Parliamentary Inquiry: Sustainable Cities 2025

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October 2003

Introduction

Garry Lawrence[1] has argued that sustainability is not in doubt. What is quite uncertain is how humans will survive, how they will live and what quality of life they will enjoy. Cities and their performance are at the heart of this challenge. How to confront this situation is the question before the Parliamentary Inquiry.

Humans, like all other species, have to live in a dynamic interactive relationship with the environment. What they do affects the environment and the environment sets the context within which they live and act. Whatever we do, we have to live with the environmental consequences. In this sense we have to choose. We have to choose futures that can be supported by the environment and we have to sustain ourselves as we go.

Interest in sustainability emerged in the '60's and 70's over concerns about population growth, increasing levels of consumption, the depletion of non-renewable resources and the release of waste products that were toxic or disruptive to the environment. The former were most notably associated with the availability of oil and the latter with ecosystem disruption and acid rain. Though it could not have been described at that time in these terms we were recognising the depletion of the Natural Capital[2] of Space Ship Earth[3].

The Nature of the Challenge

Over recent years the environmental agenda has gradually changed. There is far less emphasis on running out of resources and much more concern about the consequences of using resources. The interconnectedness of the systems of the biosphere is much more widely understood. It has also been realised that a broader socio-economic and cultural approach to sustainability is needed. This new approach in no way plays down the gravity of the underlying environmental challenge. It does recognise, however, that for humans to progress to sustainable futures requires human society, or what might be described as the human enterprise, to keep operating in a coherent and purposeful way. It is only through this ongoing and coherent pattern of human activity that sustainable outcomes may be achieved.

Triple-bottom-line accounting has become the usual description for this approach. It signifies that we need environmental sustainability, social sustainability and economic sustainability at all stages. Sometimes we now hear this concept being extended to quadruple-bottom-line. Governance is

emerging as a key issue and one requiring significant reappraisal and redevelopment. The Parliamentary Inquiry should be considering triple-bottom-line and governance as a central issue in achieving sustainable cities.

Cities and Sustainability

Until recently the connection between cities and sustainability was hardly recognised. Cities were seen as consuming economic resources, not producing any tradeable product, and, no more than marginal to the main issues of our time. This has proved to be a serious misunderstanding and especially so in relation to our future well-being and sustainability.

Alongside this rather negative view it has been recognised that cities have served as great engines of innovation and economic development. What is less often recognised is that they have also been, and continue to be, powerful engines of environmental degradation and destruction. Here is the great conundrum and here too is the challenge that now presents itself to the Parliamentary Inquiry. On the one hand our cities support our success, and, on the other, their current structures and patterns of operation threaten our very survival. Far from being marginal to our purposes cities are the context within which we may aspire to and achieve sustainable futures.

At the core of the challenge is how we live. Sustainability is about sustainable living and how the cumulative effects of such patterns of living are to be supported on a continuing and sustainable basis into the future. Creating sustainable futures is therefore predicated upon visions of sustainable living. Such visions must be accompanied by a clear understanding of the supporting tools and equipment that will be needed. It is this operating relationship between humans and their support systems that is the subject of this inquiry. The criterion of sustainability challenges us to invent and bring into being operating relationships that are compatible with the life supporting systems of the local environment and the biosphere.

This requires re-imagining and redeveloping our patterns of living so that they fall within our the criteria sustainability, and in addition, designing and bringing into being the physical, social and economic systems that will be needed to support these patterns in a continuing and always sustainable way far into the future.

This view causes us to focus on our stock of life supporting equipment. The Australian Bureau of Statistics has investigated Australia's capital stock[4]. The finding was that approximately 30% our accumulated capital stock was in the form of housing, 45% in non-housing and infrastructure, with the remainder in other forms of equipment. Our built environment was therefore 75% of our formed capital; this did not include much of the vehicle fleet, rolling stock, and numerous other capital items that are demonstrably essential for the operation of our present built environment system.

As we might expect, the figures are extremely stable with only very small changes occurring over the three-year interval between surveys[5]. Since the stock is dominated by buildings and infrastructure, and since the stock is large in relation to our capacity to form and re-form capital, only slow changes in the stock are possible[6].

The message is that change for the better, in so far as it depends on changes in the physical form and operating characteristics of our cities and other settlements, will inevitably be slow.

Cities as Operating Systems

In their day-to-day operation and in fulfilling their life supporting role cities operate as dissipative structures[7]. That is, they require a continuing flow of energy and materials. They have inputs and they have outputs. Overall they conform to the laws of thermodynamics. Energy and material is neither created nor lost. As materials and energy are transformed the required goods and services are produced and delivered. Overall, however, there is a reduction in order (which we may recognise as an increase in chaos).

This process of materials and energy undergoing transformation can usefully be considered as a metabolic process. Some of this is the normal metabolism that we associate with all biological organisms. A great deal of it, however, is the processing of materials and energy through our machines and equipment. This has been well described by Prof Stephen Boyden of ANU as techno-metabolism to signify that it is part of an overall metabolic process but it is operated through technology rather than organisms[8].

Modern humans are now totally dependent for their very survival on techno-metabolic processes. It is this relatively new human phenomenon, wholly dependent upon techno-metabolism, that now operates within the biosphere. Cities, the home territory of these modern humans, are to be seen as vast metabolisers (or digesters) of materials and energy operating in support of human life styles. Only if we confront this reality can we begin to envisage sustainable futures and the sustainable cities that we will need.

Criteria of Sustainability

There can be no simple definition of life styles or life supporting systems that would be sustainable in the long to very long term. Inevitably sustainability becomes a geo-political question that has to deal with the equitable distribution of access to the life supporting services that the global commons and natural capital provide. Such is the complex high level of interdependence within the biosphere that this is not even a simple question of distribution within the human population. Eventually we will have to come to some accommodation within our human community and with all the living systems of the biosphere. If this seem all too difficult and outside the terms of reference of the Parliamentary Inquiry, what can be said?

To get some understanding of the scale of the issues with which we are dealing we may start by envisaging a human population that operates within a carbon budget that would maintain a sustainable relationship with the atmosphere. This is not to suggest that the greenhouse effect is the only or even over-riding issue; rather, it is to recognise it as illustrative of our situation. Our current information suggests that to stabilise the carbon dioxide levels of the atmosphere at present levels (that are believed to be already significantly increased through human activities) would require an overall reduction of 60% in carbon dioxide emissions. There are, however, very substantial difference between humans in how much carbon dioxide is needed to support their particular way of life. The great majority of the population survive while using only small amounts of fossil fuel. They are already clamouring for additional goods and services, including better nutrition, that, using present or foreseeable technologies, would require substantial increases in their fossil fuel dependence and the corresponding increases in their release of carbon dioxide. If we were to envisage a situation in which access to the services of a stabilised atmosphere were to be equally distributed the technologically developed world would have to reduce its release of carbon dioxide by about 90%. All of this without population growth: when we know very well that some growth in population is virtually inevitable.

We could do the same with soil and ask how we could feed ourselves without destroying or using up the soils that ultimately support us. Again, even to maintain the status quo we would need to make spectacular changes in the way that we operate. Similar arguments could be advanced for water and the oceans or for biodiversity. The situation reminds us of Kenneth Boulding's observation that we live on Space Ship Earth. The challenge is to live within the limits of the support systems that Space Ship Earth can provide. Inevitably equity and environmental issues are inextricable intertwined.

The message for cities is that sustainability can not be achieved by any one city or by the collective actions of the cities of any nation. Badly operating cities can destroy the systems that support the rest of the human enterprise and its cities. There will be no sustainability so long as any major element of the human enterprise is operating unsustainably. The interdependence and scale of the issues involved requires global equity in access to the services of the global commons.

This idea of interdependence between environmental and societal issues is encapsulated in the concept of the triple-bottom-line i.e. economic, social and environmental accounting and accountability. In the context of the Parliamentary Inquiry it is also appropriate to refer to a growing body of opinion that would have us adopt a quadruple-bottom-line approach. The argument is that our systems of governance (at all levels from the micro-community to the global systems) must also be held to account and

recognised as an essential arena of reform if sustainable futures are to be achieved.

There are now hundreds of definitions of sustainability. Choosing any one provides very little help in identifying what to do now. Taken together, however, they enrich our understanding of our predicament. What emerges is a growing recognition that we are engaged with, and an integral part of, a very complex system: a system that has high levels of interdependence and many complex non-linear relationships[9]. Experience of such systems indicates that we must expect patterns of progression into the future that demonstrate the characteristics of dynamical systems. In turn this provides the basis on which we can form long-term strategies.

Complex Systems

The pervasive message emanating from our understanding of complex systems is that such systems are inherently non-deterministic. That is, they are not predictable in any simple intuitive sense. They have the potential to behave in ways that are inherently unpredictable. Prescriptive strategies, blue prints and master plans are therefore, at best suspect, probably irrelevant, and at worst disastrous. However disquieting it may be, the reality is that we will have to operate with the uncertainty that is inherent in the complex system in which we live and of which we are a part.

This is not, of course, to argue that we have no role to play in shaping the future. Complex systems are the product of the activities of their participants. Active participation by the community is therefore the mode of engagement. Progressing into a sustainable future and the development of sustainable cities is an ongoing recursive pattern of investigation, decision making, and, management activity.

Expecting the Unexpected

It is in the nature of complex systems that they are not predictable in any simple mechanistic sense. The reasons for this are now well know. It derives directly from their internal non-linear interdependencies. Just how such a system will react under the influence of perturbations cannot be fully determined. It is not merely unknown; it is inherently unknowable. What we can expect, at least sometimes, is the unexpected. The theory also forewarns us that we can also expect that there will be rather sudden unforeseen changes.

We do know that all systems that operate within a turbulent environment - and this includes the natural, economic and social environment, together with our urban systems - experience perturbations. Since our cities are essential elements of our life support systems it is therefore important to consider how they may behave when exposed to change. Recent practical evidence of electric power shutdowns in the east coast of the US, in London

and in Italy, together with the consequential break-down of other services such as telephones, water supplies, emergency health services, and transport, suggests that they may behave badly.

The emergence of national and international terrorism adds a significant new dimension to the problem. Firstly it increases the range of potential physical perturbations (such as arise from the deliberate destruction of equipment) but perhaps more importantly it greatly increases the risks that the information systems on which all our major life supporting systems are increasingly dependent can be corrupted in ways that could bring the operation of our cities and our life supporting systems to a stand still. A recent cover story in The Age[10] illustrates the potential.

This additional insight may serve to confirm the fragility of our current urban systems and thus the fragility of urban life as it is presently operated. It hardly needs saying that we should have life support systems that are robust and about which we have confidence. That is, we need all the essential elements of our life supporting systems to operate in such a way that they can experience and absorb perturbations while still maintaining at least basic services. We need safe and assured access to food, water, shelter, health services, work, education, recreation, and so on, and, we need the physical and organisational systems that can deliver all of these and more in a secure and reliable way.

The network of interdependencies on which our current systems rely is also the source of the fragility of the system itself. Clearly there are advantages that have been acquired through increasing interdependence. We have been slow to recognise however that this has also brought with it the system fragility that we are now beginning to recognise.

Safety, security and reliability of life supporting services are core aspects of sustainable cities. They should be a powerful influence on how we transform our cities in support of sustainable futures. They must therefore be guiding principles for the Parliamentary Inquiry. The challenge facing the Parliamentary Inquiry is how to respond. What should be done to acquire the safe secure and reliable systems that all would agree are highly desirable?

A typical first response is (to borrow a term from the military) to “harden” and defend our present systems. Within this approach we do what we can to protect them from perturbations and to make them more resilient to perturbations when they occur. There are situations in which this is technically, economically, and politically realistic but others where this would not apply.

A more strategic approach is to develop our highest priority life support systems in ways that reduce their susceptibility to major disruption. Essentially this leads to the view that we need a reorganisation of our system of interdependence such that we can limit the risks of cascade effects running

through large systems. It is an argument for networks of locally self-reliant and therefore robust systems. Lest there be misunderstanding this is not an argument for isolation or self-sufficiency. Rather the reverse: it is an argument that there should be active participation in large scale networks where this networking delivers benefits without exposing communities to the high risks associate with large scale hierarchical systems.

It is for the Parliamentary Inquiry to assess priorities across the range of life supporting systems; a preliminary listing has already been suggested. A strategic approach to security, sustainability and robustness should be an integral aspect of their recommendations.

The Time Framework

We have seen that our capacity to change the life supporting systems of the built environment is very limited and that, avoiding catastrophe, major change will inevitably take a long time. We have also recognised that the scale of change that is required for sustainable relationship within the human community and with the wider systems of the biosphere are also very large. The practical reality is that if we do succeed in achieving sustainability it will not be for some considerable time.

The environmental problem, and consequently the sustainability challenge, is inherently time dependent. Almost every element is changing over time (population growth, depletion of oil and gas resources, soil erosion, loss of biodiversity, depletion of fish stocks – indeed the ongoing degradation of natural capital). Time, on the other hand has no substitute. With almost everything else there is some potential for substitution (aluminium for copper: gas for oil: one food for another, and so on.) We have the use of time only once. We either use it well or lose it. In this context it is arguable that time is our most critical non-renewable resource. Our action to find some new working relationship with the systems of the biosphere is therefore working in this dynamic time framework. Essentially time is running out. The longer we delay the more difficult it will be or the less satisfactory will be the outcome.

There are two possible responses to this long time horizon. By far the most popular is to do nothing in the short term. Meanwhile the situation gets worse and the time available for action is lost and once lost it, and, the opportunities inherent in it, are never recovered. The alternative is to recognise that the scale of the changes that are needed, and, the time that will be required to achieve them in an orderly way render the matter urgent. We are dealing with, and operating within, a dynamical system where the challenge is to participate within the time frame of the system itself as it continues to evolve. The Parliamentary Inquiry has the opportunity to raise public awareness of the time scale within which we are operating and the urgency with which we should be confronting the challenge of making our cities and life support systems sustainable.

Victim, Villain and White Knight[11]

The challenge of cities can well be summarised by this short phrase. Although originally developed around the idea of the enhanced greenhouse effect and climate change it applies equally to many aspects of the role of cities within the socio-economic and environmental challenge. With climate change cities will be victims of that change. Having been created for one set of conditions they will have to operate in changed conditions for which they may not be well suited. In this sense they will be victims of change.

It has already been argued that cities are also a major cause of environmental damage. They are major processors of carbon and producers of carbon dioxide. (One could re-write this statement to encompass air quality, depletion and pollution of water systems, loss of soil or biodiversity, or, depletion and degradation of non-renewable resources.) In this sense cities are the cause of the problem and can therefore rightly be described as the villain.

Such is the scale of and involvement of our cities and our built environment it is not possible to conceive of any resolution of the present conundrum except that they become part of the solution. Thus, they must transform themselves and their operation so as to become the white knight[12].

New Works – Old Stock

The terms of reference of the Parliamentary inquiry identify two major areas for attention: new buildings and urban growth. These are, of course, important issues but they focus attention on the opportunities that are attendant upon new constructions, be they new urban infill, or, densification project, or, the new construction that continues (and is expected to continue for some considerable time) at the urban fringe. All of this is fine and good, but the Parliamentary Inquiry should take care that this focus does not deflect attention from other important issues, challenges and opportunities.

There are structural inertia issues operating within our cities and more extensively throughout our built environment systems. These are self-perpetuating unless there is in place some specific vision and corresponding plan of action that nurtures alternatives. The economics usually mean that it is cheaper to plug into existing systems than to introduce alternatives. This is in part simple arithmetic but it is also compounded by business strategies that seek to protect the continued use of existing structures and infrastructure. It pays the established interests to keep competitors and alternative technologies out of the market. Having written down or written off their capital costs they can therefore offer very low cost service at the margin thus undercutting new, and ultimately competing, technologies that have to carry all their capital costs in full. This situation raises important

questions for governments that hold responsibility to promote long term societal well being.

The Geddes Approach

Sir Patrick Geddes was a key figure in the development of modern thinking about town planning. About a century ago he realised that to change towns and cities was firstly a question of changing the stock and its operating characteristics, secondly, that this would be difficult, and, thirdly that it was bound to be slow. He also recognised that benefits from change were needed quickly if political and financial support were to be mobilised. His proposition was that we should engage in what he called 'conservative surgery.' He looked for relatively small changes that could have far reaching major generative effects. His message remains sound and could be a guiding objective for the Parliamentary Inquiry. We need to promote changes and interventions that in themselves are relatively small but that will cause or lead to disproportionate improvement of the environmental and triple-bottom-line performance of the built environment stock.

Re-Using and Retro-fitting Cities

Because of the scale of cities and the huge proportion of our capital that is already invested in them the cities of the future will be in large measure the cities that we currently have. We do not have a choice of cites. We cannot abandon one and move into some alternative city. Our principle opportunity to shape the future is through the cities that we have.

Some changes, and indeed improvements, in social, economic and environmental performance may be available with little or no change to our equipment. We may simply use what we have in different ways. Rather than new capital or modification of existing capital we may be able to generate benefits and improve sustainability through new visions of how to use what we have. The Parliamentary Inquiry should encourage reassessment of how we use our buildings and cities and other capital assets. It should also encourage those small interventions that may be able to open up new possibilities for improved social, economic and environmental performance.

Even so, cities are endlessly being altered and extended. This activity represents the opportunity to modify the overall environmental performance of our built environment stock. Conventionally it has been considered to be almost impossible to shape this process to societal purposes. It has been considered somewhat autonomous as the accumulated outcome of numerous private decisions. Regulation and some limited level of land use planning have set the bounding constraints within which this otherwise autonomous activity has proceeded.

In the remarkably different context within which we recognise sustainability (and the corresponding threat of non-sustainability) as a real issue significant changes in how we operate these regulatory systems are to be expected.

It is not too much of an exaggeration to suggest that our building regulations have resulted in the production of buildings of a quality and performance that is the lowest that the regulations permit. In this sense the regulations define the worst possible building that it is legal to construct.

Turning to planning, the only major section of planning legislation that it has been practical to operate consistently over long periods has been land use zoning. Essentially zoning has been used to separate out and locate in different areas the various elements of the urban and peri-urban life supporting system. In terms of generating environmentally sustainable life styles, or life styles that are not in thrall to motorised transport, this is inherently a false direction. The Parliamentary Inquiry should focus on mechanisms through which it can encourage and promote local comprehensiveness and complementarity of life supporting systems.

The mechanism promoted by the Parliamentary Inquiry should encourage rather than constrain. It should promote attractive visions of sustainable urban futures and it should propose mechanisms that will ensure that benefits flow from good environmental performance and correspondingly that dis-benefits attach to poor environmental performance.

Where Matters

Estate agents never tire of telling us that location is everything. This focuses attention on the price of property but it also reminds us that value is generated by access to services and amenities. Good access to clean water, safe disposal of wastes, food, shopping, schools, work opportunities, parks, infrastructure, recreational and social services, transport systems, and so on, all make for high values.

As we explore how to achieve patterns of living that might be sustainable similar principles apply. The movement of people, materials, and, goods by motorised transport is environmentally damaging. This simple statement might readily be interpreted as identifying motorised transport itself as the cause of environmental damage. While legitimate in itself, this would be to miss much of the social and environmental significance of the statement.

Motorised transport of people is not socially or environmentally benign. Access to motorised transport is never universally available (through age, ability, or wealth.) It therefore has powerful socially divisive or distributive effects that provide access for some and not others. It also has negative consequences for those who engage in non-discretionary travel. It consumes the one resource that is absolutely non-renewable and for which there can be no substitute, namely time. It inevitably creates danger both for those who

travel and those who do not. The direct health implications for the community are significant. And, of course, motorised transport, for whatever purpose, degrades the environment.

As materials move they are typically processed, stored, transformed, and move on along the delivery track. At each stage there is additional environmental impact created, additional materials are involved, buildings and infrastructure are used (and amortised) and there may be some loss. All of this adds up the environmental impact that is attributable to (or embodied within) the final product.

This linear journey through the built environment system is not, however, the whole story. For that the return loop must also be considered and therein lies another set of impacts either as the material is actually returned for re-use or re-cycling or alternatively there are the impacts attributable to it being dumped into the environment as waste. Thus location can be seen as a major determinant of environmental impact. As we separate positions of supply and positions of demand we also increase environmental burden.

The food system is a particularly significant element of urban living and urban environmental impact. Typically as raw food moves from its point of production (where it has already caused some environmental burden) it is transported, stored, processed, packaged, reprocessed, marketed, transported, and so on though to the household. At every stage there is loss and waste and environmental burden. In the household it is re-processed, packaging is to be disposed of, some material is wasted, and some enters the metabolic process - there to be excreted and again transported, thus contaminating water. It is then re-processed and in almost all cases, dumped. Rarely is the nutrient or nutrition loop closed because the location of the production is remote from the location of consumption; it would be uneconomic and environmentally damaging to return it.

We can trace various flows, some of which, like food, operate over a very short period while others such as building materials may operate over periods that extend over many decades. In all cases the opportunities for re-use and re-cycling reduce with distance. Correspondingly, the potential for environmental burden increases.

The conclusion is clear. Location matters. Generally, life supporting systems of spaces, buildings and infrastructure that are locally comprehensive in the services that they provide have the capacity to operate at low levels of environmental impact. Locally self-reliant communities have the potential to be sustainable.

A corollary of this is that we need our settled areas, towns and cities to be locally productive in every sense. They need to have within them local work for local people. They need to provide a comprehensive array of life

supporting services locally. This can also be achieved locally within large urban agglomerations.

This is in sharp contrast to the outcome of zoning policies that separate apart different land uses. Zoning was developed as a method (and perhaps the only available method at the time) of dealing with noxious urban activities. It provided an escape from "the dark satanic mills" and the environmental pollution associated with the industrial revolution. It did not eliminate pollution. It exemplified the maxim: "solution of pollution by dilution". In a sustainable future it will be necessary for all activities to be environmentally safe and mutually compatible.

We can therefore reasonably argue that solving environmental problems by separation or isolation is not and should not be a part of sustainable futures or the cities that will support them. While we are not yet at the stage where all processes are environmental compatible the reality is that an increasing proportion of the built environment elements that support our lives are environmentally clean. This being the case we can and should now establish processes to integrate these life support components at the local level[13].

Because it is a long time since we had locally self-reliant life support systems it is appropriate to remind ourselves of what these services and products are. Water harvesting has been banished to catchments sometimes remote from settled areas but rain falls in cities. As the cities become clean their rainfall can be organised, stored and used for productive purposes. Over recent times our urban and suburban landscapes have become devoted almost exclusively to aesthetics. Another view is that they are well supplied with water (the water supply system is like a fine grained irrigation system if used in that way), have potential access to nutrients from wastes, now enjoy clean air, should be free of toxins, and they are well supplied with educated people with good access to information services. Consequently our urban and suburban areas have substantial capacity to produce a wide variety of foods, fuels, fibres, aesthetic and educational environments, and, opportunities for creative and productive work[14]. The same applies to other aspects of life and life support. Spare capacity, or capacities that could be mobilised, within existing buildings (and suburbia has a great deal of it) afford opportunities to increase local production and thus wealth while also reducing motorised transport and environmental damage. Home working, small local enterprises, rebalancing home and work, local information, repair services and local life support services (that are so badly needed) present the challenge. A guiding principle should be that local communities will be expected to make full use of the built environment and natural environment opportunities that they have available to them. The Parliamentary Inquiry should support these issues and promote the environmental and socio-economic opportunities that they offer. They should ensure that obstacles and over-regulation that may no longer be relevant are removed. They should advocate re-regulation that is supportive of sustainable futures and sustainable cities.

Urban areas enjoy exposure to sunshine, both direct and diffuse, and therefore present opportunities to harvest energy both for thermal purposes (building and water heating) and conversion via various technologies to electricity. Since solar energy is environmentally benign the Parliamentary Inquiry should actively encourage its use. It could do this through recommending that solar access be protected and that there should be "as–of–right" permission to install solar energy collection devices[15].

Green Buildings and Sustainable Cities

Green buildings and sustainable cities are related but they are not the same thing. We certainly need sustainable cities. They are our hope for sustainable futures. Green buildings can be useful contributors. On their own, however, green buildings cannot achieve sustainable futures.

The relationship between buildings and cities is one of interdependence. This was of the interdependencies recognised publicly by the World Congress of Architects meeting in Chicago in 1993. At that congress the International Union of Architects (UIA) committed itself to sustainability through the Chicago Declaration of Interdependence for a Sustainable Future (Chicago World Congress 1993). This declaration has been adopted by the Royal Australian Institute of Architects (RAIA) as the basis for its environmental policy which applies to all RAIA members. As part of its environmental strategy the RAIA initiated Environment Design Guide (EDG) which now operates as a project of the Australian Council of Building Design Professions (BDP). Together these indicate a substantial commitment by the built environment professions to direct their practice in support of sustainable futures.

In 2002 Australia (through EPA Victoria) hosted a UNEP-IETC (International Environmental Technology Centre) charette within their Cites As Sustainable Ecosystems (CASE) programme. The outcome is "The Melbourne Principles for Sustainable Cities[16]". This is now the principle UN document indicating a strategic way forward for cities.

More recently an initiative of the Committee for Melbourne has resulted in the development and adoption of a Sustainable Cities Programme within the United Nations Global Compact[17]. This programme uses "The Melbourne Model: Solving Hard Urban Issues Together" which in turn uses the Melbourne Principles as its guide for urban sustainability.

It would be appropriate for the Parliamentary Inquiry to initiate an Australia-wide review of these two initiatives and proceed to establish a more specific set of Australian Principles for Sustainable Cities. This may in part be a matter of re-badging so as to avoid the principles being perceived as somehow 'belonging' to Melbourne.

Cities as Sustainable Ecosystems (CASE)
UNEP-IETC has established a programme that seeks to establish harmonious and sustainable relations between cities and the wider environment. It draws on the concepts of interactive ecosystems and industrial ecology and seeks to establish the conditions that would allow cities to interact in a sustainable way with the wider environment both locally and globally.

A useful insight arising from the approach is to view cities as "black boxes" with inputs from their surrounding environment and outputs to that environment. The proposition is that sustainability of a city depends on the long-term viability of these transfers. It leads to the notion that the city is itself is to be considered as a participant in the wider environment. Given the interconnected nature of the environment operating as global web of life – the biosphere – there is a persuasive argument that the exchanges (on which sustainability depends) should match or analogue the exchanges of the natural environment. Analogue settlement would therefore simply substitute for, and in its performance mimic, the natural environment that it displaces.

Analogue settlement is a far-reaching conceptual model that is far removed from current practice. It is drawn to the attention of the Parliamentary Inquiry to highlight a vision of long-term sustainability.

The principle of industrial ecology as propounded by Hardin Tibbs[18] applies not only to industry but also to the whole of the life supporting system. There should be no waste. Indeed, as McDonough and Braungart argue in Cradle to Cradle[19], everything is food - for the next stage in an ongoing system of material processing and re-processing. McDonough and Braungart recognise the difficulty that such a proposition entails. In the long run they envisage a society operating on materials that can safely be discharged to the environment which will absorb, re-use, and recycle them. For far into our future, however, there will be materials that cannot be handled in this way. For them McDonough and Braungart point out that these materials should be operated within a closed system where responsibility remains with the producer. The systems that require manufacturers to take back their products at the end of their working life (motor cars in Germany for instance) or the de-gassing of old refrigerators (widely throughout the technologically developed world) are illustrations of such systems. The Parliamentary Inquiry should develop, or support the development of, legislative and regulatory frameworks within which such systems can work.

Codicil:
Care with language.
It is often said that for every complex problem there is a simple solution – that is almost invariably wrong. Sustainability is inherently complex: the sustainability of cities perhaps even more so. It is essential, therefore, to be

extremely caution of simplifications, assumptions or propositions that seem to provide simple, prescriptive, or generalised solutions.

The difficulty of the situation is exacerbated by the fact that everyone in the community is involved in some way or another as a participant using and operating buildings and the built environment. They also have a vested interest in the future of their home place and how change will affect their lives and the lives of their families, friends and successors.

This situation provides motivation to simplify and perhaps over-simplify in the interests of finding common ground or consensus. This is dangerous. The committee should be on its guard.

To illustrate the pitfalls that are built in to our conventional language and assumptions, the terms of reference of the Committee have been reviewed. This reveals some (but by no means all) of the dangers.

1 The environmental and social impacts of sprawling urban development

This is a highly loaded statement that in a variety of ways pre-judges what is good and bad. It certainly anticipates that the inquiry will provide evidence urban development that extends in low-density form beyond the existing urban areas will have negative social and environmental effects (or impacts.) "Sprawl" is a highly pejorative term that should have no place in any genuine exploration of the issues before the committee. The issue for consideration is that urban development will have good or bad social and environmental effects that are entirely dependent on its form and its ongoing, whole–of–life, operating performance.

2 The major determinants of urban settlement patterns and desirable patterns of development for the growth of Australian cities.

It is worth reflecting on the term 'urban settlement pattern'. It readily implies a physical pattern imposed on the landscape. It should carry with it some understanding of 3-dimensions and it identifies physical dimensions. In normal usage it totally ignores the social and environmental processes through which it is created, used, and retro-fitted. It ignores the wider implications of how such a settlement will through it creation and use draw down resources from, and returns wastes to, the wider environment.

The term 'urban settlement' can readily engender the assumption that such areas and populations are somehow independent from non-urban situations, yet, as operating systems they are wholly interactive. Urban settlements are always highly dependent on the hinterlands and natural systems that support them. Their hinterlands and support areas may be, and often are, distributed globally.

Embedded within this topic there is the notion that there may be factors that somehow determine urban settlement patterns. This may be so though such a notion should be treated with caution. The reason is that human settlements are complex dissipative structures and as such are inherently non-deterministic. This tells us that there are no simple fixes. Rather it presents us with the challenge to participate in an ongoing evolving development and redevelopment process.

Whether Australian cities grow as a result of that process depends fundamentally on the nature of our participation. What we choose to do now and in the future may influence but will not determine the outcome. Developing the mind set and systems to deal with inherent uncertainty will characterise any successful societal transition to sustainability.

3 A 'blueprint' for ecologically sustainable patterns of settlement, with particular reference to eco-efficiency and equity in the provision of services and infrastructure.

Here we see the underlying assumption that we are dealing with a deterministic system within which we can take actions that will determine outcomes. It is an assumption that leads historically to disappointment and frustration. Worse, it leads to alienation and disengagement. In so far as blueprint is prescriptive of outcomes it is a term that should be treated with great caution. What is required in its place is perhaps better described as a scenario for sustainable futures.

We should be careful in thinking that we know what infrastructure is appropriate and needed and how the users of such devices are to gain access to the services that it can provide. We should not assume that services will become available through currently conventional methods.

4 Measures to reduce the environmental, social and economic costs of continuing urban expansion.

The implications here are that urban expansion (whatever that means) will indeed continue and that this expansion will entail a reduction in the health and quality of the environment, that it will reduce social quality, and, that it will be a burden on our economy. Further it assumes that it will be possible to achieve sustainability and sustainable futures despite additional degradation of the environment. It may well be that quite the opposite is true and that a different approach is needed.

There is a further assumption that sustainable cities can be achieved through constraining the environmental, social and economic costs of urban growth. Over the twenty year time horizon of the committee's terms of reference little can be achieved even with the most radical measures being applied to urban

expansion. Urban expansion will not be the principal arena of opportunity for pursuing sustainable cities.

5 Mechanisms for the Commonwealth to bring about urban development reform and promote ecologically sustainable patterns of settlement.

There are no patterns of settlement that are ecologically sustainable – unless, of course, we interpret pattern to include the future use, operation, development and redevelopment of the built environment. Physical constructions and the patterns that they produce may be necessary for sustainability but they are certainly not sufficient. To be effective in achieving sustainability and sustainable futures we will require appropriate built environments appropriately operated and managed. The challenge for the committee is to find ways to achieve an effective synthesis between patterns of community behaviour and built environment equipment that will support sustainable and convivial living.

Overview

This review of the terminology used in the terms of reference is to be taken as illustrative. Many more comments could be offered. The fields of architecture, building, urban planning and the sustainability of our built environment are fraught with difficulties and beset with vested interests. In so far as language is one of the important methods of dealing with city and built environment issues we, and the Committee, should be on our guard. It is important to question propositions and reveal hidden agendas.

None of this is to suggest that the Committee will fall into these language traps. Rather, it is to warn that it is all too easy to go along with generalisations and conventional assumptions. It is easy to rely on opinions without investigating vested professional or commercial interests.

It may well be that the success of the committee will ultimately depend on how effective it is in penetrating beyond what passes for popular wisdom.

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Endnotes

[1] Prof. Garry Lawrence , Professor of Sustainable Communities at the University of Seattle and participant in the Sustainable Seattle Project.

[2] Hawken, P., Lovins, A. B. and Lovins, L H., *Natural Capitalism,* Earthscan Publications, London, 1999.

[3] Space Ship Earth is a phrase introduced by Kenneth Boulding and popularised by Buckminster Fuller. See the chapters by Kenneth Boulding in, *Valuing the Earth: Economics, Ecology, Ethics* edited by Herman E. Daly and Kenneth N. Townsend.
-Boulding, "The Economics of the Coming Spaceship Earth," Ch. 16.

[4] Australian Bureau of Statistics, *Australian National Accounts Capital Stock 1988-89,* (Canberra Australian Government Printer: 1990)

[5] The data was collected and published only twice after which the series was discontinued. Even so, because of the stability of the data over the three-year interval, there is every reason to expect that the current situation is not significantly different. It is also thought that a similar distribution of capital stock occurs in other countries even at different levels of economic and technological development.

[6] There can, of course, be massive loss of built environment stock through catastrophes such as earthquake, fire or war.

[7] Prigogine, I. and Nicolis G., *Self-Organization in Non-Equilibrium Systems: From Dissipative Structures to Order Through Fluctuations,* J. Wiley & Sons, New York, 1977

[8] Boyden, Stephen, Dovers, Stephen and Shirlow, Megan. *Our Biosphere Under Threat: Ecological Realities and Australia's Opportunities.* Oxford University Press, Melbourne, 1990.

[9] The work of the Santa Fe Institute has been of vital importance in explaining these ideas of complex systems. A useful introduction to the general theory of complex systems is to be found in Waldrop, Mitchell, *Complexity,* (London: Viking, 1992)

[10] Sue Cant, *Expecting the Unexpected,* The Age, 18th November 2003 and an edited extract from, Verton, D., with Jane Brownlow, *Black Ice: the Invisible Threat of Cyber-Terrorism,* McGraw-Hill Osborne Media, 2003.

[11] Rodger, A and Robertson, G., *Victim, Villain and White Knight,* Proceedings, Australia and New Zealand Solar Energy Society Conference, "Solar 91: energy for a sustainable world," Adelaide, November 1991.

[12] This argument was presented on behalf of the International Union of Architects (by William McDonough and Randolph Croxton) to the Final Preparatory Committee (NY) for the United Nations Conference on Environment and Development (UNCED, Rio de Janeiro, 1992) and then directly to Maurice Strong, the Conference Secretary General, in Melbourne (Allan Rodger) and Auckland (Graeme Robertson). A new chapter on Human Settlements (Chapter 7) was subsequently included in the outcome document from UNCED, Agenda 21.

[13] Care needs to be taken so as not to confuse this proposition with any suggestion of re-creating the past. This is not a negative argument for reversion to some previous state where total environmental burden was low. It is a positive proposition based on current knowledge and opportunities. It is therefore a proposal to go froward into a designed future that has the performance characteristics that are required. That this future may have some similarities to situations that have existed in the past is coincidental.

[14] *Energy Agriculture and the Built Environment*, Ross King (Ed.) Melbourne: Centre for Environmental Studies, University of Melbourne, 1979.

[15] There will be exceptions where this would not be appropriate. Some special heritage buildings or even heritage areas may be excluded from this provision.

[16] UNEP-IETC, *Melbourne Principles for Sustainable Cities*, United Nations Environment Programme Division of Technology Industry and Economics, Integrative Management Series No. 1., Osaka, 2002.

[17] The Committee for Melbourne, *United Nations Global Compact: Cities Programme, The Melbourne Model: Solving Hard Urban Issues Together*, presented by David Teller, The Committee for Melbourne, Melbourne, 2003.

[18] Tibbs, Hardin, Industrial Ecology: An Environmental Agenda for Industry (Arthur D. Little, Inc., 1991, and GBN, 1993).

[19] McDonough, William & Michael Braungart, *Cradle to Cradle: Remaking the Way we Make Things*, North Point Press, New York, 2002.