue since assuming power.

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# Climate Change and Spatial Planning Below Sea-Level: Water, Water and More Water

JOCHEM DE VRIES

In the 1990s when the Netherlands were faced with difficult economic conditions, the newly elected government used the slogan 'work, work and more work' to describe its first and foremost priority. When reading Harriet Bulkeley's article on climate change and the challenges posed to spatial planning, a variation on this slogan sprung to my mind: 'water, water and more water'. Given the physical characteristics of the Netherlands,

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when it comes to climate change and spatial planning, there seems to be a greater sense of urgency than in the UK.

To a certain extent this strong emphasis on the dangers of flooding in the Netherlands may come as no surprise. Significant increases in the stream flow of large European rivers like the Rhine and the Maas and the rising sea level have potentially disastrous implications for a country of which 35 per cent lies below sea level. Even today 65 per cent of the country would run the risk of regular flooding if there were no protective measures such as dikes and storm surge barriers. Protecting the country against flooding is literally as old as the land. As a result, the challenges posed by climate change could easily be seen as the same old story. Nevertheless, particularly in relation to spatial planning, the issues raised by climate change have led to a revolutionary change of policy. Before I turn to the relationship between water management and spatial planning, I will briefly discuss the relationship between spatial planning and climate change in the Netherlands in a more general sense.

### Lessons to be Learned

Bulkeley's article clearly sets out the two-sided relationship between climate change and spatial planning. First is *mitigation*, that is to say by altering the spatial organization of society a contribution could be made to the reduction of greenhouse gas emissions. The second course of action is the *adaptation* of the physical environment to the consequences of climate change. Water is central from the perspective of adaptation. However, before I focus on this issue it is appropriate to link the debate about climate change to that of sustainability.

From the perspective of mitigation, the challenge of climate change strengthens arguments for the already powerful policy discourse of sustainability. In the Netherlands, like many other countries, sustainability has been an important policy goal for sometime and lessons can be learned from this experience. Key is that striving for large-scale, general and fundamental change in spatial organization is not likely to be a fruitful approach. I draw this conclusion from, amongst other things, the Dutch experience of transport policy over the last 20 years. Since the late 1980s an important goal of Dutch transport policy has been the establishment of a modal shift and containing the general growth of mobility. The justification for this policy was sustainability and not (yet) climate change. Spatial planning was considered to play a pivotal role in establishing this modal shift and limiting the growth of mobility.

Two important planning concepts, that were generally applicable in the whole country, were the compact city and the so-called ABC-location policy. The concept of the compact city is internationally well known. The ABC-location policy is a planning policy designed to concentrate economic development around transport nodes, with the locations for economic functions subdivided into three categories (A, B, C), each with its own mobility profile: A locations had a profile in which accessibility by public transport was most important; B locations had a mixed profile of public transport and car accessibility; and C locations were reserved for economic functions that depended on road access. Accordingly the location of economic uses would be determined by the number of workers and visitors attracted or the mobility it generated. Both policy concepts assume that through the manipulation of spatial organization (car) mobility can be considerably contained. However, while some evaluations show that the compact city has had some effect on mobility rates and the modes of transport used, the general trend has been growth of mobility in general and of car mobility in particular. The government advisory board for housing, spatial planning and the environment concluded in 1999 that influencing spatial organization has proven to have very little impact on total mobility



(VROM-Raad, 1999). The recently adopted new national mobility policy and the national spatial policy share this conclusion. The Mobility Paper (2005) accepts increasing mobility as a fact of life, while the National Spatial Strategy (2004) has formally ended the compact city and ABC location policies. Trying to reduce greenhouse emissions by cars in the heavily populated areas of the Western world is important in contributing to the mitigation of climate change. However, other, more effective ways than merely spatial planning will need to be found.

### Mitigation

The Dutch experience of spatial planning and mobility policy therefore teaches that fundamental societal trends, such as mobility behaviour, are not easily changed through spatial planning. If it is necessary to fundamentally change our ways of life in order to save the earth, I am afraid it will not be spatial planning that will establish this change. While I am not knowledgeable enough to judge the UK's sustainable spatial planning ambitions, maybe Bulkeley's conclusion that an implementation deficit exists is related to ambitions that are too high.

Crucially, however, the above does not mean that spatial planning has no role to play in mitigating climate change, although I would argue it is limited and quite specific. There are measures with an important spatial dimension that are less fundamental to our lives and still have a positive effect on greenhouse emissions. For example, accommodating alternative sources of energy is such a specific task. In the context of the Netherlands this largely means accommodating wind power. Moreover, this is a task that itself presents serious challenges for spatial planners. A lack of suitable locations and societal opposition to wind turbines are hampering the ability of the Netherlands to reach the targets set for wind energy. It is interesting to note that the UK appears to be more successful at developing wind farms on both land and sea (Zeelenberg, 2005). While the UK, and for example Denmark, have had success in developing offshore wind farms, the Netherlands are having big problems in realizing their offshore projects. Part of the problem is the difficulty of finding suitable locations but part of the problem is also the Dutch planning system. The system is undoubtedly much more oriented towards restricting undesirable developments than promoting desirable developments.

Another challenge for planners is to make better use of existing sources of energy, for example, the waste heat from industry. In turn, this energy could be used by households. However, this is dependent on mixing housing and industrial land uses, something which can be practically difficult and is anathema to much traditional planning practice. Notwithstanding the cautions noted above new, innovative planning concepts are called for.

### Adaptation

While spatial planning has something to contribute to mitigation, its main challenge is to help prepare for the rather uncertain future of climate change. On the one hand, it may disappoint some that spatial planning will not prevent climate change. On the other, the problems of making spatial development climate proof are difficult enough. The example of Dutch water management exemplifies the types of problems and the magnitude of the changes that will need to be realized.

In 1993 and 1995 the extremely high flow levels of the Rhine and Maas rivers nearly caused a massive flood in the centre of the Netherlands, leading in 1995 to the evacuation of more than 100 000 people. The first reaction to this near disaster was a traditional Dutch one: mobilizing all necessary resources and sidelining all opposition in order to heighten



and strengthen the dikes and dams. Specific legislation was drafted, which circumvented planning legislation, limiting the opportunities for individuals and pressure groups to influence the process. However, by the late 1990s the political climate had changed. The anxiety caused by the near floods waned. The short-term fear of flooding was replaced by a long-term consciousness of the possible consequences of climate change and doubts were expressed about the appropriateness of traditional approaches to water management. More particularly, questions were raised as to whether heightening the dikes and other traditional technological interventions such as mechanically pumping water out of low lying polders would be sufficient to counter the effects of climate change. A government commission was established to advise on water management in 21st century (CW 21ste eeuw, 2000). One of the core recommendations of this Commission was the need to develop a closer relationship between water management and spatial planning.

Two key recommendations were made. First, that maintenance of the water system should provide the pre-conditions for spatial planning. The underlying assumption is that in the past spatial development has had a negative impact on the natural capacity of water systems to handle large fluctuations in water and that this will need to change. Furthermore, the Netherlands have become more vulnerable than necessary because the majority of development has taken place in low lying locations which are most susceptible to flooding. Consequently the Commission recommended that all land-use decisions should take into account the effects of development on the water system and since 2003 a 'water test' is a legal requirement for a range of spatial plans. This test provides an important mechanism for integrating water concerns into the planning process and requires planning authorities to involve water authorities. However, such an approach is complicated by the institutional context, as water boards occupy a separate functional tier of government with their own elected councils. The isolated position of the water boards in Dutch government reflects the relative independence they have enjoyed with respect to decisions about water management.

The second aspect of the relationship between spatial planning and water management, which was addressed in the report, concerns making space for water. Crudely, in order to prepare for changing patterns of precipitation and higher sea and river levels, more territory should be permanently or temporarily reserved for water. Based on a moderate scenario for climate change it is recommended that by 2030 an additional 1700 km<sup>2</sup> of land will need to be allocated to water. This is two and half times as much land as it is estimated will be needed over the same period to meet the demand for housing and economic functions. Water, as a land demanding function, is a new phenomenon in the Netherlands, which requires new ways of working. Again, one of the requirements is greater collaboration between planners and water managers. It is no longer sufficient for spatial planning and water management merely to place restrictions on other parties. To achieve a climate-proof water system the pro-active transformation of areas is required. Many things in this process are new. There is not enough money available to simply buy the land. This in itself is new in a context where water-related investment is a matter of national security and has always been completely publicly funded. It requires the integration of water-related concerns into the calculations for development projects. This is exemplified in the Blue City in the north of the Netherlands where luxury housing has been incorporated around an artificial lake. Another new aspect of the work of water engineers in the National Public Works agency is that they have to organize and participate in collaborative planning processes. Prior to this they acted as 'a state within the state', neatly separated from other policy and social domains. However, they now find themselves competing for land and therefore have to deal with the claims of other parties

as well as citizens, who may be resistant to their plans. In contrast to the past this resistance cannot be overcome by utilizing the powers set out in the water management laws, rather they have to be dealt with through the rules of the planning system.

### Conclusion

While spatial planning has something to contribute to prevent and mitigate climate change in Western European countries such as the UK and the Netherlands, making planning more climate change sensitive could best focus on adaptive measures. There is a political reason for this. Certainly in a small country like the Netherlands it is inherently more difficult to gain support for mitigating measures than for adaptive measures. It is easier to accept that climate change is unavoidable than to be convinced that changing your way of life in a small country will have a serious impact on global climate change. Furthermore, many of the policy goals for spatial planning that could contribute to a reduction of damaging emissions are already part of the sustainability discourse. Bulkeley is making a similar point when she warns against making climate protection the all encompassing issue at the heart of sustainable development. If climate change in spatial planning is attached to a clear and well-defined problem area, such as flooding in the Netherlands, it can be a powerful means of establishing fundamental policy change. A key change is a more proactive approach to the incorporation of environmental goals into development. In the past planning has often been exclusively oriented towards restricting development in order to protect the environment. Climate change requires an active and ecologically sound transformation of specific areas.

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# Climate Change and Planning

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Climate change is a long-term global environmental issue that requires co-ordinated policy making by various international, regional, national and local policy makers over a long time horizon, and as Harriet Bulkeley points out, this is providing new challenges for spatial planning. This is because greenhouse gas (GHG) emissions emerge from key economic sectors like energy supply, industry, transportation, agriculture and waste management, as well as because the emissions survive in the atmosphere for up to 100 years while their effect on the global climate is independent of the geographical location of the emission.

As Bulkeley points out, climate change is a global public good, and dealing with it in terms of adaptation and reductions in GHG emissions involves a number of complex planning issues that go beyond the traditional scope of regional planning as well the policy objectives of local authorities. A number of official national and regional government bodies in the UK have recognized this by officially stating that regional planning bodies are obliged to take both the causes and impacts of climate change into consideration. However, the critical question is whether it is realistic for regional authorities to handle such issues.

The first critical issue in this context is the availability of relevant data about climate change impacts at regional level. Climate change is surrounded by major uncertainties, and climate change modelling predominantly provides information about expected average changes in climate parameters like temperature, precipitation and sea level at very large geographical scales and over long time horizons such as 50 to 100 years. Only very limited information is given about climatic variability and the probability of extreme events such as flooding or extreme heating, which are of importance in considering climate change impacts for regional and spatial planning.

However, there have been some recent developments in global climate modelling, which are providing data with a geographical resolution down to 50:50 kilometers and in some cases at a finer scale. The European Union (EU) Prudence project has provided very detailed maps of future climate change in Europe. These maps confirm that there are very large variations in the impact of climate change within relatively small geographical areas that will need to be taken into consideration as part of the spatial planning process. In addition to this, the new modelling has also shown that there will be important differences in the way that climate change is expected to impact in different parts of Europe. While Southern Europe can expect warmer and drier conditions and the risk of droughts, Northern Europe will face warmer and wetter weather and increased risks of flooding from storms (Prudence, 2006).

These characteristics of climate change suggest the need for an integrated planning approach that reflects a long-term perspective and an appreciation of geographical variability. Bulkeley addresses a number of areas where such integrated effort will be relevant, focusing in particular on the introduction of renewable energy technologies, urban and transportation planning and more general issues related to sustainable development.

Recent work on sustainable development and climate change has emphasized that there are very strong linkages between these issues (Halsnæs & Verhagen, 2006). These linkages are related to the economic, social and the environmental dimensions of sustainable development as well as to climate change impacts, adaptation and mitigation policies. Examples of such linkages can be seen in relation to the implementation of adaptation projects like flood protection which will have strong economic and employment impacts as well as a number of indirect impacts on land-use patterns, human settlements, transportation, agriculture and the environment. The same is true with mitigation options

where, for example, bio-energy crops will impact on both the vulnerability of agriculture to climate change and reduce GHG emissions.

Given the linkages between sustainable development and climate change, studies of climate change mitigation options, like for example renewable energy, need to be done in the context of the 'big picture' of general development goals and as part of a broad consideration of the options for energy supply. In this context Bulkeley places significant emphasis on the potential of renewable energy technologies. These are an option and given the large effort that will be needed in order to meet the challenge of global climate change all options should be considered. But there are a number of other GHG mitigation options with lower costs than most renewable energy options, such as greater energy efficiency. This is particularly important since renewable energy options at present can impose significant costs. Costs, moreover, that are greater than other energy options. Given the long time horizons, studies of GHG emission reduction policies should focus on approaches with a long economic lifetime. Two sectors that have both a long time horizon and are critically influenced by spatial planning are the transportation and construction sectors.

The transportation sector is one of the major GHG emitting sectors and at a global level, road transport together with power production has been the sector with the largest growth in CO<sub>2</sub> emissions since 1970, and in 2000 contributed 28 per cent of global energy related GHG emissions (IPCC, 2006a). Studies have indicated that Transportation Demand Management (TDM), including strategies such as the provision of information to travellers, traffic restrictions and improved driving styles can achieve traffic reductions of up to 10 per cent and thereby significantly reduce GHG emissions.

Transportation planning is characterized by contradictions and lock-in effects, which makes careful long-term planning very important. Improved transportation facilities tend to 'create their own demand' by making mobility easier and less time consuming. An example of this was seen in relation to the establishment of the Great Belt bridge in Denmark, connecting Zealand and Fynen. Between 1998 and 2001 (prior to the bridge opening) the person cars that passed the Great Belt increased by as much as 133 per cent while the number of persons travelling by rail increased by 54 per cent<sup>1</sup> (Storebælt, 2002). The increase in traffic also continued after the bridge opened. In 1998 about 3.7 million vehicles passed over the bridge, increasing to 8.7 million in 2004 (Storebælt, 2006).

In relation to the construction sector, in 2004 it was responsible for 32 per cent of all global CO<sub>2</sub> emissions and further growth is expected in the future, particularly in the fast growing Asian economies. Many experts expect that up to 30–40 per cent energy efficiency improvements could be achieved in construction by 2030. However, the achievement of this potential is strongly dependent on building turnover and changes in planning and building controls. New buildings with integrated energy efficient design can achieve improvements of 50–75 per cent, but realization depends on economic incentives, information, building code standards and management options (IPCC, 2006b).

In conclusion, there is significant scope for integrating climate change into spatial planning but it requires a careful balancing of the economic, social and environmental dimensions of sustainable development. Some of the issues that are associated with climate change policies involve time horizons and costs that go beyond the scope of regional and local planning authorities. There is therefore a need to create appropriate policy instruments as well as to ensure collaboration across different geographical administrative areas. Planning activities will need to be integrated over larger regional

areas, for example, in relation to coastal protection, while integration across sectors such as housing and transportation will also be essential.

### Note

1. Some of the traffic increase across the Belt took the form of the displacement of traffic from other cross country routes, but as much as 33 per cent of the increase was assessed to be increased activity due to the bridge.

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