IMPLEMENTING SUSTAINABLE FUTURES IN CITIES: LESSONS FROM POLICY AND PRACTICE

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PART ONE
CONCEPT AND CONTEXT

THE CONCEPT OF SUSTAINABLE DEVELOPMENT

Although the conceptual origins of sustainable development go back many years, for example to the Garden City Movement in the UK and the Regional Planning Association of America, the more recent revival of the term comes from the 1980 World Conservation Strategy (IUCN, 1980) which suggested sustainable development as a means of integrating economic development with the essential conservation of the environment. The work of the World Commission on Environment and Development (WCED) followed, leading to the publication of the Brundtland Report in 1987. In broad terms, WCED rejected the (then dominant) argument that economic growth and maintenance of environmental quality were mutually exclusive. The Report argued that development could and should be sustainable

> "(meeting) the needs of the present, without compromising the ability of future
> generations to meet their own needs" (Brundtland 1987)

Since the Brundtland Report there have been a number of significant policy debates and a range of reports addressing various aspects of sustainable development, as well as a growing body of practical experience in attempting to operationalise sustainability. The major stimulus has been the UN Conference on Environment and Development (UNCED) in Rio in 1992, and the series of UN conferences that followed, culminating in the Habitat II conference in Istanbul in 1996. However, despite the widespread adoption internationally of the non-legally binding Agenda 21 action plan from Rio, many observers conclude that sustainable development is a challenge that remains to be confronted; and here the urban and regional level, as the interface between local and national, in an increasingly globalised environment of international interests and pressures, is of particular significance.

In this millennium, unprecedented growth in urban living (particularly in Africa and Asia) gives rise to problems of persistently high unemployment rates, concerns about the future economy of cities, social exclusion, crime, the preservation of our natural and built environments, the quality of life, pressures on natural resources and negative impacts of health as well as opportunities for the renaissance of cities and urban life. Whilst these problems are faced in some measure in all cities, there is an increasing discrepancy between the scale of problems in developed and developing countries, even though cities are increasingly inter-related in global economic and environmental systems.

In addition, different concepts and models have been discussed that aid analysis and policy development. These focus on the inter-relationship between economic, environmental, social, energy, health and cultural concerns and the significance of integrated and holistic approaches at all levels of government. A major European contribution has been the increasing focus on 'urban issues' and the European Sustainable Cities Project.

This paper examines urbanisation and urban change and development against the backcloth of world and regional population change. It then introduces policy approaches adopted in Europe that take forward the sustainability agenda. The next section focuses on evaluative research carried out by the author in Sweden and presents findings from this study and selective case studies of Stockholm, Göteborg and Malmö.

The final section of the paper concludes with a number of broader and strategic issues and propositions for the future sustainability of cities in the 21st century.

POPULATION CHANGE AND URBANISATION

This part of the paper draws on statistical information from the United Nation's Population Division, Department of Economic and Social Affairs and commentaries from the UN and academics specialising in the understanding of these statistics (UN 1996, 1998). The Population Division of the UN prepares biennially the official UN population estimates and projections for countries, urban and rural areas and major cities. The information contained in this paper is drawn from the 1996 and 1998 Revisions. The summary information provides an overview for the reader illustrated by a number of graphs and tables.

World Population Growth - Year 0 to 2050

The rapid growth of the world population is a recent phenomenon in the history of the world. It is estimated that 2000 years ago the population of the world was about 300 million (see Figure 1).

Figure 1:   World Population Milestones

World Population reached:

1 billion in 1804
2 billion in 1927 (123 years later)
3 billion in 1960 (33 years later)
4 billion in 1974 (14 years later)
5 billion in 1987 (13 years later)
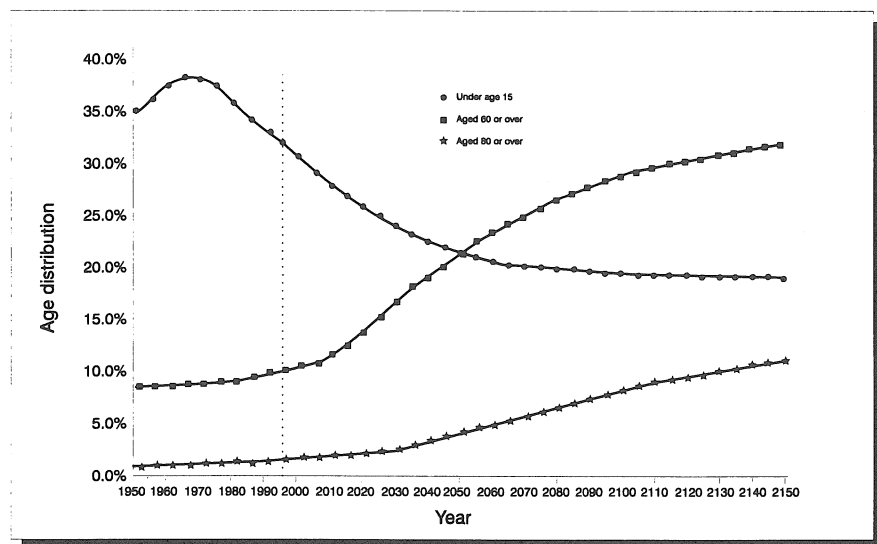
World Population may reach:

6 billion in 1999 (12 years later)
7 billion in 2013 (14 years later)
8 billion in 2028 (15 years later)
9 billion in 2054 (26 years later)

Source: United Nations Population Division, *World Population Prospects: The 1998 Revision,* forthcoming.

For a very long time the world population did not grow significantly, with periods of growth followed by periods of decline. It took more than 1600 years for the world population to double to 600 million.

The world population was estimated at 791 million in 1750, with 64 percent in Asia, 21 percent in Europe, and 13 percent in Africa. Northern America was still nearly empty. By 1900, 150 years later, the world population had only slightly more than doubled, to 1650 million. The major growth had been in Europe, whose share had increased to 25 percent, and in Northern America and in Latin America, whose share had increased to 5 percent each. Meanwhile the share of Asia had decreased to 57 percent and that of Africa to 8 percent. The growth of the world population accelerated after 1900, with 2520 million in 1950, a 53 percent increase in 50 years.

**Figure 2:   Geographical distribution of the World's population**

Source: Population Division of the Department of Economic and Social Affairs at the United Nations
Secretariat, *World Population Projections to 2150*, (United Nations, New York, 1998).

The rapid growth of the world population started in 1950, with a sharp reduction in mortality in the less developed regions, resulting in an estimated population of 6055 million in the year 2000, nearly two-and-a-half times the population in 1950. With the declines in fertility in most of the world, the global growth rate of population has been decreasing since its peak of 2.0 percent in 1965-1970. In 1998, the world's population stands at 5.9 billion and is growing at 1.3 percent per year, or an annual net addition of 78 million people.

According to the medium variant of the 1998 Revision of the official United Nations estimates and projections, by 2050 the world is expected to have 8909 million people, an increase of slightly less than half from the 2000 population. By then the share of Asia will have stabilised at 59 percent, that of Africa will have more than doubled to 20 percent, and that of Latin America nearly doubled to 9 percent. Meanwhile the share of Europe will decline to 7 percent, less than one third its peak level. While in 1900 the population of Europe was three times that of Africa, in 2050 the population of Africa will be nearly three times that of Europe (see Figure 2).

The world population will continue to grow after 2050. Long-range population projections of the United Nations indicate population growth well into the twenty-second century.

Highlights of the 1998 UN Population Revision

Some of the highlights of the 1998 Revision of the world population estimates and projections are summarised below:

- World population currently stands at 5.9 billion persons and is growing at 1.33 percent per year, or an annual net addition of 78 million people. World population in the mid 21st century is expected to be in the range of 7.3 to 10.7 billion. The medium-fertility projection, which is usually considered as "most likely", indicates that world population will reach 8.9 billion in 2050.

- The world population is expected to reach the 6 billion mark in 1999. From 1804, when the world passed the 1 billion mark, it took 123 years to reach 2 billion people in 1927, 33 years to attain 3 billion in 1960, 14 years to reach 4 billion in 1974, 13 years to attain 5 billion in 1987 and 12 years to reach 6 billion in 1999.

- The global average fertility level now stands at 2.7 births per woman; in contrast, in the early 1950, the average number was 5 births per woman. Fertility is now declining in all regions of the world. For example, during the last 25 years, the number of children per couple has fallen from 6.6 to 5.1 in Africa, from 5.1 to 2.6 in Asia, and from 5.0 to 2.7 in Latin America and the Caribbean.

- The 1998 Revision demonstrates a devastating mortality toll from HIV/AIDS. For instance, in the 29 hardest-hit African countries, the average life expectancy at birth is currently 7 years less than it would have been in the absence of AIDS. The highest prevalence of HIV in the world is currently in Botswana, where one of every 4 adults is infected. Life expectancy at birth in Botswana is anticipated to fall from 61 years in 1990-1995 to 41 years by 2000-2005. Based on the United Nations projections, Botswana's population by 2025 may be 23 percent smaller than it would have been in the absence of AIDS. Nevertheless, because fertility is high, the population of Botswana is still expected to nearly double between 1995 and 2050.

- The results from the 1998 Revision (Figure 3) shed new light on the global population ageing process. For the first time, the number of octogenarians, nonagenarians and centenarians are estimated and projected for all countries of the world. In 1998, 66 million persons in the world were aged 80 or over, that is about 1 of every 100 persons. This number is expected to increase almost 6-fold by 2050 to reach 370 million persons. In addition, in 1998, around 135,000 persons in the world are estimated to be aged 100 or over. The number of centenarians is projected to increase 16-fold by 2050 to reach 2.2 million persons.

Figure 3: Percentage of the world population under age 15, aged 60 or over, and aged 80 or over, 1950-2150, medium fertility scenario

Source: Population Division of the Department of Economic and Social Affairs at the United Nations Secretariat, *World Population Projections to 2150*, (United Nations, New York,1998).

World Urban and Rural Populations

The percentage of population living in urban areas in 1996 and 2030 is given in Figure 4. Broadly this shows the broad urbanisation trends in different regions of the world. The most noticeable changes are the very substantial increases in Africa and Asia.

Figure 5 provides a summary of these changes in relation to the regions defined by the UN as more developed (Europe, North America, Australia/New Zealand and Japan); less developed (Africa, Asia, Latin America and the Caribbean, and the regions of Melanesia, Micronesia and Polynesia); least developed countries comprising 48 countries, of which 33 are in Africa, 9 in Asia, 1 in Latin America and 5 in Oceania. They are also included in the less developed regions.

Figure 4: Percentage of population living in urban areas in 1996 and 2030
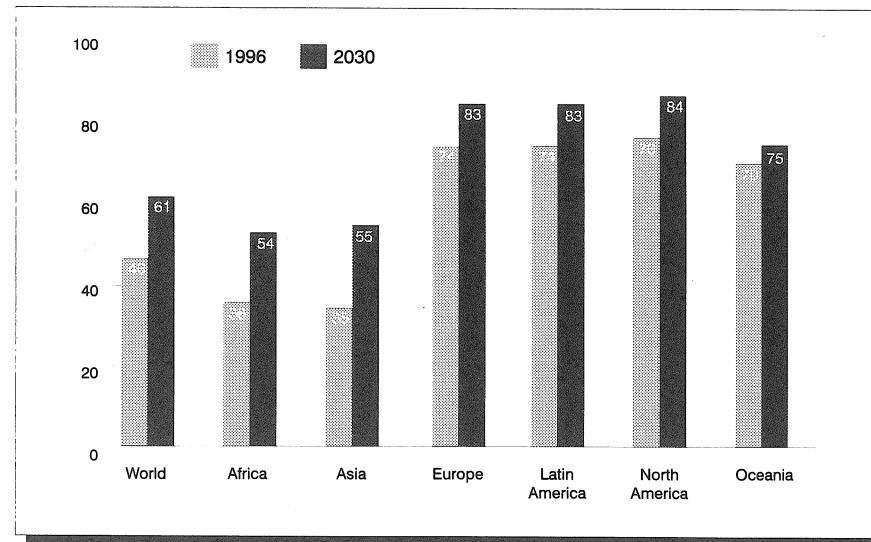
Source: Population Division, United Nations

Figure 5: Urban-rural populations (1996-2030): three regions compared

	Population (thousands)			
	Urban		Rural	
	1996	2030	1996	2030
World total	**2635645**	**5117038**	**3132129**	**3254564**
More developed regions	882890	1014759	292150	197388
Less developed regions	1752755	4102279	2839979	3057176
Least developed countries	138316	557663	456195	709539

Source: Population Division, United Nations

Large Cities

In terms of the world's largest agglomerations (with populations of 10 million or more inhabitants) the UN Urban Agglomeration Statistics 1996 provides us with the evidence of the changes that have taken place from 1970 and the predictions for 2015 (Figure 6).

Figure 6: World's urban agglomerations with populations of 10 million or more inhabitants in 1996: 1970, 1996 and 2015

Source: Population Division, United Nations

Figure 7: Number of urban agglomerations with 1 million or more inhabitants: 1950 to 2015
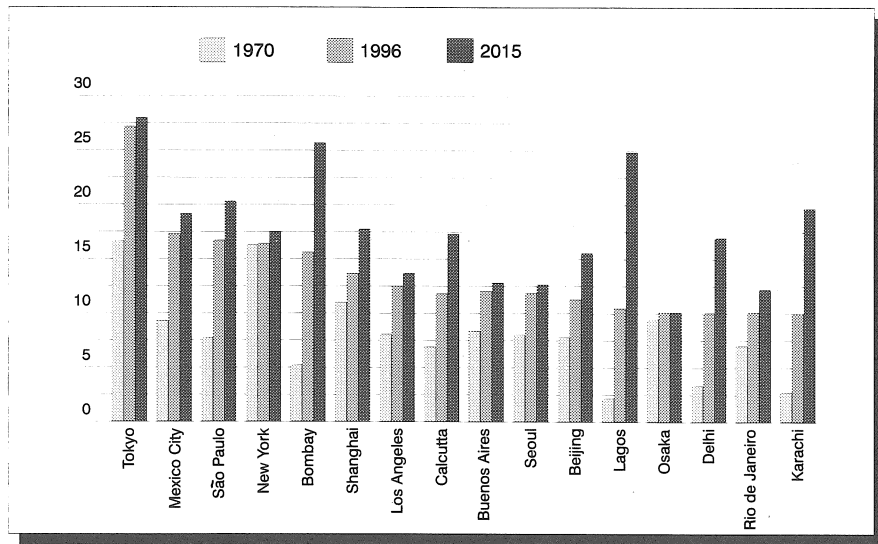
Source: Population Division, United Nations
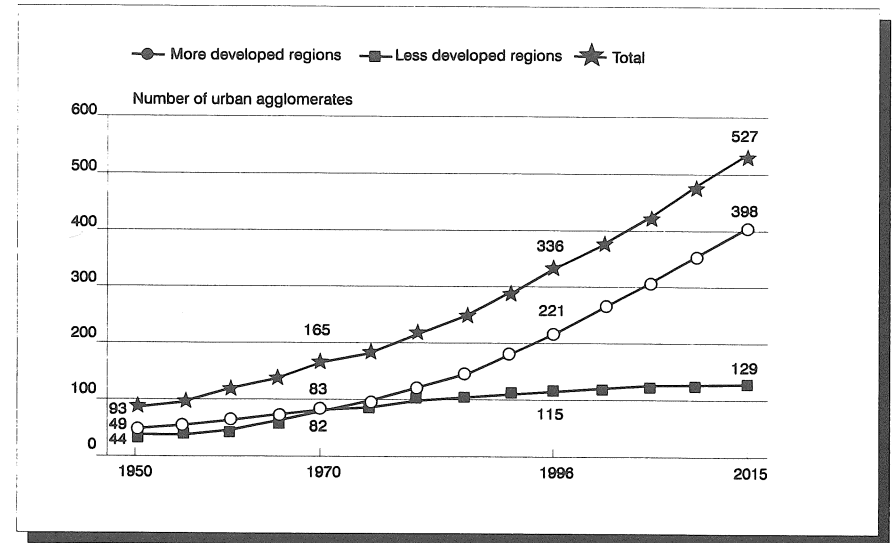
Figure 7 is a graph showing the growth in the number of urban agglomerations with 1 million or more inhabitants from 1950 to 2015. It shows dramatically the difference between the "more developed" and "less developed" regions.

The brief review of world population revised estimates and the urbanisation trends from UN statistics demonstrate that there is a rapid shift for all regions of the world to becoming more and more urbanised. **The growing urban agglomerations increasingly will be the focus for national economic performance and local and global environmental performance. The 'urban' policies of governments and the planning, management and governance at the city level become critical in the realisation of sustainable urban futures and increasingly national competitiveness in global markets.**

In Europe, which has been urbanised for a long time, there have been a number of significant policy developments that provide frameworks for urban policy. These policies take on board the sustainable development agenda; provide for the sharing of local practice in towns and cities across Europe, and are supported by an increasing research interest in the "city of tomorrow' and more sustainable futures in terms of energy use, transport, social exclusion, economic regeneration, cultural heritage and governance.

PART TWO
EUROPEAN URBAN FOCUS

The European Union is one of the most urbanised continents in the world. The Union contains approximately 170 cities with more than 200,000 inhabitants and 32 cities with more than a million inhabitants. London and Paris are the only two metropolises with populations approaching 10 million. Over 80% of the European population live in these towns and cities making them the cultural, economic and innovative centres of Europe. They function as the generators of local, regional and national economies but together are the key localities in relation to European global competitiveness. They are also the centres of European social and cultural development and in recent times have undergone what is expressed as a "renaissance" by some commentators. At the same time many of these localities are confronted with serious problems - high unemployment, social and spatial segregation, social exclusion, concerns over their future economy, crime, the general quality of life, negative impacts on health and pressures on natural and historic assets. In addition they are handling wider global and societal changes due to the globalisation of markets, shifts in demography and family structure, and new technological innovations.

Along with cities worldwide, European cities are facing up to these challenges that are reshaping their futures. In work carried out for the European Commission and the World Health Organisation (WHO) over the last ten years, a number of significant issues can be identified that are closely interrelated that provide the agenda for policy development for both cities, member states, and the European Union. These include: the increased competition among cities and regions both within the Union and between the Union and the rest of the world; the accumulation of unemployment, poverty and social exclusion in the larger cities; issues concerning in-migration; the increasing focus on sustainable urban development; the influence of changes to public expenditure and social insurance on cities; the increasing concern over urban health; the increasing inability to achieve access and mobility within and between cities; the concerns over the quality of local democracy; and the requirements these challenges imply for urban management, urban leadership and governance.

Urban Change in Europe

Changes in the European urban system have been described in depth in a number of studies and reports. 'Urbanisation and the Function of Cities in the European Community' (European Institute of Urban Affairs, 1992) still provides a stimulating understanding of urban change in Europe as do the European Sustainable Cities Reports (CEC 1994, CEC 1996) and the Urban Communication "Towards an Urban Agenda in The European Union" (CEC 1997).

It is possible to identify a clear cycle of urban change in the European system during the post-war period, from urbanisation to suburbanisation, then de-urbanisation (also called counter-urbanisation) and, most recently, re-urbanisation with close links between population shifts and changing economic fortunes. The largest industrial cities of the north and west experienced outward shifts in population and employment early on, while smaller towns and cities - especially those located in the south and west - grew. The period since the mid 1980s has witnessed a slowing of these population shifts in a period of economic recession, and, most recently, a revival of population growth in some of the largest cities, linked in part to programmes of public and private investment in historic city centres. In the early 1990s the urban system is more demographically stable than in the period from the 1950s to the late 1980s but cities are still vulnerable to change, especially from migration from eastern and central European countries. The Single Market and the enlargement of the European Union are further forces for urban change.

'Towards an Urban Agenda in the European Union' (CEC, 1997) sees the main challenges facing European Cities revolving around the dynamics of urban change in Europe due to net immigration, national economic performance, structural change in the employment market coupled with the rapid growth and size of the service sector, the increasing importance of environment and quality of life conditions and the skills base and responsiveness of labour in locational decisions, the expansion of the EU through the reunification of Germany and the accession of countries in central and eastern Europe (CEC 1997). Globalisation and the shift to services has nevertheless not diminished the importance of space for economic development. There is, however, an emerging imbalance in the European urban system with central gateway cities Antwerp, Bremen, Rotterdam, Hanover, Lyon and Vienna, and medium cities located in the core of Europe profiting more from European integration than cities on the periphery.

As these economic changes shape urban futures, inhabitants are increasingly concerned about the quality of their natural and physical environment and the quality of life their city provides. There is a growing dissatisfaction with the quality of air, water, natural environment, safety, quality of the built environment and the contribution of urban planning. Inhabitants 'voice' in relation to these issues, although growing, is often fragmented, frustrated or unequal. There is also an imbalance in local democratic influence within and between cities across the Union. In terms of institutional response, cities across Europe are operating in very different legal, institutional and financial systems. Some local authorities, for example, operate within a greater tradition of local autonomy and wield larger spending power than other local authorities.

A comprehensive review of the state of the built and natural environment in European cities is provided in the Urban Environment chapter of "Europe's Environment: The Dobris Assessment" (European Environment Agency, 1995). This chapter in many ways complements the analysis of economic and social trends, for the links between urbanisation and economic change and environmental conditions are firmly established. Different patterns and stages of economic development generate different kinds of environmental problems and distribute them unequally both within and between cities. In areas of both growth and decline the development and re-development of buildings and infrastructure have direct impacts upon natural ecosystems. Congestion, pollution from traffic, stress and noise have major consequences for health and, more generally, for the quality of life.

Europe's Environment analyses the quality of the physical environment in 51 European cities using data on 20 indicators, focusing on urban patterns (population, land use cover, areas of dereliction and urban renewal and urban mobility), urban flows (water consumption and waste, energy, transport of goods, waste production, treatment and disposal, and recycling) and urban environmental quality (air and water quality, noise, traffic safety, housing conditions, accessibility to green space and wildlife quality). This analysis has been updated (European Environment Agency, 1998) along with specific research developing an Urban Audit for Europe (CEC 2000).

European Urban Policies for Sustainable Futures

Since 1991 the European Community, now the European Union, has sought consolidation of its actions for environmental protection, re-orientation of environment policy to promote the objectives of sustainable development in relation to towns and cities. These policy shifts have key implications for the urban environment. The principal developments are described and elaborated in European Sustainable Cities (CEC 1996). A policy history is provided in Figure 8.

Figure 8:   Chronological Policy History

1972	Stockholm Conference
1980	World Conservation Strategy
1987	Brundtland Report
1987	WHO Healthy Cities – Phase 1
1990	Green Paper on the Urban Environment (EU)
1991	Expert Group on the Urban Environment (EU)
1992	Rio Conference (Agenda 21)
1993	Sustainable Cities Project, EU
1994	Aalborg Conference – Charter and Campaign
1996	European Sustainable Cities Report
	Lisbon Action Plan
	Habitat II Conference, Istanbul
1997	Urban Communications (EU)
	Kyoto Conference
1998	Vth Framework for Research
	'City of Tomorrow'
2000	Expert Group (new programme)
	Hanover Conference
2001	Habitat plus 5
2002	Rio plus 10

In the field of environmental policy and by implication health, integration of the urban discussion has been extensively pursued. An integrated approach was first advocated in the Fourth Environmental Action Programme 1988-1992, and this led to the publication of the consultative Green Paper on the Urban Environment (CEC 1990) and in 1991 to the Council of Ministers establishing the Expert Group on the Urban Environment.

The rationale for detailed consideration of the urban environment is set out in the Green Paper, which was a response to pressures from three sources - the concern on the part of several European cities that a preoccupation with rural development within the European Commission was overshadowing the interests of urban areas, the commitment of the then Environment Commissioner, and a resolution from the European Parliament urging for more studies on the urban environment. The Green Paper is a significant milestone in thinking about the urban environment in Europe, principally because it advocated a holistic view of urban problems and a policy integration approach to their solution.

The Green Paper sparked a number of debates. The most heated, perhaps, concerned different views on urban form and the relationship between notions of **compact cities** and sustainable futures. While the urban form and density of cities are clearly important, discussions since have widened the debate to consider ways in which **cities and their hinterlands**, regions and urban society are to be governed and managed to achieve sustainable futures. The Expert Group on the Urban Environment, established in 1991, developed the European Sustainable Cities Project in 1993 which led to a wider policy discussion in the European Commission with an urban focus. This work has been published in European Sustainable Cities (CEC 1994, 1996). The European Sustainable Towns and Cities Campaign, launched in Aalborg in 1994, now includes over 1700 local authorities as well as the major European local authority networks, ICLEI and WHO.

European Sustainable Cities

The key messages which have come from attempts in Europe to influence policy and practice towards sustainability at the urban level include:

- **balancing progress**. In the longer term, meeting the challenge of sustainability requires major changes in attitudes in society and in the operation of economies. However, in the short term, much can be achieved through practical incremental steps to reduce non-sustainability as much as to achieve sustainability. These steps include realigning existing policies and mechanisms, and identifying a strong set of principles and related indicators on which environmentally-sound action may be based;

- **integrating policy**. Integration must be sought horizontally between sectors, to stimulate synergistic effects of all dimensions of sustainability, and vertically between policy levels, to achieve greater coherence of policy and actions within cities and to avoid contradictions across levels;

- **closing resource cycles**. Ecosystems thinking emphasises the city as a complex system characterised by flows of energy, nutrients, materials and other resources which include finance and human resources. Working towards closing cycles by integrating flows and minimising waste will promote sustainability at the urban level. The notion of ecological footprinting for all or parts of cities and regions may assist the process (Rees, 1998);

- **designing sustainability**. There is a growing need for transforming the design of buildings and products to a sustainable future incorporating the principles of sustainability. Similarly the planning and urban design of parts or the whole of cities requires new approaches whether it be new buildings, conservation, the renewal and creation of public space or the retrofitting of areas both within and on the periphery of cities;

- **management, governance and capacity-building**. Sustainable urban management will require a range of tools addressing environmental, social and economic concerns to assist integration of policy and practice. Also required will be a reconsideration of the processes and practices of governance, including the institutional arrangements and capacities of different levels of government and agencies, and the roles and operation of partnerships between public and private sectors, NGOs and citizens.

In 1997 the European Commission published its Communication "Towards an Urban Agenda in the European Union" (CEC 1997) which also established a process of consultation which culminated in November 1998 in a conference in Vienna where the Urban Action Plan - Sustainable Urban Development in the European Union: A Framework for Action (CEC 1998) was discussed. This framework is organised under four substantive policy aims. These are: Strengthening economic prosperity and employment in towns and cities; Promoting equality, social inclusion and regeneration in urban areas; Protecting and improving the urban environment: towards local and global sustainability; and Contributing to good urban governance and local empowerment.

Further the Fifth Framework for Research in the European Union, which commenced in 1999 for four years, contains a strong focus on urban issues and includes a research area called the 'City of Tomorrow'. Fudge and Rowe (1997) in a report on the development of socio-economic environmental research for the European Commission suggest some of the priorities for urban research to be included in the Fifth Framework Programme should be:

- how to upgrade (towards sustainability goals) current urban stock - which will also comprise the fabric of the 'City of Tomorrow';

- developing models for the future of access and mobility which are affordable and sustainable;

- how to reduce inequality, counteract unemployment and social exclusion;

- investigating methods of implementing healthy public policy including community safety;

- investigating how to reduce energy consumption in all aspects of production and consumption in cities;

- attuning urban economies to sustainability goals, at the appropriate scale and without exporting problems. Thus the research agenda must include city and hinterland;

- underpinning research into the changing nature of urban and social values;

- examining approaches to urban management and governance that are required for sustainable futures for cities.

Cities are increasingly at the centre of European policy thinking even though the legal and constitutional competence is less clear. The Urban Forum in Vienna concluded a consultation period on the nature of 'urban sustainable development' in Europe and hopefully the follow-up will set out the emerging policy directions and processes for implementing the various strands that together might provide a European 'urban policy' that is also a European policy for 'urban sustainability'. Fundamental questions remain to be addressed, however the European Parliament, the Committee of Regions and the Urban Environment Expert Group are all continuing the focus on urban issues and urban sustainability. The Expert Group on the Urban Environment is currently completing four pieces of work (see Figure 9) and is preparing the "urban" component/chapter for the new Environmental Action Programme for Europe. The European Commission is continuing work on the Urban Audit, Sustainable Transport, Kyoto protocol and a new research programme.

Figure 9:   Work Programme of the "New" EU Expert Group on the Urban Environment

Towards a local Sustainability Profile European Common Indicators	Chair of Working Group: Nedialka Sougareva French Ministry of the Environment
Sustainable Land Use	Chair of Working Group: Michael Bach UK Department of Environment, Transport and the Regions
Implementation of Environmental Legislation	Chair of Working Group: Giuseppe Gamba Italian Ministry
Urban Design for Sustainability	Chair of Working Group: Gabriele Langschwert Austrian Environment Ministry

Guiding Principles for Sustainable Development

Given the European experience what then are the guiding principles of sustainability around which a common agenda for action may be formulated? The UK Round Table on Sustainable Development for example has defined the following as essential:

- **the precautionary principle:** where there are threats of serious or irreversible damage to the environment, the lack of full scientific certainty should not be used as a reason to delay taking cost-effective action to prevent or minimise such damage;

- **the integration principle:** environmental requirements must be integrated into the definition and implementation of all areas of policy making;

- **the 'polluter pays' principle:** the costs of preventing or cleaning up pollution and wastes should be borne by those responsible for causing it and not by society at large (ie. the external costs of production should be internalised);

- **the preventative principle:** society should avoid incurring the costs of development activities which seriously damage natural or physical capital; and

- **the participative principle:** widespread and informed public participation in decision-making is an essential prerequisite for development which may be sustainable.

Although there is a range of positions in different sectors and interest groups, a list around which practical discussion towards urban and regional action might take place includes:

- **environmental limits to growth,** as framed in the concept of **'carrying capacity'** within which all forms of development and management must be contained;

- **demand management,** through which new patterns of production and lifestyle/consumption may be achieved;

- **environmental efficiency,** where maximum economic benefit is extracted from each unit of resource used;

- **welfare efficiency,** where maximum human benefit is extracted from each unit of economic activity; and

- **equity,** where the interests of the poor and of future generations are implicit in all considerations of policy and practice (intra- and inter-generational equity).

The problems with both conceptualising sustainable development and applying the principles derive from the requirement to bridge the very different paradigms of the so-called 'hard' disciplines associated with the environmental sciences, and those of management and social sciences. The extent to which different elements of the 'capital' of sustainability may be substitutable, eg. whether an increase in human knowledge can compensate for resource losses, is also, by definition, unknown (see e.g. Pearce et al, 1990). The concept of 'carrying capacity' seems to offer the possibility of setting objective limits upon the use of both natural and man-made resources. However, this concept too is interpreted differently by various users to reflect their own perceptions of value (see e.g. O'Neill, 1996). Moreover, issues such as democratic probity have yet to be addressed at all (the majority may choose not to pay the price for sustainability policies and practice). Tensions arise from the potential breadth and scope of sustainable development, both spatially (from global to local) and temporally (from 'as soon as possible' to the very long-term). Relevant policy areas include environment, transport, land use planning and practice, health, technology and business practice, as well as the frameworks for trade; and the instruments which might be brought to bear thus range from legislation and market regulation to systems management and community action. There are problems of definition, measurement, attribution of value, and the use of indicators (e.g. LGMB, 1995; Countryside Commission, 1995; HMSO, 1996). Work continues into green accounting (e.g. OECD, 1996; Green Alliance, 1997) and,

particularly through the Organisation for Economic Co-operation and Development (OECD), alternatives to GNP as measures of national well-being. However, it may be argued that the growth paradigm and the strength of business interests to a large extent still prevail. There is a dominant central commitment to international competitiveness which militates against business and capital engaging with more environmentally and socially beneficial forms of production and management (Welford, 1995). Globalisation, fostered by technological, informational and managerial change, proceeds apace; eco-efficiency may be super-imposed but would require concerted international effort, of which there is little evidence (Fussler and James, 1996). Localisation, on the other hand, which underpins sustainability thinking in many countries emphasises place, community and individual. The question which then arises is how urban and regional actors may most usefully resolve these dilemmas to make progress at the urban and regional level.

Given these generic approaches emerging from both European and international experience, the paper now examines in more detail the experience of implementation from a northern country, Sweden, and its three main cities – Stockholm, Göteborg and Malmö.

PART THREE
ECOLOGICAL MODERNISATION – A CASE STUDY IN SWEDEN

Sweden has long been an acknowledged leader in Europe in terms of its commitment to environmental protection linked with ecologically based technological innovation, and to social democratisation and high levels of welfare provision. Following the 1992 UN Conference on Environment and Development in Rio, Agenda 21 was received warmly in Sweden as codifying an existing determination to pursue development which may be sustainable. However, over the last decade the economy has come under increasing pressure from globalisation and social change. Although the environmental agenda remains strong, a schism seems to be developing with key socio-economic drivers. The Swedish government has responded with a policy framework of ecological modernisation, through which it hopes to regain the high ground economically, environmentally and socially. I have reported elsewhere on this evaluative study of the implementation of the national framework for sustainable development and how it is being interpreted in cities and towns in Sweden (Fudge and Rowe 2000, 2001). This paper provides case study material from three cities – Stockholm, Göteborg and Malmö – to illustrate selective aspects of their implementation of policies for sustainable futures.

STOCKHOLM

The challenge for Stockholm (population 750,000) as capital lies in remaining a national leader in sustainable development in the face of rising consumer expectations in a globalising society, ghettoisation and developing 'edge crisis', and the ever-increasing costs of implementing sustainability principles as the public ownership of land, housing, and other resources diminishes. Many of the difficulties it faces are reflected in the increasing inner-city traffic congestion and air-quality deterioration which characterise all Sweden's major conurbations. A thematic 'flagship' project has been developed through the part-EU-funded programmes Zero Emissions in Urban Societies (ZEUS) and, more recently, Electric Vehicle City Distribution Systems. Standard traffic lights have been replaced with diode control systems, providing a significant energy saving. In the municipal fleet, 1500 petroleum and diesel vehicles are being replaced, or converted, to use methane from waste and sewage digestion, ethanol, rapeseed oil, or electricity. Hybrid buses and heavy-duty vehicles for waste management and food and goods distribution are also being introduced. Pools of low-energy cars are being set up for public and private use, and electric vehicles are used for shorter trips. Petroleum companies have co-operated in a new diverse fuelling infrastructure. Evaluation of performance, the effectiveness of incentives, and transferability are built into the programmes, and many achievements have been noted. One of these is the ongoing co-operation and mutual entrepreneurship which has been achieved between public and private sectors. The project focus, led by deputy mayors, has also meant that various players within municipal governance, across sectors and levels, have worked together. However, this mutual working has yet to be translated into significant institutional change. The approach remains heavily 'expert', and the community at large has been little involved. Road traffic continues to increase, and the costliness of the programmes limits their expansion and transferability. More ambitious development of new transport nodes and routes, including light rail, is more problematic as public spending declines and public ownership of land and resources diminish.

The project focus has also characterised neighbourhood regeneration projects in Stockholm. The adaptation of two 1960s suburbs to 'ecocycles principles' was the subject of an open 'ideas' competition within the neighbourhoods themselves, amongst the professions, and in senior school classes throughout Sweden, with the aims of inclusion and awareness raising. In what is intended to be an international prototype for inner-city regeneratioin, an 'ecological neighbourhood', Hammarby Sjöstad, is also being constructed, on contaminated industrial land in south-central Stockholm. Aims include a halving of the usual environmental impacts of new-build housing. The neighbourhood will house 15,000 people in 8000 apartments within a mixed development of shops, offices, small businesses, schools, and social and leisure facilities (Stockholm City Council, undated). Environmental and design objectives were agreed at the outset by a cross-sectoral partnership: to close resource loops at as local a level as possible; to minimise consumption of natural resources; to meet energy needs from renewable sources; to promote solutions that meet residents' and employers' needs; and to enhance social co-operation and ecological responsibility. Technological solutions are already advanced. Thus, there will be: district heating from heat recovery from local liquid biofuel-fired boilers, supplemented by solar panels and heat pumps as necessary; electricity supply in accordance with the

Swedish Natural Environment Protection Agency's criteria for good environmental choice; waste-water separation and reuse, and district cooling through heat exchange with purified waste water; provision for community-waste sorting at source and vacuum collection of 60% of the total, along with resource recovery for local use as appropriate; transport initiatives as above, etc. However, the commercial viability of the scheme is already under pressure. Its social inclusiveness, its feasibility in relation to the right to personal choice of its inhabitants, and its transferability are questionable. In this regard, an earlier experimental ecological neighbourhood, that of Ladugårdsängen in Örebro (Guinchard, 1997), designed in 1989/90 for 3200 people and 500 businesses in public-private partnership, has to date largely survived commercial and ideological pressures. It continues to deliver successfully on waste and energy use minimisation, and some transport parameters. However, it was suggested to us that it tends to constrain further environmental, social, and economic innovation.

GÖTEBORG

Göteborg (population 450,000) has an industrial past associated with the ferry industry and vehicle manufacturers. Its reinvention of itself as a 'city of ideas' relies to a large extent on maintaining the close relationship between municipality, technological development, and diversifying industry. Its early lead in Sweden in comprehensive planning (Berggrund, 1994) aimed to reconcile what are seen as the contradictory drivers of ecocycles-based sustainability – competitiveness and citizen empowerment (see, for example, CEC, 1996b). The city council's green procurement policy is a key tool, in the (pre-regionalisation) context of 60,000 employees, a procurement budget of SKr7 billion (about 3.5 billion euro), and the potential to influence a wide constituency in the private and community sectors (Göteborg Stad, undated). The procurement department, a municipal company wholly financed through commissions on contracts which works closely with the environment department, develops and administers lists of environmental life-cycle efficiency criteria and approved companies within 250 'fields'. Companies must commit to ongoing improvement through annual reporting, which tends to impact positively on all their business practice. Although initial investment by both the city and private business was high, contract suppliers (often small companies, where growth is needed) have won significant market advantage. Systematic auditing shows unambiguous reductions in the city's environ- mental impacts, through lower resource use in products and packaging, delivery planning, and high-volume supplies. However, the procurement model depends on political commitment and leadership, widely accepted methodology, and a comprehensive strategy of ongoing cross-sectoral research, development, and information dissemination, all of which are costly. In a changing political climate, and in the face of anticompetitiveness legislation from the EU and the dilution of local mutual responsibility (through regionalisation as well as the globalisation of markets), questions arise as to whether its devices and instruments will be strong enough to maintain it. In addition, the population's longer working hours allow less time for the political, environmental, and community activity which has in the past assisted in holding together such policies. Priorities in a developing 'two-thirds' (enfranchised) society are also changing as some districts become impoverished.

MALMÖ

Malmö (population 250,000) is at the forefront of the changes sweeping through Sweden. Its most pressing problem is unemployment, reaching more than 85% in one inner-city neighbourhood amongst immigrant communities. It is the national pathfinder in integrating cultural and socio-economic change with traditional values, and innovative thinking is reflected in the development of the new University College (Malmö Högskola, 1998). A key objective of the college is that it should make a significant contribution to the life of the city, and that its tuition and research should play a crucial part in the transition from a depleted industrial to a modern knowledge-based economy incorporating the highest environmental competencies. Development is publicly funded on publicly owned land on a complex disused shipyard/industrial site in the centre of Malmö, supported in part by parallel commercial development. Ecocycles thinking is being employed in both built-form and curriculum development. The state programme for architecture and form underpins good functional and aesthetic design as well as sound, safe, manageable, and ecologically durable technology, at investment and operating costs appropriate to users' ability to pay. The college is expected to be self-sufficient in heating, with minimal electrical and cooling demands, and to incorporate systems to separate grey and foul water and waste close to source. These in themselves will provide learning tools. The curriculum is characterised by multidisciplinary and interdisciplinary activity. Departments and faculties are replaced by 'fields of training', all at basic, higher, and research levels – for example, technology and economics, art and communication, health and community. Integral to all is a knowledge of Europe, and of issues of equality, gender, ethnicity, environment, and the international context. Comprehensive use of information technology is intended to support rather than replace personal contact. Enabling factors have included strong local political leadership, and good relations between the city council and higher-education policy communities. However, planning and implementation have been very rapid, and thus strongly professional and 'top-down'. The city's industrial, commercial, and local communities generally have been little engaged. This is problematic both because the city is deeply divided socio-economically and politically, and because business remains strongly conservative and tends to demand certain (sectoral) competencies in its potential employees. The extent to which the University College's ambitions can influence significantly the thinking and behaviour of the wider community remains in question.

The city "case studies" described above implementing the national policy framework provide compelling evidence of the progress Sweden has made towards sustainable development. In our analytical work we perceived various needs in our municipality case studies. These included: rebuilding power and trust in a new pluralist frame which can encompass the whole of the sustainable development agenda; strong and long-term leadership which may be able to survive the exigencies of party politics; clear methodologies, programmes, and tools for vertical and horizontal integration in what remains a fragmented 'silo' culture; and a recognition of shifting public, private and community boundaries, so that expertise and experience at all levels in all sectors may be both governed and built upon (Fudge and Rowe, 2001).

PART FOUR
CONCLUDING COMMENTS AND PROPOSITIONS

Following the opening discussion of the definitions and meanings of sustainable development the paper examined world population estimates and urbanisation trends. These demonstrated that the 21st century will be an 'urban century' and that the growth rate of cities in all regions but particularly in Asia and Africa presents major problems in terms of spatial planning, infrastructure, housing, transport and the quality of life. It also leaves governments with major policy questions around the future of growing urban and declining rural populations, significant demographic questions concerning the growing population of the elderly and children in different regions of the world and for the UN and governments' major concerns about global climate change and poverty.

These changes were explored in relation to the European Union where a considerable urban history exists. 'Urban policy', spatial planning and sustainable development are being pursued at European, national and city levels of government within supportive networks with considerable sharing of practice and the sense of being involved in a meta urban sustainable development project.

The paper then examined ecological modernisation in Sweden as a selected case study focusing on the three cities Stockholm, Göteborg and Malmö.

This final concluding discussion aims to directly assist the Winter Cities and the Winter Cities organisation by discussing two issues:

- expand on the emerging policy and management orthodoxy to achieve more sustainable futures for urban areas

- propose some steps for pursuing urban sustainability.

Despite considerable work by towns and cities and by national governments, urban settlements continue to face economic and social problems and environmental degradation and ill-health. New ways of managing the urban environment need to be found so that cities can both solve local problems and contribute to regional and global sustainability. At the same time we are witnessing an urban renaissance in parts of the world and policies for regeneration and renewal can be used to advance the sustainability agenda.

Sustainable development is identified as a much broader concept than environmental protection. It has economic and social as well as cultural, health and environmental dimensions and embraces notions of equity between people in the present and between generations. It implies that further development should only take place within the carrying capacity of natural and social systems. In relation to work on the ecological footprint of cities (Rees 1992) it could be suggested that a sustainable city is one that is attempting to reduce its ecological footprint (Douglas 1995).

A developing argument deriving from discussion of these principles is that sustainable development must be planned for and that market forces alone cannot achieve the necessary integration of environmental, social, health and economic concerns. A form of urban management and urban governance is emerging which provides a framework within which innovative approaches to the planning of sustainability can be explored. In this respect, a set of ecological, social, economic, organisational and democratic principles and tools for urban management have been identified, which may be applied in a variety of urban settings and which could be used selectively as cities move from different starting points and different circumstances towards contributing to local and global sustainability. The case study examples from practice across Europe clearly demonstrate an institutional as well as a policy focus. The **capacity** of different levels of government and particularly local government, to deliver sustainability is seen as crucial.

This may require fundamental reviews of the internal structure and working of local authorities and their relationship with their communities, as well as an examination of the relationship between central and local governments. A further dimension is that thinking about cities is undergoing a reappraisal with a return to a view of the city as a complex system requiring a set of tools which can be applied in a range of settings.

Although the system is complex, it is appropriate to seek practical solutions, especially solutions which solve more than one problem at a time, or several solutions that can be used in combination. Illustrative examples of this are numerous - a Sheffield UK example in housing captures the essence of the new approach (Fudge 1995; Price and Tsouros 1996).

The challenge of urban sustainable development, involves both the problems experienced within cities, the problems caused by cities and the potential solutions that cities themselves may provide. Managers of cities, if they are to meet more sustainable futures, must seek to resolve the social, economic, cultural and health needs of urban residents while respecting local, regional and global natural systems; broadly solving problems locally where possible, rather than shifting them to other spatial locations or passing them on to future generations. This prescriptive advice must, however, be interpreted within the complexity of regional and global economic and environmental relationships. This interpretation may raise broader issues about the "production of space" and the "production of nature" (Harvey 1996).

The preceding overview of the changes argued to be necessary to achieve a more sustainable future for cities is both proactive, coherent and potentially radical. However, for it to be implemented a number of deeper questions and issues are raised that must also be addressed.

We have witnessed considerable 'local' changes that support sustainable futures (environmental strategies, recycling, environment centres, Agenda 21 coordinators, Agenda 21 plans, increases in cycling provision etc.) but there seem to be limits to furthering this early progress. First through the limited spread of ideas and ownership of the issues within the population of a city. (Do we have to wait for the next generation?) And second because the next developmental step cannot be accommodated alongside the existing economic functioning and economic relations within and between cities. The next step in other words requires a more fundamental transformation of socio-ecological and political-economic processes and relations both within the locality and potentially at national and global levels.

What then are the next steps in confronting these issues?

My general propositions include:

- concerns of urban management and governance for sustainability are as important as the need for different substantive policies

- local authorities and their communities are crucial constituencies for sustainability but regional and central government frameworks need to be supportive

- ecosystems thinking, particularly notions of resource flows, the recycling of land and buildings, the closing of resource loops, the principles of "resource efficiency" and "circularity" are the keys to adapting existing and designing new urban localities

- networks of actors engaging in this "project" are crucial to avoid duplication, share good practice and support problem solving (see Winter Cities but also European Sustainable Cities and Towns Campaign)

- integration is needed between different sectors - economic, social, health, environmental, cultural; vertically between organisations and their communities; and, horizontally within parts of organisations

- strategic planning and management and infrastructure planning and provision at different spatial levels needs new approaches in terms of political leadership, technical competence, resource allocation and procurement

- conceptual and practical approaches need to be holistic at different spatial scales, not sectoral

- education and awareness needs a strategic plan as well as bottom up initiatives and actions

- partnerships and collaboration between different sectors seem to provide more fruitful opportunities than relying on traditional categories of responsibilities

- demonstration projects are needed so that sustainable approaches can be experienced

- regular measurement of progress towards or away from sustainable futures related to base line data is needed to understand progress and change

- democratic changes are implied through the involvement of communities (e.g. Agenda 21) and other actors

- action research is needed now to support and provide appropriate and timely feedback to practitioners

- longer term developmental and evaluative programmes of research (e.g. Swedish Research Council's sustainability programme) are needed to explore new ways of managing changing cities and evaluating existing policies and practices.

Clearly for Winter Cities a number of requirements are crucial for sustainable futures and indeed survival. These include:

- Reduction in the need to travel
- Compact city and satellite design
- Encourage mixed use developments
- Maximise energy conservation
- Appropriate design of buildings and spaces to maximise winter sun, shelter and enclosed links, and minimise impact of prevailing winds
- Encourage community facilities
- Incorporate sun angles and appropriate orientation in town planning regulations
- Exploit the opportunities for celebrating and enjoying winter – design of parks, skating routes and centres, skiing routes and centres
- Convert conventional lighting to diode lighting
- Use solar power and photovoltaics where possible
- Use combined heat and power and district heating
- Consider production of biogas from sewage for heating and fuel
- Rethink landscape for protection and aesthetics

My final point in this paper is one that William Rees raised with me in the past. In an era of real or implied global environmental change, it may be crucial to reconsider our thinking about urban change. Cities all over the world are in different development phases and in different states of vulnerability to the potential consequences of over consumption and global ecological mismanagement. What happens to urban settlements if the distant sources of food, water, energy etc. are no longer secure - threatened by ecological change, increasing competition, or dwindling supplies?

Rees argues that "To reduce their dependence on external flows, cities and regions may decide to reinvigorate their local and regional natural capital stocks and to promote local fisheries, forests, agriculture etc. Perhaps it is time to think of cities as whole systems, to include the entire supportive hinterland. Even if this is seen as too great a conceptual leap, there is much that can be done and is being done all over the world towards this approach. However, whether we define cities with or without their hinterland or whether we argue strongly for concentrated urban forms or looser sustainable lattices in regions the best designed cities and most sensitively managed and governed cities cannot be sustainable if the inhabitants live unsustainable lifestyles." (Rees, 1998)

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