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BARRIERS TO IMPLEMENTATION OF URBAN SUSTAINABILITY

ABSTRACT: Much of the debate over urban sustainability has revolved around the key components of sustainable development, and this has resulted in the identification of key concepts and principles which should be followed. Very little attention has been given to the difficulties encountered in the implementation of urban sustainability. This paper sets out the background to urban sustainability within clearly stated parameters, namely land, energy and transport. Development principles are established and the implementation issues addressed at four different levels - decisions relating to the use of existing resources; decisions relating to new development; decisions relating to transport; and decisions relating to increasing energy efficiency within urban areas. At each level, the objectives of sustainability, together with the key concerns and actions are described. The barriers to implementation explain why progress towards urban sustainability has been slow. Recommendations are presented as to how these barriers can be overcome so that the objectives of urban sustainability can be matched with other objectives such as improvement of the quality of life in urban areas.

1.   Introduction

Urban sustainability is not just about making towns and cities more efficient in terms of their use of resources. The main objective is to improve the quality of life by providing affordable housing, employment opportunities, a wide range of facilities and services, with a high quality environment in safe and secure surroundings. It also aims to provide quality through open space, green space, and it could include cultural, leisure and recreational resources, as well as the dynamics of cities as users of resources and producers of waste. The discussion here will be focused on three of the key elements which contribute to that quality - land, energy and transport - and the range of decisions which have to be made (Banister and Button, 1993). The main question is how can we reverse the movement of employment and people out of our cities as this is reducing the already high levels of urban sustainability. The answer must be a combination of factors as suggested here to enhance the quality, attractiveness, distinctiveness and opportunities which urban areas are uniquely able to offer (see Haughton and Hunter, 1994; Nijkamp and Perrels, 1994).

Some seventy per cent of the population of developed countries live in urban areas (over 25,000 population), but development patterns have become increasingly car dependent, land hungry and energy intensive - urban sustainability is being reduced. The consequences are now being felt in terms of environmental pollution, congestion, loss of countryside and the use of all forms of non renewable resources. Many factors have contributed to this situation: demographic change, economic restructuring, rising car ownership, improved transport links, aspirations to move out of cities, a general dissatisfaction with urban living, and greater flexibility and complexity in lifestyles and patterns of movement. In short, all the indicators would suggest a substantial and permanent move towards patterns of unsustainability.

The actual situation is less bleak. Land, energy and transport constitute the three main physical components of urban sustainability. Each of these components contributes towards the overall use of resources and levels of emissions within urban areas, and the aim for urban sustainability would be to improve the efficiency in the use of each of these three components. This means that decisions relating to the use of existing resources, decisions

relating to new development, decisions relating to transport, and decisions relating to increasing the energy efficiency within urban areas all need to be addressed. At the same time, the concerns over quality of life within urban areas must be addressed as the aim of urban sustainability strategies must be to enhance the attractiveness of urban areas, and to prevent and reverse the continued movement of population out of these areas.

There is some agreement over the problem and to a great extent the range of strategies available, but progress towards implementation has been disappointingly slow in integrating sustainability into everyday planning decisions. This paper takes a UK perspective and concentrates on the energy and transport implications of development decisions.

Development principles are first outlined, principally from the perspective of reducing the need to travel. The paper then explores how these principles can be implemented with respect to existing resources, new development, transport and energy efficiency. The outcome of this analysis can help identify why there has been so little progress in terms of achieving urban sustainability objectives. The final part of the paper attempts to suggest how these barriers can be overcome.

2.   Development Principles

At the strategic level there are a clear set of objectives which can be adopted. *Settlement Size* is an important influence on the range of activities which are available with the larger settlements having a greater potential for self sufficiency. Each locality within the city should offer a sufficient diversity to meet daily requirements. The degree of proximity will determine the choices of travel mode. At distances under 2km there is a substantial potential for walking, and most cycle journeys are less than 8km in length. In principle, many of the daily urban activities could be carried out by these two "green modes". Other modes are less distance-dependent, but rail trips are normally over 5 km in length.

Centrality allows non-residential activities to be grouped together at the centre of an area. This suggests that a hierarchy of centres at the city, the district and the neighbourhood levels would reduce total travel. The types of activities located at each level would depend
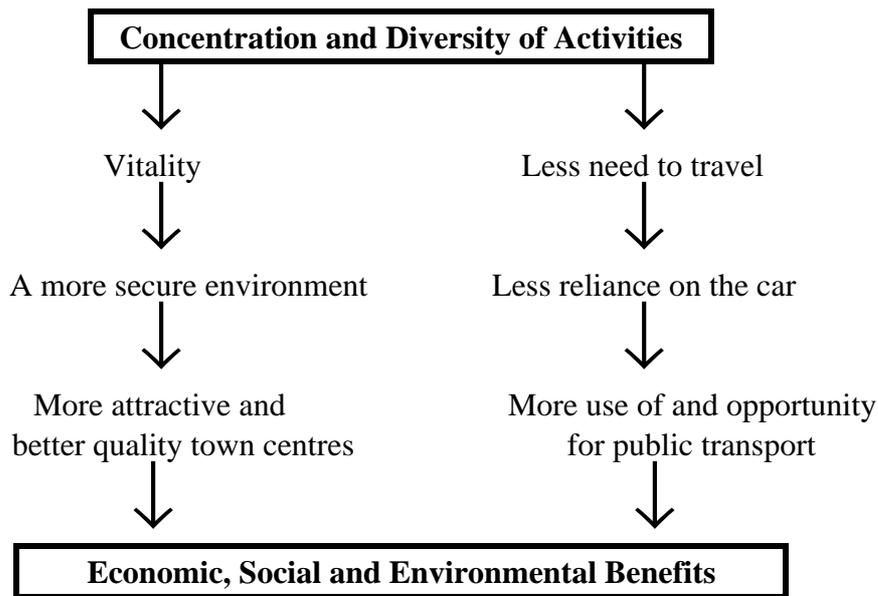
on the level of specialisation (and frequency of visit) and their function. Higher order functions should be located at the centre as this would reduce journey lengths and make public transport easier to provide. This hierarchy of non-residential activities, which minimises the need to travel, can be seen in many urban areas and it is often an integral part of development plans.

At the local level, other important considerations need to be accommodated. The *scale of development* reflects economies of scale which can be achieved through size. Larger but fewer has been the trend in the provision of hospitals, leisure facilities and shops. The implications of these changes, mainly brought about by commercial pressures, has been savings to the provider of the services, but additional costs have been transferred to the users of that service. Many such services and facilities are only accessible by car, so there are additional problems for those without car access.

Density has been keenly debated as a principle, as it works in counter directions (e.g. Newman and Kenworthy, 1989a and b; Banister, 1996; Banister et al, 1994; Breheny, 1995). People want to live in low density urban areas, so increasing density may reduce the attractiveness of towns and cause out-migration. But higher density locations can reduce journey lengths and the proportion of trips made by car. It is easier to provide public transport services in high density locations, and there is more opportunity for mixed use developments which in turn allow linked trips or "tours" to take place. However, density must be complemented by other quality factors such as vitality, security and accessibility. Towns must be seen as being attractive places in which to live, work and enjoy the opportunities available.

These four elements of development can be brought together to produce high quality sustainable developments, whilst at the same time reducing the need to travel (Figure 1). There is a substantial potential for increasing urban sustainability, but positive action has been slow. In the next section we explore the options available in more detail and begin to suggest why urban sustainability is so hard to achieve in practice. The four development principles identified here are translated into four areas of responsibility which planning authorities have for the implementation of sustainability policies.

Figure 1:   Development Principles

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                ┌─────────────────────────────────────────────┐
                │  Concentration and Diversity of Activities   │
                └─────────────────────────────────────────────┘
                         │                        │
                         ▼                        ▼
                     Vitality                Less need to travel
                         │                        │
                         ▼                        ▼
              A more secure environment    Less reliance on the car
                         │                        │
                         ▼                        ▼
                More attractive and        More use of and opportunity
             better quality town centres      for public transport
                         │                        │
                         ▼                        ▼
                ┌─────────────────────────────────────────────┐
                │  Economic, Social and Environmental Benefits │
                └─────────────────────────────────────────────┘
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Source: GB: Departments of the Environment and Transport (1995)

3.   Implementation: Theory into Practice

3.1   Introduction

The difficulties of transforming the theory into practice has been structured here under four headings. The intention is to describe why action is needed in each of these areas and then to comment on how the principles can be translated through objectives to key concerns and actions. Each of these stages is described in more detail in Llewelyn-Davies et al (1996).
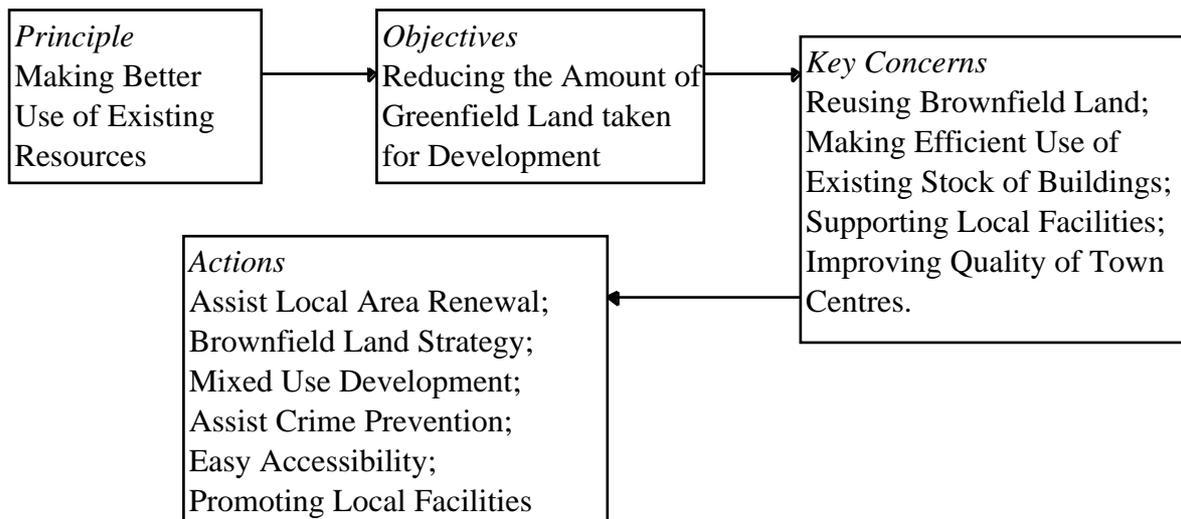
3.2   Decisions Relating to the Use of Existing Resources

┌──┐
│ **Why we need to make better use of existing resources ?**   │
│ • 35,000 ha of land lies derelict or contaminated in England today │
│ • 15-20% of offices in the UK are vacant at any time   │
│ • There are around 800,000 empty houses in England   │
└──┘

Derelict, contaminated and vacant land represents a substantial under-utilised urban resource. This brownfield land within urban areas must be brought back into positive use in

preference to the development of greenfield land. Apart from reducing pressure on the countryside, the reuse of brownfield sites can assist local area renewal and the provision of housing and employment for local people. It can contribute to the maintenance of local facilities and services by raising levels of demand, and it can reduce travel demand and encourage the use of public transport. On the land, energy and transport criteria, it scores well, and will help to reduce the use of resources and promote urban sustainability.

Principle
Making Better
Use of Existing
Resources

→

Objectives
Reducing the Amount of
Greenfield Land taken
for Development

→

Key Concerns
Reusing Brownfield Land;
Making Efficient Use of
Existing Stock of Buildings;
Supporting Local Facilities;
Improving Quality of Town
Centres.

Actions
Assist Local Area Renewal;
Brownfield Land Strategy;
Mixed Use Development;
Assist Crime Prevention;
Easy Accessibility;
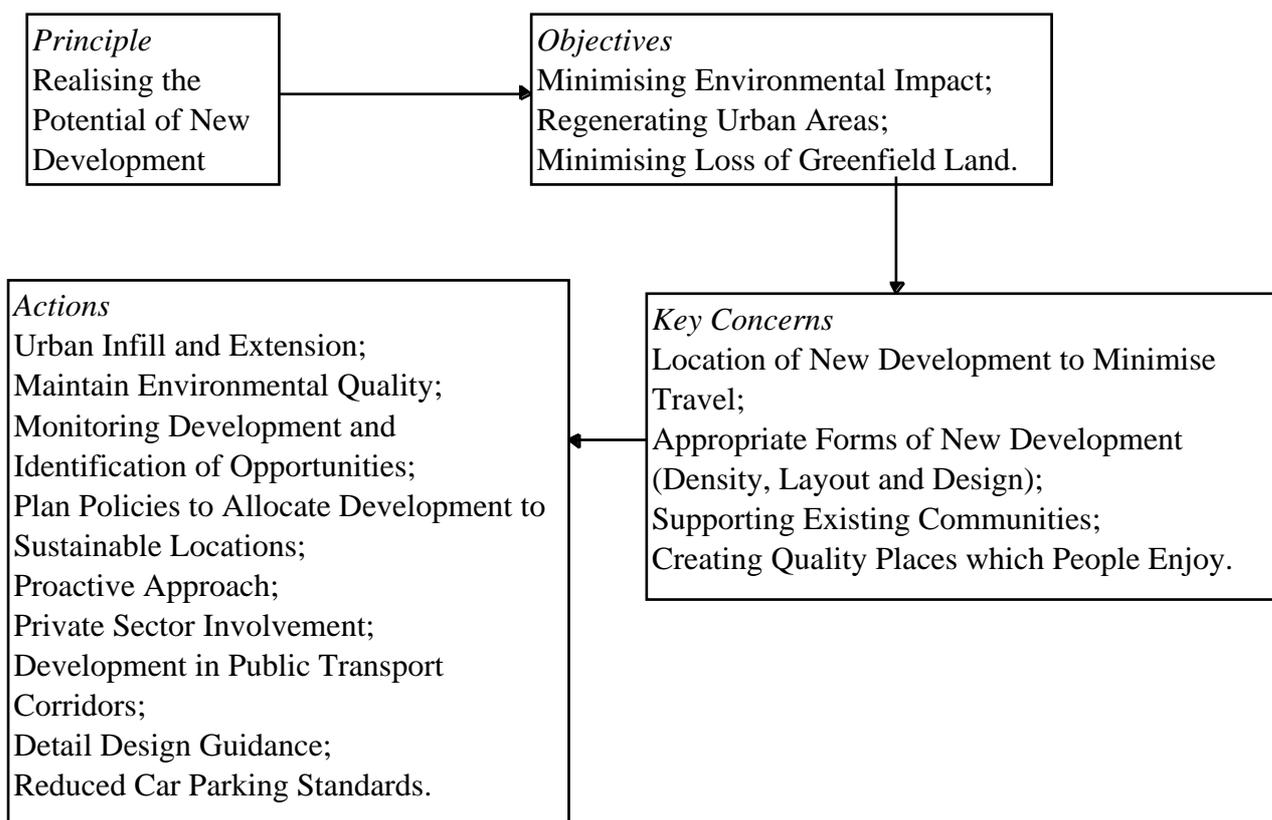Promoting Local Facilities

←

However, it is often expensive to redevelop these brownfield sites, particularly if the land has been contaminated. Provisions must be made for the polluter to pay for restoration work on land which they have polluted, perhaps requiring some form of restoration bonds from developers undertaking activities which could result in land becoming polluted. Investors and developers require greater certainty about the possibility of future liability arising from brownfield land they acquire and develop.

The existing building stock provides considerable potential to accommodate new and different uses, to increase density and provide diversity so that urban sustainability objectives can be met. Houses can be transformed into flats, offices into houses and surplus upper floor space into housing - living over the shop. This spatial mixing may provide opportunities to increase density of development and diversity.

3.3   Decisions Relating to New Development

Why we need to be concerned with new development ?
- 11,000 ha of rural land is lost to development each year
- 4.4 million new dwellings are required in England (1991-2016)
- Location of new development has an impact on all activities

Principle Realising the Potential of New Development	→	Objectives Minimising Environmental Impact; Regenerating Urban Areas; Minimising Loss of Greenfield Land.

Actions Urban Infill and Extension; Maintain Environmental Quality; Monitoring Development and Identification of Opportunities; Plan Policies to Allocate Development to Sustainable Locations; Proactive Approach; Private Sector Involvement; Development in Public Transport Corridors; Detail Design Guidance; Reduced Car Parking Standards.	←	Key Concerns Location of New Development to Minimise Travel; Appropriate Forms of New Development (Density, Layout and Design); Supporting Existing Communities; Creating Quality Places which People Enjoy.

The pressure for new housing is generating the largest demand for land, and the decisions facing many urban planning authorities is whether that demand can be accommodated with minimal environmental damage, whilst at the same time providing high quality living environments. Fundamental demographic change is taking place as traditional family structures are being broken down and as new types of social structures emerge - young single persons, single parent families, cohabitation, increasing numbers of elderly people - much of the new housing is required to meet these new demands.

The greatest challenge facing planners in the UK is the means to accommodate the 4.4 million new dwellings required in the current planning period (1991-2016) in England alone. This is the largest increase in new households ever predicted, and over half of them will be for single persons. Most of the growth is expected to be in the South East of England - 1.64 million out of the 4.4 million (Hall, 1996). Even if half of these new dwellings are located in existing urban areas, that will still mean over 2 million new units on greenfield sites. At a density of 20 dwellings per hectare, the total land take will be about 120,000 hectares, about the size of a county (e.g. Bedfordshire).

However, in many urban areas, the availability of sites for housing is limited, so the tendency has been for urban infill and extensions to urban areas to allow development to be clearly related to existing transport services with mixed land-uses. In this way urban development densities can be maintained or increased. A second option would be to develop expanded towns, so that existing settlements over 25,000 population can be promoted as the availability of existing services and facilities, together with local jobs, means that locally based travel patterns can develop - there would be high level of self containment (GB: Department of the Environment, 1993).

The high risk strategy would be to develop new settlements. If new settlements are to be sustainable, they would have to be large (a minimum of 50,000 population) with a high level of self sufficiency for employment, shopping, social and recreational activities. The difficulty here is that large new settlements are unacceptable politically and the rate of build up is often slow. It may take twenty years to reach the target size and by that time travel patterns based on the car will have evolved. Planning must allow for local facilities and services, together with public transport provision to be in place before residents move in. In the Netherlands, this problem has been overcome through planned new settlements with phased development (e.g. Almere), but even here there is substantial out commuting (e.g. from Almere to Amsterdam).
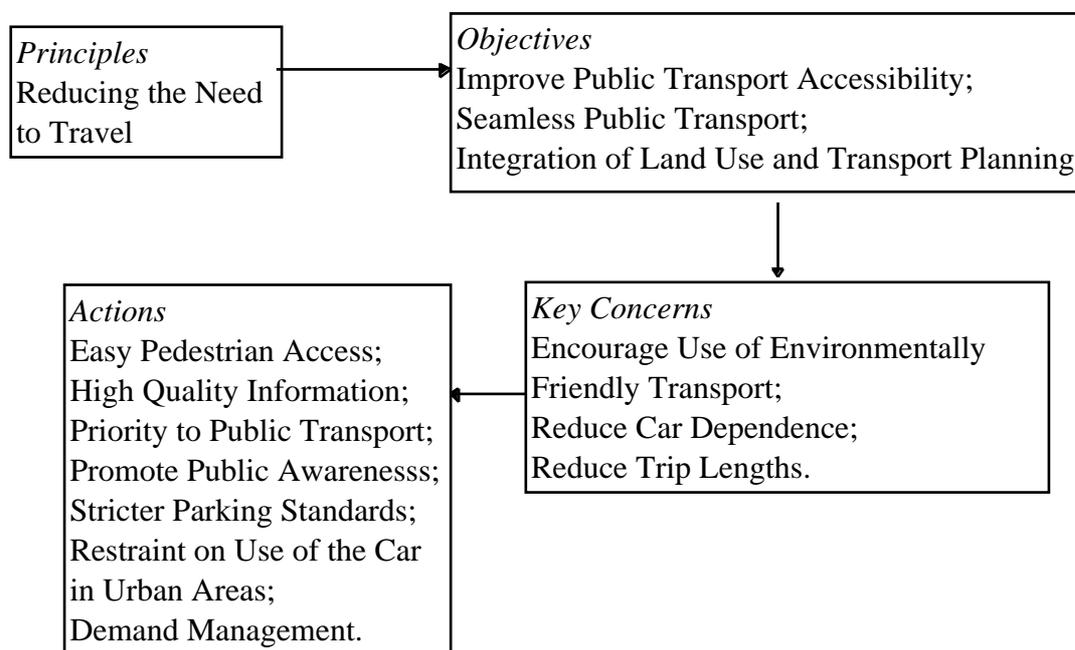
In all of the debate over urban sustainability and new development, size and density emerge as key determinants (see Section 2). A concentration of population in the compact city can help support a better range of local facilities and reduce the dependence on the car (Breheny, 1995). In the UK at densities over 50 persons per hectare, 40% of all trips are made on foot. At densities between 15 and 50 persons per hectare this reduced to 30% of all trips, and at low densities only 20% of all trips are made on foot (ECOTEC, 1993). Higher densities also allow better quality access to district/local centres or a public transport facility - the key threshold distance here would be about 800 metres or a 10 minute walk. Higher densities result in less land being used, greater efficiency in the supply of energy, and shorter journey lengths. It also maximises the potential for higher proportions of travel by "green modes" such as walk, cycling, bus and tram.

Many of the trends in urban areas suggest that development pressures are concentrated at greenfield sites on the periphery of urban areas at low densities with greater land requirements and longer journeys, often by car. This type of new development has been particularly apparent in retailing and warehouse location, together with high technology, business and science parks. More recently, new forms of recreation and leisure activities have also tended to be developed in peripheral locations. The implications of these new developments on sustainability are clear, with land, energy and transport costs all being increased. If urban sustainability is to be encouraged, then clear guidance needs to be given to developers to concentrate new development in corridors and near to interchanges which are accessible to public transport and the car. Examples include zoning of particular areas for specific types of development (GB: Departments of the Environment and Transport, 1995), the Dutch ABC policy (Priemus, 1995), where development and transport principles can be combined to reduce car dependence. Authorities should designate areas for development which minimises the need to travel. Consistency in approach between urban authorities is necessary so that decisions taken on sustainability criteria can be made without losing out on development opportunities.

3.4   Decisions Relating to Transport

Why do we need to be concerned with transport ?
- Trip lengths have increased by 21% over the last 20 years
- The car now accounts for 77% of distance travelled
- The use of bus, cycle and walk have all declined by about 15%

Principles
Reducing the Need to Travel

Objectives
Improve Public Transport Accessibility;
Seamless Public Transport;
Integration of Land Use and Transport Planning.

Actions
Easy Pedestrian Access;
High Quality Information;
Priority to Public Transport;
Promote Public Awarenesss;
Stricter Parking Standards;
Restraint on Use of the Car in Urban Areas;
Demand Management.

Key Concerns
Encourage Use of Environmentally Friendly Transport;
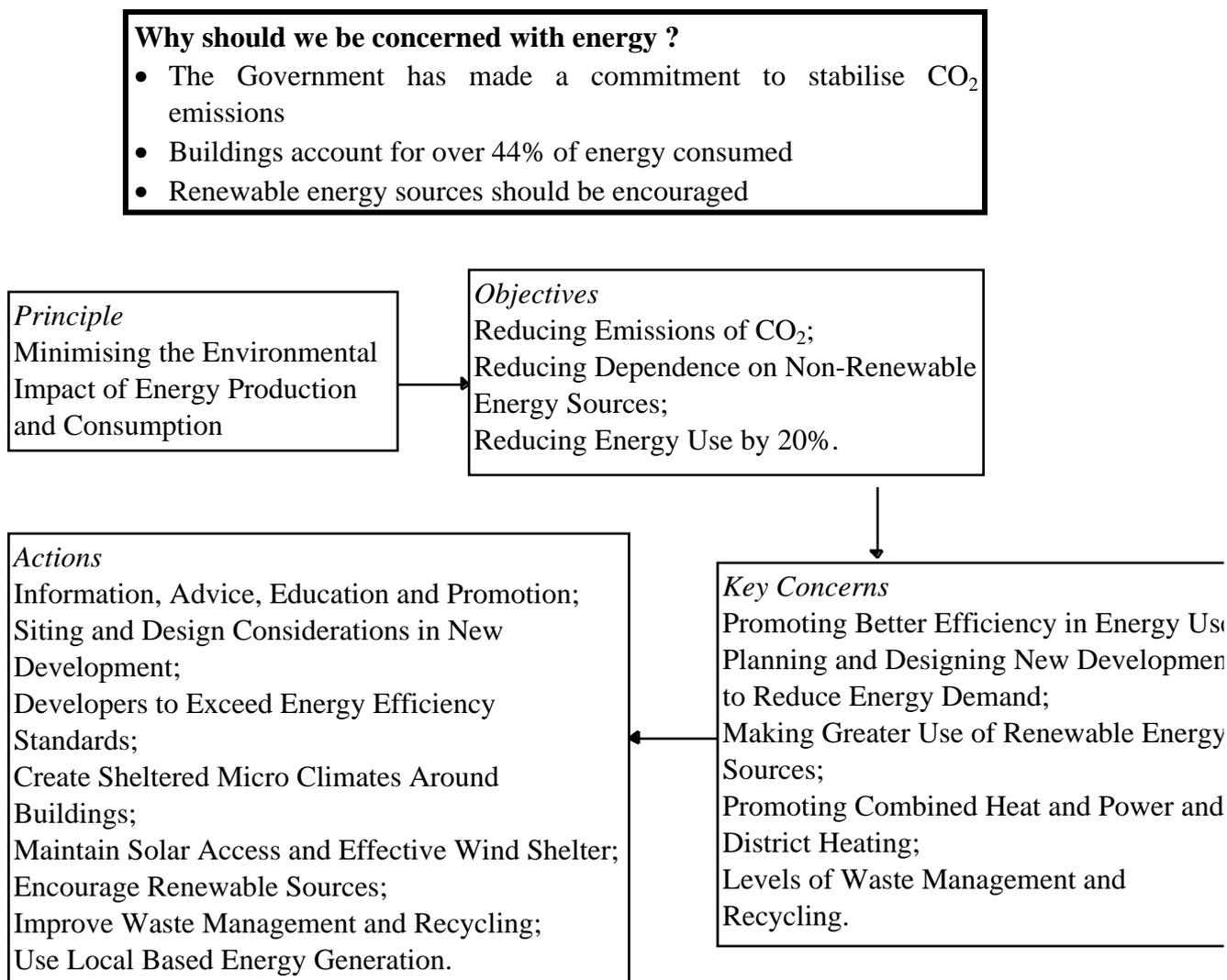Reduce Car Dependence;
Reduce Trip Lengths.

Transport is a critical issue, but urban transport policies continue to favour the car over other forms of transport. Fragmentation of public transport services and the separation of responsibilities between operators and local authorities means that integrated and co-ordinated services are difficult to provide. Sustainable urban transport must be based on the best combination of modes with environmentally friendly transport being given clear priority within towns. This means that walking, cycling, bus and tram should be given preference within the city, with rail and car providing passengers from outside the city. Priority includes vehicle actuated lights, bus only routes and lanes, and exclusive access for buses to the central area. Cars and rail need to be seen as complementary to the bus, providing an essential part of the integrated service by supplying passengers at park and ride locations. Trams complement the bus services in large cities, but most towns will only have bus-based public transport systems.

Similarly, cycle routes are often fragmented and are not available where most needed. It is only with a network of routes, together with appropriate safe storage, particularly at interchange points that substantial increases in cycle use will take place. Freight transport is also organised on a company basis so that only limited co-ordination takes place, but there should be clear commercial and environmental arguments for more efficient freight distribution. Regulations may be imposed on size of vehicle and timing of delivery, and more attention should be given to reducing the number of freight movements through co-ordinated transhipment or through reductions in empty running.

With any set of proposals, the overall efficiency of the transport system must be balanced against the need to reduce trip lengths and to reduce the use of the car, particularly for short journeys within urban areas. It is here that the car is operating at its most inefficient with slow speeds resulting from congestion, and with high levels of fuel consumption and emissions caused by the engine operating from cold and in congested conditions. The closer jobs, houses, facilities and services are to each other, the greater the likelihood that the car will not be used. Restrictions on the use of the car in urban areas is central to achieving the best combination of modes, to providing an efficient transport service and to enhancing quality of life. It is here that market forces and planning actions can work together to obtain optimality in the use of scarce urban space through investment in public transport and local facilities, and control on development, as well as through substantially raising the costs of

using the car in urban areas, such as through increases in fuel prices, road pricing and parking pricing.

3.5   Decisions Relating to Increasing the Energy Efficiency within Urban Areas

Why should we be concerned with energy ?
- The Government has made a commitment to stabilise CO_2 emissions
- Buildings account for over 44% of energy consumed
- Renewable energy sources should be encouraged

Principle
Minimising the Environmental Impact of Energy Production and Consumption

Objectives
Reducing Emissions of CO_2;
Reducing Dependence on Non-Renewable Energy Sources;
Reducing Energy Use by 20%.

Actions
Information, Advice, Education and Promotion;
Siting and Design Considerations in New Development;
Developers to Exceed Energy Efficiency Standards;
Create Sheltered Micro Climates Around Buildings;
Maintain Solar Access and Effective Wind Shelter;
Encourage Renewable Sources;
Improve Waste Management and Recycling;
Use Local Based Energy Generation.

Key Concerns
Promoting Better Efficiency in Energy Use;
Planning and Designing New Development to Reduce Energy Demand;
Making Greater Use of Renewable Energy Sources;
Promoting Combined Heat and Power and District Heating;
Levels of Waste Management and Recycling.

An energy efficient settlement gives high priority to recycling, to district heating and combined heat and power (CHP), to housing design and insulation standards, and to energy efficient offices and buildings. It may also explore the possibilities of using renewable energy sources (e.g. biomass). Energy use in industry has declined over the last thirty years, but this has been matched by increases in energy use in domestic and commercial sectors. The real growth has come in the transport sector which has more than doubled its use of energy (1960-1993).

The opportunities to improve energy efficiency in urban areas are substantial. At the urban scale, combined heat and power and district heating schemes can increase thermal efficiency to 80%, as compared with the 38% efficiency obtained from a conventional power

station. Its efficiency and cost advantage is very sensitive to location and density of development, as thermal losses increase with distance. The potential is enhanced if refuse based systems can combine recycling with heating. Comprehensive waste management systems for both liquid and solid waste must form an integral part of any strategy to reduce waste production, to help conserve valuable resources, and to reduce the risk of environmental contamination and health hazards.

Opportunities are also available at the neighbourhood to reduce energy use through the built form. Here, layout considerations and high thermal insulation standards in housing, with higher densities and smaller units (terraced and flats), all increase energy efficiency. Passive solar design involves the siting, design, orientation, layout and landscaping aspects to be calculated, so that the solar gain can be maximised with reduced requirements for space and water heating (or cooling). Micro climatic factors are important in reducing heat loss from buildings by controlling wind speed and raising external ambient temperatures, principally through the use of shelter belts and other forms of planting, which in turn helps improve the local environment.

Underlying the argument here is the necessity to attract people back to the city as this enhances possible economies of scale in energy provision, reduces travel distances and provides opportunities to promote energy efficient public transport. Experiments are being carried out with non polluting public transport with electric buses and natural gas powered buses to match the energy efficiency of trams and trolley buses which have been in use for many years. All of this depends upon critical thresholds for demand. The urban area provides the opportunity for the greatest efficiency in the use of resources, yet people in many cities are now choosing to leave. Out migration from cities and reductions in density of development are two key reasons why the sustainability of cities is being reduced. This is the compact city paradox where greater levels of sustainability can be achieved through greater densities, but as perceived quality of life is reduced the reverse is actually occurring. The paradox can only be resolved if density and perceived quality of life cities are both improved (Jenks et al, 1996).

4.   Barriers to Implementation

Barriers - Decisions Relating to the Use of Existing Resources

- Ready supply of easier and cheaper greenfield sites;
- Lack of certainty about the funding for land remediation;
- Concern over future legal liability;
- Limited attraction of town centres and high streets as places to live;
- Lack of funding and/or tax support to encourage the conversion of vacant space to housing and other uses;
- Loss of trade to competing centres - often with better road access and convenient car parking;
- Poor environmental quality due to impact of through traffic;
- Lack of "image and ownership" of local facilities and mechanisms for co-ordinating and managing improvements;
- Limited resources for environmental improvements;
- Competition from out of town centres (business and retail parks);
- Multiplicity of interests involved in town centres;
- Convenience of access - road congestion, car parking and quality of public transport.

Barriers - Decisions Relating to New Development

- Failure to address new settlement issues at the regional level;
- Scepticism about potential for urban infill reinforced by concerns about town cramming;
- Carry over of outstanding planning permissions;
- Concern to provide high quality greenfield sites which can compete successfully for mobile investment;
- Political desire to provide convenient (for some) facilities which people like;
- Leaving important principles of detailed design to too late in the planning/development process;
- Design and liveability concerns make authorities reluctant to promote higher density housing;
- Pressure to provide convenient car parking to allow town centres to compete;
- Failure of development industry to respond imaginatively to sustainability concerns.

Barriers - Decisions Relating to Transport

- Application of general planning and car parking standards which are inappropriate and unachievable in a town centre/ high street context;
- Parking is a major use of urban land, yet it is often not priced to reflect its value;
- Increasing reluctance of people to use public transport and cycle/walk, even for local trips;
- Strong desire of urban residents to use their cars as of right;
- Fragmentation of the organisation, integration and management of public transport;
- Uncertainty over the funding of public transport and other green modes;
- Separation of planning and transport functions within local authorities.

These four lists give impressive evidence why there are barriers to implementation at all levels of decision making and across all elements of urban sustainability. It could be argued that the progress which has been made is a positive sign, given these barriers. Yet there does seem to be an underlying desire from decision makers at all levels to make further progress, at least in areas where competitive advantage will not be lost, and where sustainability principles coincide with economic benefits.

5.   Overcoming Barriers

From this extensive list of barriers, two areas seem to be most important for immediate action. The first relates to the development of appropriate methods of analysis for urban sustainability which can bring together at least the four main elements covered here. This means that methods have to extend beyond single sector analysis to explicitly include the effects of decisions on urban sustainability. Too often in the past has the problem been seen as a transport or energy or land one rather than a problem which has elements from all three. Similarly, most analysis is static, based on data collected at one point in time. Sustainability is not an event but a continuum, where processes and interactions must be explicitly analysed. This means that monitoring and auditing form an essential part of the investigation, and this needs to take place at the European, national, regional and local levels.

Considerable action has already taken place through national and international agencies (e.g. Commission of the European Communities, 1992; EU Expert Group on the Urban Environment, 1995; and Local Management Board, 1993), but clear guidance, together with the means to overcome barriers to implementation is still required. At the city-wide level, environmental strategies and statements, together with action plans need to be set up. These statements can and should be set within the statutory planning process so that issues of sustainability become a central consideration in policy making at the city level. To implement these broad policy and environmental statements, a series of lower level plans and management systems are required (Breheny, 1992). One possibility here are integrated environmental plans which explicitly involve community consultation and participation - this idea is central to Local Agenda 21 and the EU's Fifth Environmental Action Plan "Towards Sustainability".

Environmental budgeting and environmental management systems (Eco-Management and Auditing Scheme - EMAS) help establish levels of resource use, facilitate the monitoring of progress towards sustainability targets, and provide a regular audit of the total urban environment. For new projects it is essential to have a full environmental impact assessment of both the individual project, and a complementary assessment of how it fits into the city as a whole - a strategic environmental assessment (Glasson et al, 1994).

Much of the framework for analysis used here can be incorporated into a strategic environmental assessment, as principles are developed together with objectives, key concerns and actions. The missing elements area series of assessment criteria which would establish whether sustainability objectives have been achieved. The four basic principles developed here relate more to decisions which have to be taken at the urban scale on development (existing and new), transport and energy. Broader-based strategic principles for sustainability would include environment, development, futurity, equity and participation (SERPLAN, 1996). *Urban Sustainability Assessment (USA)* would be complementary to Strategic Environmental Assessment (SEA).

Urban sustainability is a "creative, local, balance seeking process extending to all areas of local decision making " (City Charter, 1994, para 107). This Charter suggests that by building the management of a city around the information collected through this process, the city can be understood as an organic whole, and this in turn will allow citizens to make

informed choices. Through a management process rooted in sustainability, decisions can be made which not only represent the interests of current stakeholders, but also of future generations.

The second set of barriers relates to the responsibilities of the decision makers themselves. There does not seem to be the political commitment to introducing measures to address the key issues. Part of the explanation for this is the separation of planning from transport, and the division of planning into plan making and implementation. More fundamentally though is the professional scepticism about the effectiveness of any policy measure on the problem. There seems to be some justification for this view as implementation in one location might result in problem migration to another area. The competitive position will be changed and the attractiveness of one location may be reduced, at least in perception of the developer. There is also a concern over the political acceptability of the most radical policies and a resentment from the general public. Consequently, it has been much easier to introduce policies which directly improve the quality of urban areas (e.g. town centre management schemes) rather than those policies which are perceived as negative, but would also have a significant (but indirect) impact on town centre quality (e.g. limitation of car access to the town centre).

This argument suggests that the next stage in gaining acceptance would be to raise the awareness of all parties (including the general public) to build that commitment. Within local government, this must take place at national, regional and local levels (Table 1). This "bottom up" assessment of the barriers to implementation has been based on a series of detailed case studies at the borough, district, town and county level in England (Llewelyn-Davies et al, 1996). The conclusions are consistent with those derived from a "top down" assessment carried out on the implementation of PPG 13 on Transport (GB: Departments of the Environment and Transport, 1994) carried out for the Department of the Environment by Arup Economics and Planning (Breheny et al, 1996). Local Authority responses, to reducing the growth in the length and number of motorised journeys, to encouraging alternative means of travel which have less environmental impact, and to reduce the reliance on the private car, were assessed through survey and interview.

Table 1:   Responsibilities and Actions to Overcome Barriers

Level	Actions	Comment
National	Guidance through Regional Planning Guidance and Planning Policy Guidance; Guarantee of financial support for reuse of derelict land; Development levy on greenfield sites to support restoration of brownfield sites; Certification of brownfield sites; Tax benefits to assist conversion; Lower parking standards in urban areas; Planning appeals to promote town centre development, not peripheral development.	Already being done, but guidance can be contradictory; Some funding from regional and city challenge budgets; Aim to reduce the costs of brownfield development; Polluter pays principle; Costs of conversion offset against tax in Ireland; Being done, but parking revenue a major source of income; Backlog of permissions make it difficult to change direction.
Regional	Direct grants for site preparation in urban areas; Consistency in Development Plans between neighbouring Local Authorities; New settlements need to be of a substantial size and require regional level support.	Needs support from national government; Development should not migrate from one Local Authority to another; Most planned new settlements are too small to be sustainable.
Local	Business plan for reuse of brownfield land; Facilitate change of use and mixed use; Promotion of local facilities and town centre improvement; Funding of public transport and cycle/walk facilities; Promotion of member/officer and public awareness; Restraint on car use in urban areas; Development Control criteria to match renewable energy applications with broader environmental criteria; Promotion of recycling and waste management; Responsibility for Combined Heat and Power, District Heating and Renewable Energy; Design Guides to have environmental, energy and transport considerations as an integral part of design and layout.	Brownfield policies absent - mainly due to lack of resources; More flexibility now; Town Centre Management schemes set up; Possible through Package Bids to the Department of Transport; Members Seminars and Local Agenda 21 events now being used; Demand Management schemes; Debate over location of renewable energy schemes in visually attractive places; New tax on landfill sites to encourage recycling; Debate over location in urban areas, particularly near to housing; Current Design Guides only cover design and layout considerations.

Six main problems to the implementation of PPG 13 objectives were identified:

1. Loss of competitive position of one local Authority as compared with another;

2. Existing commitments made it difficult to change policy;

3. Conflicts between PPG 13 objectives and other objectives for the local economy and employment;

4. Lack of clarity on impacts of alternatives;

5. Urban sites for development were limited and the costs of site preparation are high. Concern also over the need for investment in rural areas;

6. Implementation options are weak as responsibilities are fragmented, as prices need to be increased, and as there are inconsistencies in major decision making - the burden of proof is with the authority.

In addition to actions at all levels, there must be agreement between the different agencies and a consistency in approach. Most of the actions promoted here relate to the public sector, but increasingly it will be the private sector through the developers, the privatised utilities and public transport operators that have the key role to play in implementation. The public sector can provide the statutory framework within which action takes place, and it can also provide and encourage change, but the main actors will be in the private sector (including individual decision makers). It is here that the market driven imperative has to be tempered by broader sustainability objectives. Urban sustainability also relates to long term development and the dynamics of cities. Competitive forces, new technologies, knowledge and new political imperatives will all change the nature of cities over time. The notion of urban sustainability will also change, but even now new institutional structures may be required, plus a greater and a more active involvement of the actors, if urban sustainability is to move from being a dream to being a reality.

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