

# Eco Urbanism.

**Herbert Girardet**

Issues of Sustainability – Sustainable Cities

Introducing Herbert Girardet at a recent lecture in Sydney, Professor Peter Droege suggested that Girardet had come to bid farewell to an old friend – fossil fuels – and to welcome a new friend – solar cities. Herbert Girardet is an ecologist, writer and broadcaster who has authored seven books, including *Creating Sustainable Cities*. He is an honorary fellow of the RIBA.

The illustrated case studies, referred to by Girardet in his talk, are by British architect Bill Dunster. Lindsay Johnston has transcribed extracts from Herbert Girardet's lecture.

■ We love the interplay between people that occurs in cities. They are the stage on which so many of us act out our lives. The question is, can we make them less harmful with regard to their environmental impact? Cities are immensely demanding on energy. The challenge is to make them less harmful in the future and to create cities running on renewable energy systems in the 21st century.

■ We have experienced an extraordinary global process of urbanisation. In 1800 there were only two cities in the world with a population of more than one million people – London and Beijing – and the world's 100 largest cities had a total population of 20 million. In 1990, the world's 100 largest cities accommodated 540 million people. There are now more than 10 cities with over 10 million people and 35 cities with more than five million people – Sydney is one of these.

■ Since 1800, humankind has gained access to the Earth's crust enabling the draw down of fossil fuels and in turn the development of metals to dig deeper and deeper. This has allowed us to become a completely different species than we were for thousands of years. We have had available to us huge amounts of energy and mineral resources that have allowed us to develop sophisticated infrastructures and communication systems to which we have now become accustomed.

■ Today we do not live in a civilisation, we live in a 'globalisation' – globalisation of resources, globalisation of humanity. We have become completely new creatures in terms of the demands that we make upon the planet, the energy we consume and the sheer distances that we can travel. In many ways that's wonderful – but it is also now evident that our individual lives are increasingly unsustainable.

■ Looking at the cityscapes of the 20th century, the types of buildings and the type

of urban sprawl would be functionally impossible without the use of oodles and oodles of fossil fuel. We are consuming the Earth's fossil fuel resources one million times faster than they were created. Every year we burn something like a million year's worth of fossil fuel to support these urban structures and the transportation systems that bind them together. Most of the world's energy resources are consumed in cities or their transportation systems.

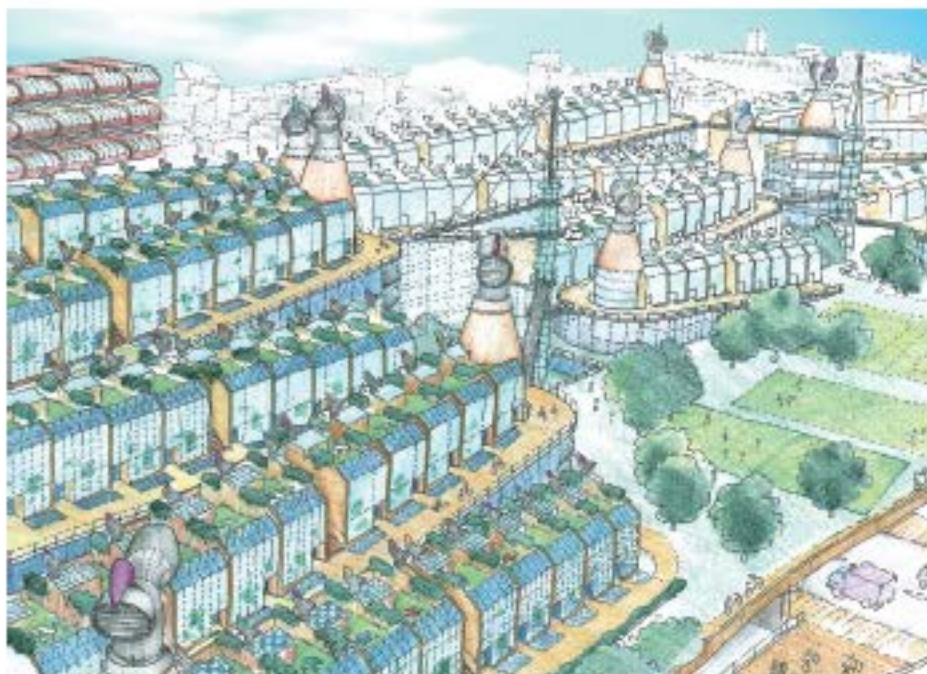
■ Everybody wants to be part of this globalisation. The level of consumption of fossil fuel resources that we took for granted in Europe and the US is being copied in developing countries with huge populations. Cities in the developing world now look like New York and the buildings and transport systems depend on fossil fuels. Everybody wants status symbols – a new flashy building and a new flashy car, the labels or symbols of our lives – and we need to address the associated resource utilisation and sustainability. Do we need to dig deeper into the Earth's crust to provide the resources? Is it acceptable that we fill containers with consumable goods and transport them half way across the world to be used for a couple of weeks and end up as landfill?

■ I flew over a forest fire in the Amazon the size of Ireland or Tasmania, set to clear the forest and create a cattle ranch, even though the soil is not suited to it – direct conversion of land use to meet urban and global demand for food. Or indirect conversion of forest into a soya grain field in order to produce enormous amounts of soya beans to feed animals on the other side of the world to meet new markets for beef.

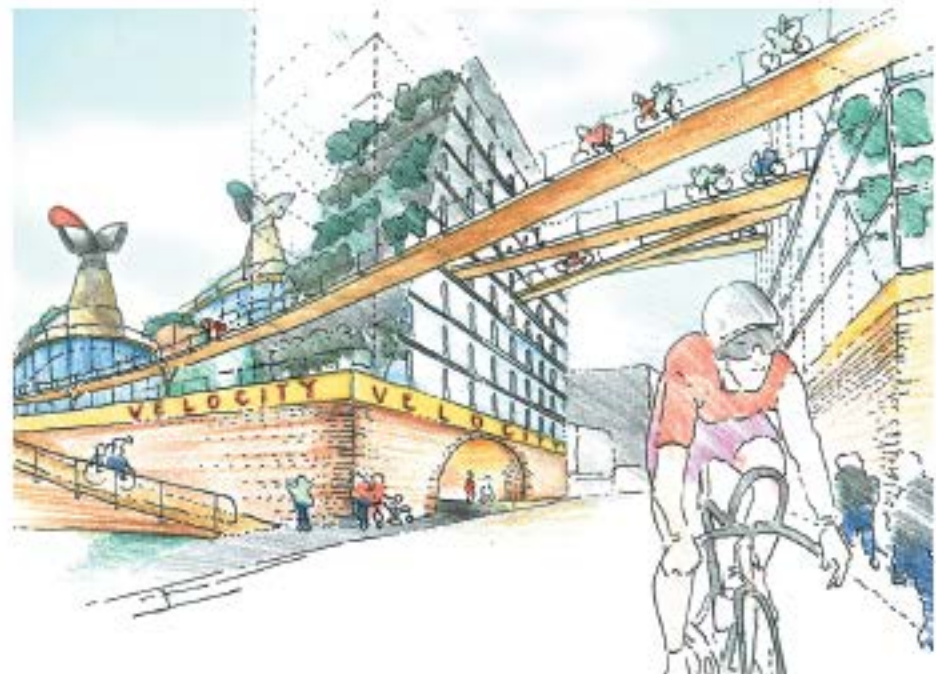
■ These are processes that have to do with the 'ecological footprint' of cities, a term used by Canadian economists Rees and Wackernagel to describe the land area needed to support our cities and our urban lifestyles. Can these demands of our cities for resources from somewhere else be reduced in the future? Can we find a way of reducing the footprint of cities on the global landscape?



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**01** Wind vane: dominate the "Velocity" skyline and ventilate workspaces with heat recovery systems. Access towers, with communal bike lifts, support tall flues to disperse emissions from the bio-diesel

burners. The city block has become a small hill town, with housing facing the sun and workspaces, with high IT, on the shaded side.

**02** Aerial view of "Velocity" showing hillside streets where dense urban renewal combines residential, commercial and light industrial uses. Residences have roof terraces and sun spaces, there is a car

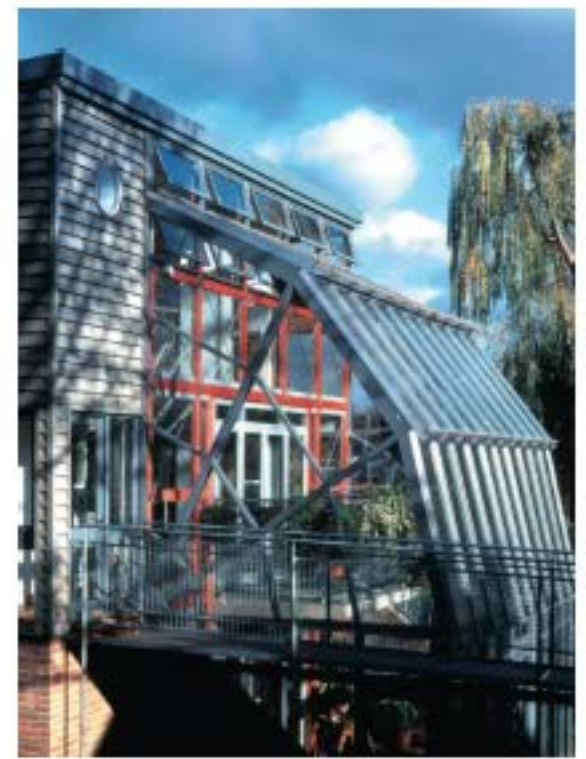


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- A more important question is the ability of the biosphere to support us in the future with this sort of destruction. A recent study on what has happened to the natural world over the past 30 years found that, in the 30 years, one third of the Earth's species, one third of the natural world, has disappeared primarily as a result of the demands of our cities.
- As well as the issue of resources going into our cities, there is the issue of the waste coming out the other end – solid waste in the form of garbage often going to landfill, effluent going to our rivers and seas and carbon and other emissions into the atmosphere. It is not only the sewage from the cities themselves that is a problem, but from the farmland feeding the city, which has been covered with artificial fertilisers. Most cities in the world can't be bothered to find ways to redirect the sewage back to the land as fertiliser, which is ultimately the only sustainable way to run an urban system.
- Then there is atmospheric pollution and global warming. Over the past 150 years or so we have added 30 percent to the overall quantity of carbon dioxide in the atmosphere. There is scientific consensus now on the impact of this on climate change and, although there are a few voices who disagree – Governments and oil companies were saying it was not really an issue – very few people now are voicing that opinion. Can we address climate change by active and deliberate policy methods to switch to renewable energy systems in the future?
- Thus the definition of 'sustainability' is the essential need to look at what we are doing to the future, in our present lives. We are not only affecting our future but also the viability of nature as a whole that is, after all, the host to our lives – all of our lives. Considering the ecological footprint of cities, there are three different categories of impact. One is the area required to feed the city, another the area required to supply the city with resources and products and the third is the actual area that would be required to reabsorb the effluent and emissions from the city. The CO<sub>2</sub> output of a city may have to be absorbed by growing forests. It is projected that London's ecological footprint is roughly the size of all of Britain. In a world of cities, if all the world's major cities copy the lifestyle of London, New York, or Sydney, Rees and Wackernagel estimate that we will need three planets – not one, but three planets – to sustain our human habitation.
- We have to look at the metabolism of cities, taking the city as a super-organism in terms of resource use. Currently our cities have an essentially linear metabolism with goods, water, fuel, resources and food going in, and then coming out as waste materials at the other end. The key concept for the future is how to convert this linear metabolism into a loop or cyclical metabolism that minimises resource consumption and reduces waste.
- It is no longer pie in the sky to think in these terms. Since the Rio Earth Summit in 1992, there have been a lot of initiatives, a lot of thinking, particularly under the auspices of Agenda 21, the major international treaty signed by the world's nations at that momentous event. Our big problem at the moment is that we are schizophrenic. On the one hand, we are signed up to sustainable development, and on the other we are signed up to economic growth.
- One of the starting points is to measure just how many tonnes of materials are going into our cities and the tonnes of waste that comes out the other end, and to do this with the participation of all people. In the Brazilian city Curitiba they have big signs indicating how many trees are saved each week as a result of the city's recycling mission. These kinds of public displays indicate how policy within the city is translated into reduced environmental impacts.
- In the US major achievements have been made in the field of recycling. For example, pulp mills are no longer built next to forests, but next to cities, because the raw material for new paper accumulates there and it is good to make tomorrow's newspapers out of yesterday's newspapers.
- We have millions of trees in our cities that have to be trimmed and until recently the branches were chucked away. Now, in London, they are being shredded and turned into compost, replacing peat from bogs in Ireland or Scotland that would otherwise have been used in gardens in the suburbs.
- Another initiative of the Brazilian city of Curitiba gets the public in the poorer districts to participate in the recycling of their household waste (the mayor of Curitiba for many years is architect Jamie Lerner – the power of creative thinking! – LJ). The city has given the recycling over to the people themselves to make sure that the neighbourhoods stay clean. The incentive is that residents get free vegetables grown on compost from within the urban agriculture area on the edge of the city, in exchange for their waste.
- In the UK, Bristol turns its entire sewage output from 600,000 people into granules, using large drying pans in rotating drums, and these granules have been used to fertilise the greening of former industrial waste slag heaps in south Wales.



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There are now many prototype buildings around the world that demonstrate that it is possible to run buildings on the power of the sun. In Australia, with abundant sunshine, (we) have the opportunity to become one of the countries taking the lead in the development of solar-powered cities of the 21st century.



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**05 - 07** Hope House has been built as a prototype live/work unit that forms the basis of the 'Bedzed' solar housing now under construction.

**08** Perspective view of mews housing in the 'Bedzed' Beddington Zero Energy Development in south London demonstrating strategies for density, solar access and privacy.

**09** The 'Bedzed' housing profile admits daylight, solar conservatories collect heat and roof mounted wind vents induce natural ventilation.



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■ In Shanghai, one of the ultimate modern cities, they have the remarkable policy of making sure that the vegetables eaten in the city come from the city. The city authorities have ensured that half of the area of the city is set aside for the express purpose of growing vegetables.

■ How can cities, which are primarily the product of the availability of fossil fuels, come up with energy systems to run them on a sustainable basis in the future? There is the 'half-way-house' solution already very widely used, especially in Europe, running on oil, gas or coal but on the other hand making efficient use of passive and solar technology, and the per capita energy consumption is dramatically reduced. The future lies, however, with total renewable energy. There are now many prototype buildings around the world that demonstrate that it is possible to run buildings on the power of the sun. In Australia, with abundant sunshine, you have the opportunity to become one of the countries taking the lead in the development of solar powered cities of the 21st century. Wind power is also a significant option, and although it may not be acceptable to have wind turbines in our cities, wind farms in remote locations have already achieved success – Denmark is supplying 20 percent of its entire electricity from wind power.

■ There are exciting new developments in the transportation sector, which is a major consumer of fossil fuel energy in cities, including vehicles with fuel cell engines. Fuel cell technology is one of the great hopes for our cities in the 21st century, and the possibility is that we cannot only run vehicles on them, but also buildings. Hydrogen can be produced from solar and wind power. We are seeing massive investments in fuel cell technology by major motor companies and even by the company that makes London taxis.

■ An integrated public transport system can be a major factor in reducing the need for private vehicles in cities. The Brazilian city of Curitiba is, again, a wonderful example. Their bus system is comprehensive throughout the city and allows people to get in and out quickly through a loading tube where people pay their ticket in advance. There are different coloured buses taking people on different routes – and residents can exchange travel vouchers for produce and waste – one of the great success stories in urban planning. Pedestrianisation and cycling are efficient forms of transport and we must design our cities to facilitate these – in beautiful cities of the past, pedestrianisation was an essential aspect.

■ How do we plan greater urban density as an alternative to the sprawling cities that are a product of the motor car age? We must achieve greater density without compromising environmental quality. Multi-use high urban density can mean vitality with a convivial environment – a little courtyard with trees for people to enjoy the shade, with cafés and workshops and cinemas, one or two theatres, all scattered within a very dense urban environment. We have also lost the art of making beautiful parks in our cities. Let us allow cities to be the platform for the exchange of ideas and the exchange of fun and enjoyment.

■ And what type of architecture are we going to have in the solar powered sustainable cities of the 21st century? There are many fine examples emerging, especially in Europe. One notable current project in England is the Beddington Zero Energy Project (BEDZED), designed by architect Bill Dunster in Sutton south of London, funded by the Peabody Trust and the London Bio-regional Development Trust, illustrated here. It is a solar village for 300 people on the site of a former power station with many innovative environmental features. It will be a major contributor to the perception that the new kind of architecture – solar architecture – is possible.

■ Dunster has also authored a number of solar concept projects, including 'Velocity' – the bicycle-based urban redevelopment project for central London, also illustrated here.

■ The environmental imperative is a critical one. We have to get to grips with the metabolism of cities, turning them from a linear process – consuming resources and generating waste – to something cyclical – renewable resources and recycling waste – and thus reducing their ecological footprint in the process. This we must do, so that we may enjoy this century, and beyond, in cities that have a proper fit with the available resources of the planet, taking no more than the Earth can afford to give.

Information on Herbert Girardet's book *Creating Sustainable Cities* can be found at [www.schumacher.org.uk/briefing2](http://www.schumacher.org.uk/briefing2) and *The Gaia Atlas of Cities* at [www.oneworld.org/guides/thecity](http://www.oneworld.org/guides/thecity)

Bill Dunster's Bedzed and Velocity projects can be seen at [www.zedfactory.com](http://www.zedfactory.com)

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